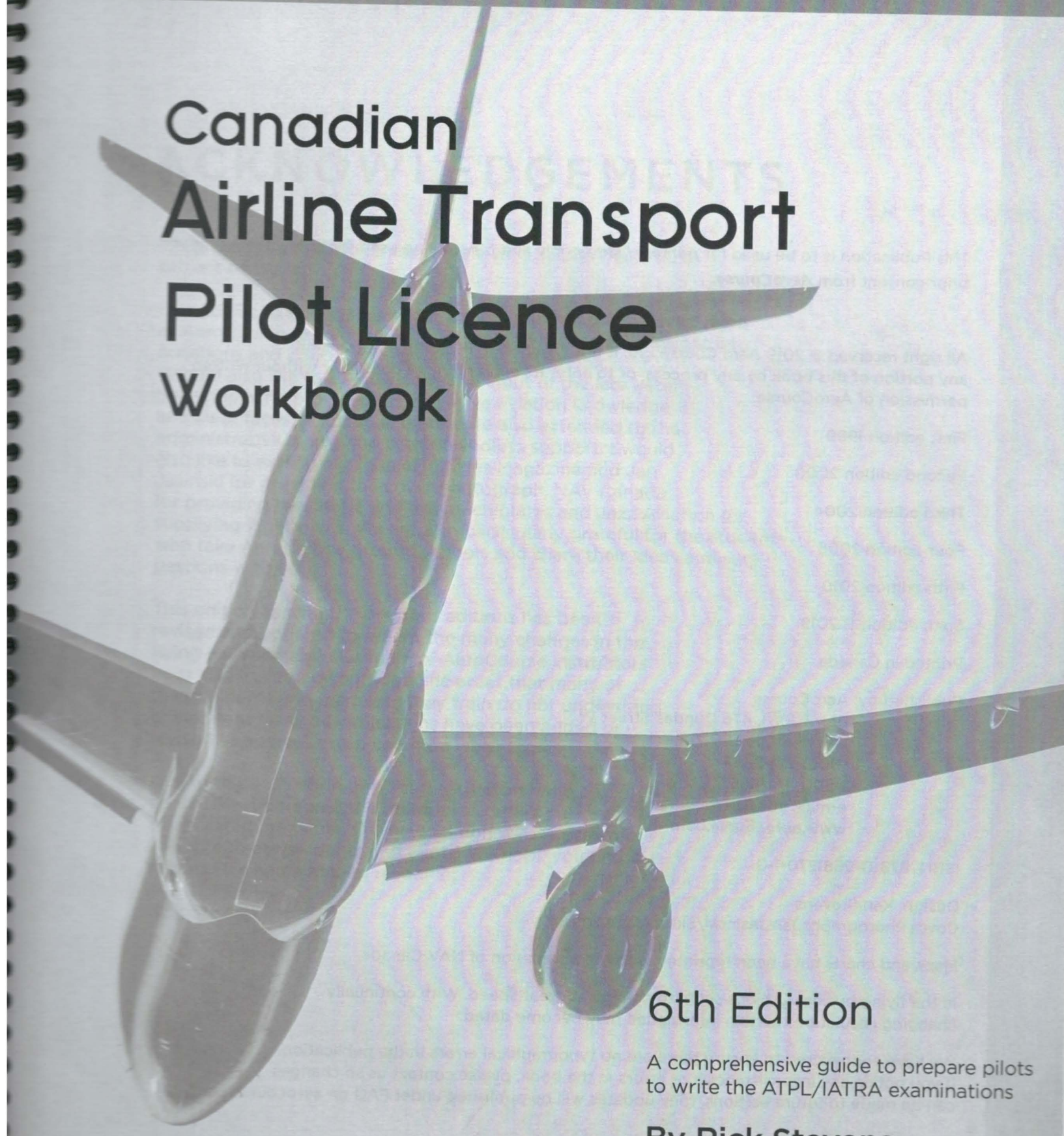
Canadian Airline Transport Pilot Licence Workbook



6th Edition

A comprehensive guide to prepare pilots to write the ATPL/IATRA examinations

By Rick Stevens

AeroCourse

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In the flying business, things seem to change at great speed. With continually changing regulations certain information may become dated.

We have endeavored to ensure there are no typographical errors in the publication. If you notice any inconsistencies or errors in the book, please contact us so changes can be made to future editions. (any updates will be published under FAQ on **aerocourse.com**)

Thank you in advance.

ACKNOWLEDGEMENTS

Many thanks go out to all the people who helped make this project possible.

I would like to express my great appreciation to the teaching team at AeroCourse, who go above and beyond in providing insight into questions and concepts included in this workbook.
I would also like to acknowledge the input of the late Peter Shewring, who provided his extensive aviation knowledge and clear focus. My special thanks are also extended to the administrative team, who provide endless support. I would also like to extend our thanks to Skies Magazine and Jan Jasinski for providing the cover photograph, NAV Canada for providing the charts and approach plates and Jazz Aviation for supplying flight plans. We are also particularly grateful for the students who take AeroCourse ground schools and share their ideas and suggestions with us.

This edition as with the previous editions has been revised and updated to reflect the many changes in the flying environment. Our team of AeroCourse instructors have also identified some specific areas that many of their students and the pilots they train do not understand completely. Many new questions have been added or revised to address these common weak topics.

Due to the dedication of all our instructors, who are continually upgrading the material to reflect current aviation requirements, this new edition will be even more valuable to our students and pilots. We hope you find it informative and a helpful resource.

Rick Stevens

INTRODUCTION

A GUIDE TO THIS WORKBOOK

The ***Canadian Airline Transport Pilot Licence Workbook*** was developed from AeroCourse well-respected ground school seminars. Over several decades, we have assisted thousands of pilots and dispatchers to understand the requirements for and to pass their Transport Canada exams. The material is created specifically to assist students writing the Transport Canada ATPL (SARON, SAMRA) and IATRA exams. This edition is a significant update of content spanning several years of changes to the requirements. It provides a thorough review of the ATPL and IATRA material as well as an introduction to air carrier operations. It embodies the over 30 years of the knowledge, we at AeroCourse, have gained through teaching ATPL, IFR and dispatcher ground schools and flying with Canada's largest airlines.

The material in this workbook has been complied and written by professional pilots, with thousands of hours experience flying the line and training pilots. It is this background and knowledge, which allows us to provide the highest quality of information available in the marketplace. While this workbook is intended to assist in the preparation for the exam process, it goes much further to provide understanding and requirements needed by the airline industry to effectively fly in today's complex aviation environment.

In this edition, there are over 500 theoretical and practical questions, which provide the student with opportunity to gain the confidence and knowledge to arrive at the correct solutions on their Transport Canada exams.

The manual is presented in a format to assist students with their studies, following logically through the requirements. It is divided into six sections arranged based on subject areas, as presented on the Transport Canada exams. Each section covers a specific topic in detail including: Canadian Air Regulations (CARs), air carrier operations, meteorology, radio aids, flight planning, performance, weight & balance, navigation, advanced aircraft systems, and human factors. We suggest reviewing each section in-depth ensuring you arrive at the correct solutions consistently.

We highly recommend attending one of our ground school seminars, where you will both gain a understanding of what is needed on the exams and what is required to fly the line. We know that those who attend have an excellent pass rate as the seminars focus studies on the key areas needed to be successful. We also stronglyrecommend the *Aviation & Meteorology*: *Weather Fundamentals* manual as meteorology continues to be a difficult area for many students.

AeroCourse has been publishing ground school manuals and conducting aviation ground school seminars for over 30 years. We pride ourselves on being leaders in advanced aviation training. Our publications and ground school seminars provide a solid foundation to advance your aviation career. We have added new resources and courses over the years and will continue to do so to provide the best materials to reach your aviation goals.

Check our website for new information and resources - **aerocourse.com**

SECTION HIGHLIGHTS

SECTION 1 – CANADIAN AVIATION REGULATIONS (CARS)

The Canadian Aviation Regulations (CARs) are the rules that govern civil aviation in Canada. This section provides a series of questions to ensurein-depth understanding of the CARs as they pertain to general regulations and airspace, commercial air carrier operations and commercial operating minima.

SECTION 2 – MET GENERAL

It is important for students to have a good understanding of weather theory to help deal with the weather conditions an ATPL pilot is expected to handle when flying the line. This section provides a review of basic weather theory as well as covering advance subjects such as aircraft icing, fog, thunder-storms, jet streams and high altitude meteorology.

SECTION 3 – MET PRACTICAL

In this section, students interpret and analyze examples of a complex weather systems including forecasts, reports and charts. This section also provides examples of various upper level charts as they relate to high altitude meteorology. The weather reports and charts are presented in the same sequences as they appear on the NAV Canada web site. The questions are designed to help the student go through the material in a logical step-by-step manner.

SECTION 4 – RADIO AIDS AND FLIGHT PLANNING

This section of questions covers operating theory and practical applications of VHF/HF communication, ADF, VOR, DME, ILS and GNSS. This section also covers advanced subjects such as INS, IRS/FMS, EFIS, TCAS, GPWS, advanced surveillance systems along with flight planning and oceanic procedures.

SECTION 5 – PERFORMANCE AND WEIGHT & BALANCE

A basic understanding of aircraft performance and weight & balance as it relates to large aircraft is essential for every professional pilot. This section consists of numerous questions on performance theory and actual performance calculations on various charts, graphs and tables as they relate to line operations. This section also includes two weight and balance exercises for practice purposes.

SECTION 6 – FLIGHT OPS GENERAL & HUMAN FACTORS

This section of the manual consists of questions on aircraft systems (engines, hydraulics, pressurization, fuel, electrical, flight controls and wheels/brakes), basic aerodynamics, advanced aerodynamics, human factors and aircraft icing/deicing procedures.

MAPS AND CHARTS

A number of questions contained in the book refer to charts or maps included as references. These charts and maps are to be used for training purposes only and are not to be used for flight planning or navigation

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CANADIAN AVIATION REGULATIONS

CARS General Questions

1. A 41-year old airline transport pilot can maintain a Category 1 Medical Certificate by having:

   a) a medical examination every 6 months, an ECG every 12 months and an audiogram as required.
   b) a medical examination every 12 months, an ECG every 24 months and an audiogram every 5 years.
   c) a medical examination every 6 months, an ECG every 24 months and an audiogram as clinically indicated.
   d) a medical examination every 12 months, an ECG every 12 months and an audiogram as required

2. A 43-year old pilot flying single-pilot VFR in a commercial operation can maintain a Category 1 Medical Certificate by having:

   a) a medical examination every 6 months, an ECG every 12 months and an audiogram as required.
   b) a medical examination every 12 months, an ECG every 24 months and an audiogram every 5 years.
   c) a medical examination every 6 months, an ECG every 24 months and an audiogram as clinically indicated.
   d) a medical examination every 12 months, an ECG every 12 months and an audiogram as required

3. What privileges may be exercised by an ATPL pilot whose Category 1 Medical Certificate expires?

   a) Commercial Pilot privileges.
   b) Private Pilot privileges.
   c) All flying privileges will be immediately suspended.
   d) Recreational Pilot privileges.

4. The minimum number of hours of instrument flying experience that must have been acquired by an applicant for the Airline Transport Licence is:

   a) 25 hours.
   b) 100 hours.
   c) 75 hours.
   d) 50 hours.

5. When the Group 1 instrument rating of an ATPL pilot expires, what licence privileges may then be exercised by that individual?

a) Private Pilot privileges.
b) ATPL Pilot privileges restricted to daytime VFR operations.
c) Student Pilot privileges since the ATPL certificate would be revoked.
d) Commercial Pilot privileges; no PIC privileges on aeroplanes that have a minimum of 2 crew requirement.

6. A LARGE aircraft is a term used to describe which of the following:

a) an aircraft with a maximum certificated take-off weight of more than 5,700 kg or 12,566 lbs.
b) a turbine engined aircraft with a maximum certificated take-off weight of more than 44,000 lbs.
c) an aircraft with a maximum certificated take-off weight of 15,000 kg (33,069 lbs) or more.
d) an aircraft with a maximum certificated take-off weight of 50,000 lbs or more.

7. Which of the following would require the PIC to file a mandatory reportable incident with the Transportation Safety Board?

a) An airport employee sustains serious injury as a result of being directly exposed to jet blast.
b) An unresponsive passenger due to a medical condition requiring approach and landing priority at the destination
c) An aircraft that sustains damage that affects the structural strength of the aircraft.
d) A shortage of fuel requiring approach and landing priority at the destination.

8. How soon after an aircraft accident should the relevant information pertaining to its occurrence be reported to the Transportation Safety Board of Canada?

a) Within 7 days and by registered mail.
b) As soon as possible and by the quickest means of communication available.
c) Within 10 days and by telephone.
d) Within 24 hours and either by telephone or email.

9. Any aircraft that has been involved in an accident causing death or injury may not be moved or interfered with in any way in order to_____ without first obtaining permission from the Minister. The missing words are:

a) remove the Aircraft Journey Log.
b) avoid danger to any person or property.
c) extricate a person.
d) prevent destruction by fire.

10. Pilots of IFR aircraft operating within controlled or uncontrolled high level airspace shall, unless otherwise instructed by ATC, adjust their transponder to reply on Mode A, Code:

a) 1000 and on Mode C.
b) 1500 and on Mode C.
c) 2000 and on Mode C.
d) 3000 and on Mode C.

11. In a climb to a cruise altitude above 12,500 feet ASL on a VFR flight, what code(s) would a pilot set on his/her transponder?

a) 1200 until the aircraft leaves 12,500 feet ASL in the climb and then to code 1400 for operation above that altitude.
b) 1000 until the aircraft climbs above 12,500 feet ASL and then to code to 2000.
c) 1200 until the aircraft has reached its cruising altitude and then code 1400.
d) 1200 until the aircraft reaches 12,500 feet ASL and then to code 1000 for operation above that altitude.

12. An aircraft that had been using Code 7500 on its transponder subsequently changes to code 7700. This sequence of transponder operation would indicate that:

a) the aircraft had developed an unrelated emergency following the unlawful interference.
b) the aircraft is threatened by grave and imminent danger and requires immediate assistance.
c) the aircraft is unable to transmit any ETA's and changes to planned destination following unlawful interference.
d) the pilot is making every effort to inform ATC of how serious this hijack situation is by using this code sequence to activate their radar monitor alarm systems.

13. A serviceable transponder with automatic pressure-altitude reporting equipment is required by all aircraft that intend to operate within:

a) the Canadian high level airspace.
b) all Class A, B and C airspace as well as within any Class D or E airspace that has been specified as transponder airspace.
c) any controlled low level airspace above 9,500 feet ASL.
d) all Class B, C and D airspace and within any active Restricted airspace.

14. As a measure of enhancing safety, a pilot should adjust the aircraft transponder to reply on Mode A, Code 1000, plus Mode C (if available) for which of the following occasions?

a) A VFR flight along a low level airway above 12,500 feet ASL.
b) An IFR flight that is operating at FL180 or above and for which ATC has not assigned a transponder code.
c) A VFR flight that is operating within the Canadian ADIZ.
d) An IFR flight along a low level Air Route.

15. Determination of the appropriate altitude for cruising flight in the Northern Domestic Airspace is based on the aircraft's:

a) magnetic heading.
b) true heading.
c) magnetic track.
d) true track.

16. Reduced Vertical Separation Minimum (RVSM) is the application 1,000 ft vertical separation at and above FL290 between RVSM certified aircraft operating within designated RVSM airspace. RVSM and RVSM transition airspace is defined as controlled airspace extending from

a) Fl290 to FL330 for RVSM transition airspace and FL330 to FL420 RVSM airspace.
b) FL290 to FL410 inclusive for RVSM and RVSM transition airspace.
c) FL230 to FL 410 for RVSM transition airspace and FL270 to FL410 RVSM airspace.
d) FL230 to FL 410 inclusive for RVSM and RVSM transition airspace.

17. Prior to entering RVSM airspace pilots are required to ensure which the following equipment is functioning normally?

a) Two separate and independent altimeter systems.
b) One auto pilot with an altitude hold function
c) One altitude alerting device
d) All of the above

18. RVSM-certified aircraft that intend to fly along a High Level Airway between FL290 and FL410 inclusive and with a published track of 265°M should be operated at:

a) odd flight levels at 4,000 foot intervals.
b) even flight levels at 4,000 foot intervals.
c) odd flight levels at 2,000 foot intervals.
d) even flight levels at 2,000 foot intervals.

19. The next three RVSM flight levels immediately above FL290 that would be appropriate for the operation of an RVSM-certified aircraft whose track is 180°M would be:

a) FL300, FL30, FL320.
b) FL330, FL370, FL410.
c) FL 300, FL320, FL340.
d) FL310, FL330, FL350

20. During climbs or descents in RVSM airspace flight crews should not overshoot or undershoot assigned flight levels by more than _____:

a) 50 ft.
b) 150 ft.
c) 200 ft.
d) 3000 ft.

21. When ATC has temporarily suspended RVSM within selected non-radar coverage areas due to adverse weather conditions, controllers will then provide _____feet vertical separation for opposite direction traffic and ____feet vertical separation for same direction traffic. The missing numbers are, respectively:

a) 1,000 feet; 2,000 feet.
b) 2,000 feet; 2,000 feet.
c) 2,000 feet; 4,000 feet.
d) 4,000 feet; 2,000 feet.

22. The base of the Arctic Control Area is:

a) FL330
b) FL290
c) FL270
d) FL230

23. IFR flight only is permitted for aircraft that wish to operate within the Northern Control Area from:

a) FL230 and above.
b) FL230 to FL600 inclusive.
c) FL250 and above.
d) FL270 to FL600 inclusive.

24. What airspace would a northbound aircraft flying at FL260 enter immediately after departing the northern boundary of the Southern Control Area?

a) The Arctic Control Area.
b) Uncontrolled high level airspace.
c) The Northern Control Area.
d) Canadian Minimum Navigation Performance Specification Airspace.

25. Consider an aircraft flying at FL190 that has just exited the northern boundary of the Southern Control Area northbound. If the pilot now wishes to climb to and maintain FL220, he/she should:

a) request the desired flight level change from ATC.
b) broadcast the intended change on 122.8 MHz and then make the change.
c) inform the nearest Flight Information Centre of the intended change and then climb to FL220.
d) broadcast the intended change on 126.7 MHz and then make the change.

26. In order to increase a VHF/UHF airway's basic width of ___ NM, _____degree splay (diverging) lines are projected from either side of the airway centreline and intersect the basic airway width boundary at a distance of _____ NM from the navigation facility. The missing numbers are, respectively:

a) 4; 5; 50.8
b) 8; 4.5; 50.8
c) 8.68; 5; 49.66
d) 4; 4.5; 49.66

27. With reference to **T-Routes**, select the statement below that is false;

a) They are low-level controlled fixed RNAV routes that have a primary obstacle protection area 8 NM wide.
b) They are low-level fixed RNAV routes have a primary obstacle protection area of 6 NM each side of the centre-line.
c) The airspace associated with these routes is 10 NM on each side of the centre-line.
d) RNAV-T route airspace and protection areas do not splay.

28. Which of the following types of controlled airspace that are based in Low Level airspace can extend upwards into the High Level airspace structure?

a) Victor Airways.
b) Control Area Extensions.
c) Terminal Control Areas.
d) Class C control zones associated with Canada's major airports.

29. An aircraft would be operating in Class A airspace anytime that it was flying within:

a) any portion of Canadian Controlled High-Level Airspace at FL600 and below.
b) all of the Northern Domestic Airspace above 18,000 ft. ASL.
c) a Military Terminal Control Area between 12,500 ft. ASL. and 17,999 ft. ASL.
d) all of the Canadian Domestic Airspace above FL600.

30. Which of the following regions would constitute Class B Airspace?

a) That portion of a control area extension above 9,500 ft. ASL up to, but not including, 18,000 ft. ASL.
b) Airspace that underlies the Northern Control Area and extends from 12,500 ft. ASL up to, but not including, FL230.
c) Transition Areas adjacent to Class C control zones that extend vertically from 700 ft. ASL up to 2,200 ft. ASL.
d) Within Low Level Airways above 12,500 ft. ASL or at and above the MEA, whichever is the higher.

31. An example of Class D airspace would be:

a) A Military Flying Area.
b) A control zone without an operating control tower.
c) The transition area which underlies the lateral limits of the CMNPS Airspace.
d) A control zone with an operating control tower and whose airspace has not been designated as Class B or Class C.

32. All high level controlled airspace above FL600 within the Canadian Domestic Airspace structure has been designated:

a) Class A.
b) Class G.
c) Class E.
d) Class F.

33. That airspace within a Victor Airway at 12,500 ft. ASL and below would be designated as:

a) Class B.
b) Class E.
c) Class D.
d) Class G.

34. Consider an airport with a Class C control zone. What would be the status of this airport and its control zone airspace classification when the tower is not operating?

a) Controlled airport; Class E airspace.
b) Controlled airport; Class D airspace.
c) Uncontrolled airport; Class E airspace.
d) Uncontrolled airport; Class G airspace.

35. A true statement regarding an active Restricted Area would be:

a) Flight through an active Restricted Area is prohibited at all times.
b) A pilot may fly through an Active Restricted Area provided that either an IFR or DVFR flight plan has been filed for the flight and during that time the aircraft operates within the Restricted Area the pilot maintains a continuous listening watch on 121.5 MHz.
c) Aircraft on an IFR flight plan or on an IFR flight Itinerary will automatically be cleared by ATC to fly through an active Restricted Area.
d) A pilot may fly through an active Restricted Area if prior permission has been obtained from the controlling authority.

36. With respect to Class F advisory airspace, pilots should know that:

a) an advisory area is a region of positively controlled airspace.
b) specific instructions that apply to the use of advisory airspace are detailed in the Planning section of the CFS.
c) pilots of activity-participating aircraft within an advisory area, as well as pilots of aircraft flying through the area, are equally responsible for collision avoidance.
d) IFR aircraft that are transiting an advisory area will always receive ATC vectoring to resolve potential conflicts with any VFR aircraft within the area.

37. A VFR aircraft has received a SVFR clearance to enter a control zone at night and has been cleared by the tower for a straight-in approach to the active runway. Due to the prevailing low ceiling and reduced flight visibility, the pilot is unsure as to the exact location of a TV broadcast antenna in the immediate vicinity. The responsibility for avoiding this obstacle is:

a) assumed by the tower controller who will provide vectors if required.
b) shared equally by the tower controller and the pilot.
c) assumed by the pilot.
d) shared by both the nearest terminal control unit and the tower controller.

38. If an aircraft is required to cross over an uncontrolled airport to join the circuit, it is recommended that the crossover be accomplished at least _____ above aerodrome elevation (AAE).

a) 500 feet
b) 1000 feet
c) 1500 feet
d) 2000 feet

39. A true statement regarding an ATC clearance would be:

a) A clearance is authorization to proceed under specified conditions within controlled and uncontrolled airspace.
b) A clearance issued to an IFR aircraft is predicated on the movements of all other IFR and VFR aircraft operating within a section of controlled airspace.
c) A clearance is a directive issued to an aircraft by an ATC controller that requires the pilot to take a specific action.
d) Once a pilot supplies a read-back of an ATC clearance, then compliance shall be made with that clearance.

40. An advisory area charted as CYA134(P) To 6000 informs a pilot that:

a) parachuting is conducted in this area up to 6000 ASL
b) aircraft test flights take place in this area.
c) aircraft test activities may be conducted up to, but not including 6,000 ft. AGL.
d) this advisory area is located in Ontario (due to its regional identifying number of 134.

41. The airspace classification that applies to that portion of a Low-Level Air Route that extends above 12,500 ft. ASL up to, but not including, 18,000 ft. ASL is:

a) Class G.
b) Class B.
c) Class E.
d) Class D.

42. You have just departed IFR on a planned flight between two aerodromes in the Standard Pressure Region and are climbing to a cruising level of FL130. You should set the aircraft altimeter to standard pressure (29.92" of Hg):

a) immediately prior to take-off.
b) after ensuring that all obstacles along the departure track have been cleared by at least 1,000 feet.
c) just after level-off at FL130.
d) immediately prior to reaching FL130.

43. The pilot of an IFR aircraft that has departed from Edmonton International Airport is cleared to climb to and maintain FL270. In this case, the pilot should set the aircraft altimeter to standard pressure (29.92" of Hg) immediately:

a) after level-off at FL270.
b) after climbing through 18,000 feet ASL.
c) prior to reaching FL270.
d) prior to reaching 18,000 feet ASL.

44. As you near your destination airport, which is located within the Standard Pressure Region, you brief the instrument approach procedure to be used and prepare for initial descent. The correct altimeter-setting procedure you should use for this approach is:

a) Continue with 29.92" (Hg) on the altimeter until crossing the primary approach fix outbound, and then set the altimeter to the current airport setting.
b) Set the aircraft altimeter to the current airport setting 15 minutes prior to commencing the instrument approach.
c) Change the aircraft altimeter from 29.92" to the current airport setting immediately after intercepting the final approach track inbound during the approach.
d) Set the aircraft altimeter to the current airport altimeter setting prior to commencing descent with the intention to land.

45. When conducting a holding procedure prior to landing at an aerodrome located within the Standard Pressure Region, the pilot-in-command of the aircraft shall:

a) set the aircraft altimeter to the current altimeter setting of the aerodrome of intended landing immediately after completing the hold entry procedure.
b) not set the aircraft altimeter to the current altimeter setting of the landing aerodrome until departing the holding fix for the purpose of conducting an approach procedure.
c) not set the altimeter to the current altimeter setting of the aerodrome until immediately prior to descending below the lowest flight level at which the holding procedure is conducted.
d) set the aircraft altimeter to the current altimeter setting of the landing aerodrome immediately prior to commencing the hold entry procedure.

46. Within Designated Mountainous Regions 1 and 5, the minimum IFR altitude to be used by an IFR aircraft that is operating outside of areas for which minimum IFR altitudes have been established is at least:

a) 3,000 ft. above the highest obstacle within 10 nm of the aircraft.
b) 2,000 ft. above the highest obstacle within 5 nm of the aircraft.
c) 1,500 ft. above the highest obstacle within 10 nm of the aircraft.
d) 1,000 ft. above the highest obstacle within 5 nm of the aircraft.

47. When flight planning over mountainous terrain during the winter months when air temperatures may be much lower than ISA, pilots should select an operating altitude which is at least _____ feet higher than the MEA/MOCA. The missing number is:

a) 2,500
b) 2,000
c) 1,500
d) 1,000

48. As you analyze the weather for a proposed IFR flight, you determine that abnormally high pressure conditions will be present on arrival at the destination aerodrome producing an altimeter setting there of 31.29 inches(Hg). This aerodrome has an ILS approach with a Decision Height (DH) of 320 (200- 3/4). Since you are unable to set the current altimeter setting on the aircraft altimeter, you must apply adjustments to the weather requirements (ceiling and visibility) which would now become:

a) 620 – 2 ¼
b) 500 – 1 ½
c) 800 – 2 ½
d) 620 – 1 ¾

49. With respect to VFR flight operations within the Canadian ADIZ, the tolerances for ETA's, projected ADIZ boundary entry point positions and flight plan track centerline deviation are:

a) ±3 minutes and 20 nm.
b) ±3 minutes and 10 nm.
c) ±5 minutes and 20 nm.
d) ±5 minutes and 10 nm.

50. What is required in order to operate within the ADIZ?

a) An IFR flight plan or DVFR flight plan.
b) An IFR flight itinerary.
c) A VFR flight plan.
d) None of the above.

51. Any aircraft that is not involved in forest fire control activities should not fly lower than ____feet AGL when operating closer than __nm from the limits of a forest fire area. The missing numbers are, respectively:

a) 5,000 and 3.
b) 1,500 and 5.
c) 2,000 and 3.
d) 3,000 and 5.

52. For wake turbulence categorization purposes, the term "Heavy" is used to indicate an aircraft certificated for a maximum take-off weight of:

a) 150,000 kg or more.
b) 200,000 lbs or more.
c) 300,000 kg or more.
d) 300,000 lbs or more.

53. ICAO wake turbulence categories use the term "Medium" to indicate an aircraft with a maximum take-off mass of:

a) 7,001 kg to less than 156,000 kg.
b) 7,001 lbs to less than 150,000 lbs.
c) More than 15,500 lbs. to less than 300,000 lbs.
d) 12,500 lbs to less than 300,000 lbs.

54. The radar separation minimum that ATC controllers will apply between a medium aircraft and a preceding IFR super aircraft separated vertically by less than 1,000 feet is:

a) 7 miles.
b) 6 miles.
c) 5 miles.
d) 4 miles.

55. With respect to the non-radar departure of a light aircraft from the threshold of the same runway as a preceding medium aircraft, what spacing interval will ATC apply?

a) a four-minute interval.
b) a three-minute interval.
c) a two-minute interval.
d) no interval, but ATC will issue a wake turbulence advisory to the light aircraft.

56. In Canada no person shall operate an aircraft below 10,000 feet ASL at an indicated airspeed of more than 250 KIAS unless:

a) the aircraft is on departure and the final flight plan altitude is above 10,000 feet ASL.
b) the crew advises ATC the aircraft is being operated in accordance with a special operations certificate.
c) on departure the crew advises ATC of their intent to operate at speeds exceeding 250 KIAS and the reason for this action.
d) the crew requests a free speed.

57. Unless otherwise authorized in an air traffic control clearance, the pilot of an aircraft that is operating below 3,000 feet AGL within 10 NM of a controlled airport shall not operate at a speed of more than:

a) 200 kts.
b) 230 kts.
c) 250 kts.
d) 265 kts.

58. An adjusted speed that has been assigned to an aircraft by an ATC radar controller should be maintained within:

a) ±20 kts.
b) ±15 kts.
c) ±10 kts.
d) ±5 kts.

59. The maximum holding speed for a civil turboprop aircraft at an assigned altitude of 7,000 feet ASL is:

a) 175 KIAS.
b) 200 KIAS.
c) 230 KIAS.
d) 265 KIAS.

60. To ensure that an aircraft does not exceed obstacle clearance protected airspace the crew of a civil turbojet aircraft cleared to shuttle climb from 6000 ft to 15,000 ft must not exceed:

a) 230 KIAS until above 14,000 ASL.
b) the airspeed limit published on instrument procedure charts or if no limit is published, 250 KIAS below 10,000 ASL and 310 KIAS above.
c) 250 KIAS below 10,000 ASL and 310 KIAS above 10,000 ASL.
d) 310 KIAS until cleared above 15,000 ft.

61. When a turbojet aircraft is assigned a holding procedure at 6,000 ASL, the pilot must ensure that the holding pattern is entered and flown at or below:

a) 150 kts.
b) 175 kts.
c) 200 kts.
d) 230 kts.

62. The flight crew of turbojet aircraft transitioning from oceanic airspace to Canadian Domestic Airspace with an assigned MACH number may….

a) resume normal speed once being radar identified.
b) must maintain within .01 the filed MACH number once in domestic airspace.
c) must maintain within .01 of the assigned Mach number until ATC approval is obtained to make the change.
d) None of the above.

63. From the statements concerning IFR flight planning which follow, identify the one which is correct:

a) An IFR flight from Montreal to Cancun, Mexico does not require the filing of an ICAO flight plan.
b) A composite flight plan may be filed for an aircraft that will enter American airspace controlled by the FAA.
c) An IFR flight plan will be automatically closed by ATC for an aircraft whose pilot has stated "cancelling IFR".
d) Intermediate stops may not be included in a single IFR flight plan.

64. Consider a flight itinerary that was filed with an FIC and in which no SAR time was specified. The pilot who terminates this flight itinerary shall ensure that an arrival report is filed with the FIC as soon as possible after landing but no later than:

a) 48 hours after landing.
b) 12 hours after the last reported ETA.
c) 24 hours after the last reported ETA.
d) 48 hours after the last reported ETA.

65. 090249 NOTAMN CYYT ST. JOHN'S INTL ZYT- OUTER COVE NDB 246 U/S TIL APRX 0906101630 With respect to this NOTAM, a correct statement would be:

a) The referenced NDB will be usable at approximately1630Z on October 6, 2009.
b) The NOTAM will expire on October 6, 2009.
c) Either a replacing or cancelling NOTAM will be issued regarding the future serviceability of the ZYT NDB.
d) It was issued at 0249Z, June 10, 2009 and operational use of the ZYT NDB will be permitted after 1630Z unless a Replacing NOTAM is issued.

66. **N0318/19 NOTAMN**
A) CYOW 1904021115 TIL 1904302110
D) Daily 02-04,08-12, 16, 22-24, 27, 29 1115-1615
Daily 05-07, 14, 15 19-21, 25, 26, 30 1705-2110
E) CYOW RNAV (GNSS) Z RWY 14 APCH:
LNAV/VNAV MINIMA: NOT AUTH LNAV MINIMA TO READ 760 (409) 1 DIST/ALT TABLE, CONSTANT DESCENT ANGLE AND RATE OF DESCENT INFORMATION NOT USABLE

A correct statement regarding to the NOTAM above would be;

a) LNAV/VNAV minima would not be authorized April 8 to 12 between 1615Z and 1705Z
b) The constant descent angle table is not usable for approaches conducted daily between 1115Z to 1615Z and 1705Z to 2110Z April 02 to April 30.
c) For approaches conducted on April 15 after 1615Z are not subject LNAV minima adjustment to 760ASL and 1 SM.
d) For approaches conducted on April 26 prior 1705Z are permitted to utilize charted LNAV minima.

67. Consider the situation during which a CF-18 military aircraft assumes a position in front of, and to the left of, your civilian aircraft while in cruising flight and then commences to rock its wings. This visual signal initiated by the military jet means:

a) You are operating in an active Restricted airspace; call the interceptor on 121.5 MHz for instructions.
b) You are to land at the nearest suitable aerodrome and phone the Search and Rescue Centre in your region as soon as possible.
c) You have been intercepted.
d) You have been identified as not being hostile and may proceed to your destination aerodrome.

68. The "Operator" of an aircraft is:

a) the pilot-in-command.
b) the owner of the aircraft.
c) the person in possession of the aircraft.
d) the lessee of the aircraft.

69. No person shall act as a crew member of an aircraft;

a) within twelve hours of consuming alcohol.
b) while using over the counter drugs without first getting permission from a civil aviation medical examiner.
c) within eight hours of consuming alcohol.
d) within twelve hours of consuming alcohol and/or cannabis.

70. The farthest distance that a land aeroplane may operate from shore without having to carry a life preserver or flotation device for each person on board is:

a) 200 nm.
b) 100 nm.
c) 50 nm.
d) 25 nm

71. A Transport Category aeroplane which carries a life preserver or flotation device for each person on board is about to operate on a flight over the water. In this case, the maximum distance from a suitable emergency landing site that this aeroplane may fly without having to carry life rafts on board would be the lesser of:

a) 400 nm or the distance that can be covered in 120 minutes of flight at the filed cruising speed.
b) 200 nm or the distance that can be covered in 60 minutes of flight at the filed cruising speed.
c) 100 nm or the distance that can be covered in 30 minutes of flight at the filed cruising speed.
d) 50 nm or the distance that can be covered in 15 minutes of flight at the filed cruising speed.

72. The dimensions of a Mandatory Frequency Area associated with an aerodrome are published:

a) on the appropriate Enroute Low Altitude Charts.
b) in the applicable FIR General NOTAM Summary.
c) on the appropriate VNC or WAC VFR Navigation Charts.
d) in the Canada Flight Supplement.

73. An uncontrolled aerodrome has no published MF or ATF. In this case, the common frequency to be used for the broadcast of aircraft position and the intentions of pilots flying in the vicinity of this aerodrome would be:

a) 122.8 MHz.
b) 123.2 MHz.
c) 126.7 MHz.
d) 122.3 MHz.

74. Aircraft seat belts are required to be worn during flight by:

a) all passengers during take-off and landing only.
b) infant passengers at all times.
c) all passengers at all times.
d) at least one pilot at all times.

75. When must crew and passengers wear seatbelts in an aircraft?

a) During taxi, take-off, and landing.
b) Any time any crew member advises it.
c) During take-off and landing, as well as any time the PIC directs it.
d) During take-off and landing, as well as any time there is a thunderstorm within 20 NM.

76. A true statement regarding the use of the flight control lock system of an aircraft would be:

a) The aircraft engines cannot be started when this mechanism is engaged.
b) An unmistakable warning must be provided to the pilot when the flight control lock is engaged.
c) When this mechanism is engaged, it will lock the elevator in the full nose-up position.
d) If this system is installed in an aircraft powered by reciprocating engines, the mixture control can not be adjusted when the flight control lock is engaged.

77. Consider an unpressurized aircraft that is flying at 12,000 feet ASL. After what period of time should flight crew members breathe from sealed oxygen masks?

a) The entire period of flight above 10,000 feet ASL.
b) After 30 minutes at a cabin pressure altitude exceeding 10,000 feet ASL.
c) They are not required to, they are below 13,000 feet ASL.
d) It is at the discretion of the pilots, if they feel they are becoming hypoxic.

78. Consider an unpressurized aircraft that had been flying for one hour and thirty minutes at an altitude of 12,000 feet ASL. In this case, its two crew members should have been wearing their oxygen masks and using supplemental oxygen for what period of time?

a) 30minutes.
b) 45 minutes.
c) 60 minutes.
d) 90 minutes.

79. Each person on board the aircraft shall be wearing an O2 mask and using supplemental O2 for the duration of that portion of any flight which takes place at cabin pressure altitudes above:

a) 18,000 feet ASL.
b) 15,000 feet ASL
c) 13,000 feet ASL.
d) 12,000 feet ASL.

80. For any flight that will be operating for more than 30 minutes at cabin pressure altitudes above 10,000 feet ASL but not exceeding 13,000 feet ASL, the required minimum number of O2 masks (and O2 supply) that must be available when 20 passengers are carried would be:

a) 20
b) 10
c) 5
d) 2

81. When does an aircraft operated in a commuter operation require a functioning Cockpit Voice Recorder?

a) It is required by any multi-engined turbine-powered aircraft seating 6 or more passengers and requiring 2 pilots.
b) Any time passengers are carried, including any employees of the operation other than the pilots.
c) At all times, unless there is an MEL.
d) Any time the flight data recorder is not operational, for a maximum of 90 days.

82. Which commuter aircraft are required to have a functioning FDR?

a) All aircraft.
b) All aircraft carrying passengers.
c) At all times, unless there is an MEL.
d) It is required by any aircraft with a seating capacity of 10 or more, and manufactured after October 11, 1991.

83. A multi-engine turbine-powered aeroplane that was manufactured after October 11th, 1991, configured for 10 or more passengers and for which a minimum of 2 crew is required by the type certificate, must have which of the following types of equipment aboard?

a) Flight Data Recorder only.
b) Cockpit Voice Recorder only.
c) Flight Data Recorder and Cockpit Voice Recorder.
d) Flight Data Recorder and Enhanced GPWS.

84. For those aircraft which are required to have a functioning Cockpit Voice Recorder on board, it must be operated continuously from:

a) the time at which electrical power is first provided to the recorder before the flight to the time at which electrical power is removed from the recorder after the flight.
b) the commencement of the take-off roll to the completion of the landing roll.
c) the beginning of the start checklist to the completion of the shutdown checklist.
d) engine start-up to clearing the landing runway at the destination.

85. Consider an aircraft with no approved Minimum Equipment List and which is required to have a functioning Cockpit Voice Recorder (CVR) and a functioning Flight Data Recorder (FDR) on board. If the CVR is unserviceable, this aircraft may:

a) only be flown back to its maintenance base via a direct route.
b) be flown for a maximum period of 90 days provided the FDR remains serviceable.
c) not be flown with passengers aboard until it is repaired.
d) not be flown until a flight permit has been obtained.

86. When the Altitude Alerting System of a turbo-jet-powered aeroplane, which requires such a device aboard, is unserviceable, what type of flights are permitted if no MEL has been approved for this aircraft?

a) only flights that will operate in the low level airspace structure.
b) only those flights that are designated as test flights, Pilot Proficiency Checks or training flights.
c) any flight that is restricted to day VFR conditions.
d) only flight crew training flights.

87. When can you test a 406 MHz ELT?

a) Tests shall only be conducted during the first 5 minutes of any UTC hour.
b) Test durations shall not exceed 5 seconds.
c) They should only be tested in accordance with the manufacturer's instructions.
d) a and b.

88. What aircraft are required to have a Standby Attitude Indicator?

a) Any large aircraft.
b) Any aircraft operated under an air operator certificate issued under Part VII of the CARs.
c) Any transport category aircraft in commercial air service.
d) Any aircraft flying at night.

89. A Third Attitude Indicator that is powered from a source independent of the aircraft's electrical generating system must be aboard:

a) any large aeroplane powered by reciprocating engines.
b) any turbine-powered aeroplane that operates above FL250.
c) any large turbo-jet-powered aeroplane or any turbine-powered Transport Category aeroplane operated by an air carrier.
d) any turbine-powered aeroplane used in Commercial Air Service operations.

90. When a Third Attitude Indicator is required to be aboard an aircraft, it must:

a) be able to provide pitch and roll signals to an autopilot.
b) provide a pitch and roll reference within the 5 second period immediately following the failure of the aircraft's electrical generating system.
c) have a fast-erect mechanism which will provide an audio warning when its gyro has reached its normal operating speed.
d) provide a minimum of 30 minutes of reliable operation following the failure of the aircraft's electrical generating system.

91. The requirement to have a functioning GPWS aboard a turbo-jet-powered aeroplane that is involved in either Commuter or Airline operations commences at what MCTOW and authorized passenger configuration?

a) More than 5,700 kg (12,566 lbs); more than 6 passengers.
b) More than 8,618 kg (19,000 lbs); more than 9 passengers.
c) More than 15,000 kg (33,069 lbs); 10 or more passengers.
d) More than 15,000 kg (33,069 lbs); 20 or more passengers.

92. Identify the correct statement with respect to the completion of aircraft tasks by a pilot that are identified as Elementary Work:

a) The pilot is required to sign a maintenance release prior to the next flight.
b) The pilot should make signed entries in both the Aircraft Technical Log and the Aircraft Journey Log detailing the tasks completed.
c) An authorized person must sign a maintenance release before a flight in that aircraft is undertaken.
d) The pilot shall make an entry in the Aircraft Journey Log detailing the completed tasks and accompany this entry with his/her signature.

93. The movement area of an aerodrome includes:

a) the manoeuvring area plus aprons.
b) only the taxiways and the ramp areas.
c) all runways and taxiways but excludes any aprons.
d) only the aprons and any ramp surfaces used for engine run-ups.

94. The Touchdown Zone of the landing runway comprises whichever is the lesser of:

a) the first 3,500 feet or the first one-half of the runway.
b) the first 3,000 feet or the first third of the runway.
c) the first 2,000 feet or the first one-quarter of the runway.
d) the first 1,000 feet or the first one-fifth of the runway

95. The simultaneous use of intersecting runways known as land and hold short operations (LAHSO) may be carried out under certain conditions. One of these would be:

a) A pilot who has accepted the hold short clearance must remain 200 feet short of the closest edge of the runway being intersected.
b) A tailwind of 10 kts. or less for either a dry or a wet runway is acceptable for normal LAHSO.
c) The weather minima of a 1,500 foot ceiling and a visibility of 5 statute miles are required.
d) Only those runways with average coefficients of friction above 0.45 will be approved for wet runway LAHSO.

96. What is the definition of an Infant?

a) A baby weighing less than 10 kg (22 lbs.).
b) A baby who is less than two years old.
c) A baby who is less than 4 years old.
d) A baby weighing less than 14 kg (31 lbs.).

97. What is the recommended practice to restrain an infant?

a) The infant should occupy an individual seat, with the restraint system securely fastened.
b) The infant should be held securely in another passenger's arms, with the restraint system securely fastened around both passengers.
c) The infant should sit on the lap of another passenger, with the restraint system securely fastened around both passengers.
d) A passenger shall securely fasten the restrain system around themselves and hold the infant securely in their arms.

98. You are the owner of a foreign-manufactured aircraft that is now registered in Canada. If that foreign manufacturer issues an Airworthiness Directive (AD) applicable to your aircraft type, you would know that:

a) Your compliance with the AD would not be required until it had been published in the "Index of Airworthiness Directives Applicable in Canada".
b) An exemption for compliance with any AD issued by a foreign government can always be obtained from the nearest TC Maintenance and Manufacturing office.
c) Even if compliance with a foreign AD is not met, the Certificate of Airworthiness for your aircraft will continue to remain in force until its next Annual Inspection.
d) You, the aircraft owner, must ensure that compliance with the AD is met.

99. The number of entries from the previous Journey Log to be carried forward to become the first entries of a new Journey Log would be:

a) a sufficient number of relevant entries to ensure some sort of meaningful continuity.
b) the last 5 entries.
c) the number of consecutive entries required to include the last maintenance action performed on the aircraft.
d) the last page of entries.

CARs Commercial Operations

100. Which of the items or statements listed below are regulatory requirements for the operation of a single-engine aeroplane in an Air Taxi VFR night flight carrying passengers?

1) The aeroplane must be factory built and turbine powered.
2) Two ATPL-licenced pilots on board.
3) A radar altimeter.
4) The aeroplane must operate at least 1500 feet above all obstacles within 5 nm of the aeroplane.
5) Two independent power generating sources.
6) A maximum of 12 passengers may be carried.
7) This type of operation must be authorized in the Air Operator Certificate of the operator.
8) A functioning landing light.

a) 1, 2, 5, 6, 8.
b) 2, 3, 4, 7, 8.
c) 1, 3, 4, 6, 7.
d) 1, 3, 5, 7, 8.

101. The normal 30 calendar day flight time limitation for a pilot working in 704 operations is:

a) 150 hours.
b) 120 hours.
c) 110 hours.
d) 90 hours.

102. The flight time of a flight crew member shall not exceed ___ hours in any 30 consecutive days, ___ hours in any 90 consecutive days, and ___ hours in any 365 consecutive days.

a) 120, 300, 1200
b) 100, 200, 1000
c) 150, 400, 1200
d) 90, 250, 1000

103. What is the definition of "Flight Duty Time" for Airline operations?

a) The time from when a flight crew member reports for duty until "engines off" at the end of the final flight.
b) The time from the moment an aircraft first moves under its own power for the purpose of taking off until the moment it comes to rest at the end of the flight.
c) The time from when a flight crew member reports for a flight until 15 minutes after "engines off" at the end of the final flight, including the time required to complete any duties.
d) The time from when a flight crew member reports for duty until when they are finished all duties.

104. What is the normal flight duty day time limitation for two crew in commercial operations?

a) 10 hours.
b) 12 hours.
c) 14 hours.
d) 15 hours.

105. With respect to Flight Duty Time extensions, who is permitted to extend the Flight Duty Day beyond the normal 14 hour maximum?

a) The Operations Manager after consulting with the operating flight crew.
b) The Pilot-in-Command, after consulting with the other flight crew members, considers it safe.
c) The Chief Pilot, consulting with the operating flight crew.
d) The Duty Dispatcher.

106. The flight crew in a 705 Airline Operation due to unforeseen operational circumstances may…

a) extend their flight duty time by 1 hour if the flight is augmented by one crew member occupying the flight deck observer seat.
b) not exceed the 40 hour in 7 day flight time restriction.
c) exceed the 40 hour in 7 day flight time restriction by up to 3 hours.
d) extend their flight duty time by 2 hours on a flight that is augmented by one crew member where the relief facility is a passenger seat.

107. If a duty period includes a rest period, the duty time may be extended beyond the maximum duty time by _____, up to a maximum of ___ hours.

a) One half of the length of the rest period, 3
b) One half of the length of the rest period, 2
c) The length of the rest period, 3
d) The length of the rest period, 2

108. A correct statement concerning the requirements for "Time Free From Duty" for flight crew members involved in Commuter operations is:

a) An Air Operator shall provide each flight crew member with one period of at least 24 consecutive hours free from duty within each 7 consecutive days or one period of at least 3 consecutive calendar days free from duty within each 30 consecutive days.
b) An Air Operator shall provide each flight crew member with one period of at least 36 consecutive hours free from duty within each 7 consecutive days or one period of at least 3 calendar days free from duty within each 17 consecutive days.
c) An Air Operator shall provide each flight crew member with one period of at least 24 consecutive hours free from duty 13 times within 90 consecutive days and 3 times within each 30 consecutive days.
d) An Air Operator shall provide each flight crew member with at least 24 consecutive hours free from duty following 3 consecutive duty days that exceed 10 consecutive hours.

109. A Type C Operational Control System is required in commuter operations operating under which of the following conditions?

a) IFR
b) VFR at night using aeroplanes seating 10 to 19 passengers.
c) VFR at night using turbojet aeroplanes seating 19 or less passengers.
d) All of the above.

110. What are the minimum IFR fuel requirements for a propeller driven aircraft in a commuter operation?

a) Fuel to fly to the destination and land, plus 45 minutes.
b) Fuel to fly to the destination, conduct an approach and missed approach, fly to the alternate and land, then fly for 45 minutes, as well as sufficient fuel for and foreseeable delays and conditions and to descend along the route and divert to a suitable diversion aerodrome and hold.
c) Fuel to fly to the destination, conduct an approach and missed approach, fly to the alternate and land, then fly for 30 minutes, as well as sufficient fuel for and foreseeable delays and conditions and to descend along the route and divert to a suitable diversion aerodrome and hold.
d) Fuel to fly to the destination, conduct an approach and missed approach, fly to the alternate and conduct a missed approach, then fly for 45 minutes, as well as sufficient fuel for and foreseeable delays and conditions

111. What are the minimum IFR fuel requirements for a Turbojet in Commuter operations?

a) Fuel to fly to the destination and land, plus 30 minutes.
b) Fuel to fly to the destination, conduct an approach and missed approach, fly to the alternate and land, then fly for 30 minutes, as well as sufficient fuel for and foreseeable delays and conditions and to descend along the route and divert to a suitable diversion aerodrome and hold.
c) Fuel to fly to the destination, conduct an approach and missed approach, fly to the alternate and land, then fly for 20 minutes, as well as sufficient fuel for and foreseeable delays and conditions and to descend along the route and divert to a suitable diversion aerodrome and hold.
d) Fuel to fly to the destination, conduct an approach and missed approach, fly to the alternate and conduct a missed approach, then fly for 45 minutes, as well as sufficient fuel for and foreseeable delays and conditions.

112. Which of the following statements is true with regards to "Briefing of Passengers" in a Commuter Operation?

a) Safety briefings consist of a demonstration of all doors and emergency exits and the location of the safety features card.
b) Safety briefings are only required in the event of an emergency, time and circumstances permitting.
c) The PIC or his/her designate shall ensure that passengers with physical, sensory or comprehension limitations are given individual safety briefings.
d) Safety briefings consist of fastening of seatbelts, stowage of carry-on baggage and the location of emergency exits.

113. In a Commuter Operations, an aircraft that has more than 9 passengers is prohibited from taking off when the weather conditions are at or above take-off minima but below landing minima for the runway to be used except…

a) When the weather for another suitable runway at the airport is at or above landing minima.
b) An alternate aerodrome has been specified on the IFR flight plan and the aerodrome is located within 90 minutes at one-engine inoperative speed.
c) An alternate aerodrome has been specified on the IFR flight plan and the aerodrome is located within 120 minutes at one-engine inoperative speed.
d) An alternate aerodrome has been specified on the IFR flight plan and the aerodrome is located within 60 minutes at the normal cruise speed.

114. Which of the following statements listed below are regulatory requirements to conduct a RVR 1200 feet (1/4 mile) visibility take-off in a turbine-powered twin-engined aeroplane flown in a Commuter operation with more than 9 passengers?

1. The captain and first officer attitude instruments on the aircraft shall incorporate pitch attitude index lines in appropriate increments above and below zero pitch reference lines to at least 15°.
2. The captain and first officer must have received initial and recurrent RVR 1200 feet (1/4 mile) training if the captain and first officer are authorized to conduct lower than standard visibility take-offs.
3. The runway is equipped with all of the following: serviceable and functioning high intensity runway lights, runway centre line lights and centre line markings that are plainly visible to the captain throughout the take-off run.
4. The runway has at least two runway visual range sensors, one situated at the approach end and one situated at the mid-point reading not less than 1200 RVR.
5. The runway is equipped with at least one of the following: serviceable and functioning high intensity runway lights or runway centre line lights or with runway centre line markings that are plainly visible to the captain throughout the take-off run.
6. The captain shall have at least 200 hours of pilot-in-command on the aeroplane type.
7. A take-off alternate aerodrome is specified in the IFR flight plan that is located within a distance that can be flown in 60 minutes at normal cruise speed.
8. A take-off alternate aerodrome is specified in the IFR flight plan that is located within a distance that can be flown in 60 minutes at one-engine-inoperative cruise speed.

a) 1, 2, 4, 6
b) 1, 2, 5, 8
c) 1, 3, 6, 7
d) 2, 4, 6, 8

115. A flight crew in a 704 Commuter operation with 10 or more passenger seats may operate an aircraft without a functioning Class A TAWS with a terrain display under which of the following?

a) The aircraft is operated in day VFR only.
b) The aircraft is operated within three days after the failure occurs if the aircraft does not have an MEL.
c) For safety reasons, it is necessary to deactivate the TAWS or any of its modes provided it is done in accordance with the Flight Crew Operation Manual and the MEL.
d) All the above

116. Which of the following statements listed below are regulatory requirements for a person to continue to act as a flight crew member in a 704 Operation?

1. The pilot-in-command must complete the air operator's flight training program semi-annually.
2. Each crew member must complete a Pilot Proficiency Check (PPC) annually.
3. Each pilot must complete a Pilot Proficiency Check (PPC) semi-annually.
4. In the preceding 90 days each pilot must have completed three take-offs & landings.
5. Each pilot must complete the air operator's ground and flight program annually.
6. The pilot-in-command of an aircraft carrying passengers in VFR at night is required to have at least 500 hours of flight time as PIC.
7. The pilot-in-command of an aircraft carrying passengers in IFR flight is required to have at least 1,200 hours of flight time as a pilot.
8. Each pilot must have completed three take-offs & landings plus one sector in the preceding 90 days.

a) 2, 4, 5, 7
b) 1, 2, 5, 8
c) 1, 3, 6, 7
d) 2, 3, 6, 8

117. Which of the following statements is true with regard to Line Indoctrination Training for pilots initial training on to a turbo-prop aircraft in a Commuter operation?

a) Training shall be conducted over parts of the operator's route structure.
b) Each pilot shall complete 20 hours of flying and 4 sectors, 2 as pilot flying and 2 as pilot monitoring.
c) A sector is considered a flight with a take-off, departure, arrival and landing with an enroute segment of at least 50 NM.
d) All of the above

118. In an Airline Operation what does "co-authority dispatch" mean?

a) The equal authority between the PIC and dispatcher for decisions regarding take-off profiles.
b) The shared authority between the PIC and dispatcher for decisions regarding the operational flight plan prior to acceptance by the PIC.
c) The shared authority between the PIC and SIC for decisions regarding the dispatch of a flight.
d) The shared authority between the PIC and flight attendants regarding the decision for a flight to dispatch.

119. Unless otherwise authorized, when an aeroplane in Airline Operations conducts a IFR flight, in addition to sufficient fuel for taxiing, and foreseeable delays that could delay landing, it must carry sufficient fuel to fly to:

a) its destination, then to an alternate aerodrome, conduct an approach and a missed approach and thereafter for a period of 30 minutes at 1500 feet above aerodrome elevation.
b) its destination, then to an alternate aerodrome, conduct an approach and a missed approach and thereafter for a period of 45 minutes at 1500 feet above aerodrome elevation.
c) its destination, then to an alternate aerodrome and thereafter for a period of 30 minutes at normal cruising speed.
d) its destination, then to an alternate, conduct an approach and a missed approach, thereafter for a period of 45 minutes at 1500 feet above aerodrome elevation and an enroute fuel reserve of 5%.

120. In an Airline Operation, what is the standard maximum distance that a twin-engine aeroplane may be flown from an adequate aerodrome on an international flight?

a) 200 NM or 60 minutes at single engine cruise speed, whichever is the lesser.
b) 300 NM or 45 minutes at normal cruise speed, whichever is lesser.
c) 30 minutes at single engine cruise speed.
d) 60 minutes at single engine cruise speed.

121. With regards to "Crew Member Briefings" select the statement below that is false.

a) The PIC shall ensure prior to each flight or series of flights a pre-flight briefing is given to all crew members including flight attendants.
b) A pre-flight briefing shall cover anticipated weather and flying conditions, flight time, and altitudes.
c) The PIC is required to review selected communication, emergency, safety and security procedures.
d) A review of selected communication, emergency, safety and security procedures is also required along with any additional information necessary for the flight.

122. An aircraft involved in an Airline operation carrying passengers in IMC with weather reports for thunderstorms must be equipped with which of the following?

a) A stormscope.
b) A weather radar.
c) ADS-B in with weather services.
d) Datalink weather radar uploads.

123. Airline Operations require flight crew members who are on flight deck duty to remain at their respective stations with their seat belt and shoulder harnesses fastened below:

a) 18,000 feet ASL.
b) 12,500 feet ASL.
c) 10,000 feet ASL.
d) 3,500 feet AGL.

124. For a person to continue to act as a second in command in an Airline Operation they must: (Select the correct statements from below)

1. complete the air operator's flight training program semi-annually.
2. complete a Pilot Proficiency Check (PPC) annually.
3. complete a Pilot Proficiency Check (PPC) semi-annually.
4. Each crew member must complete the air operator's ground program annually.
5. Must complete three take-off and landings plus one sector within the proceeding 90 days.
6. Each crew member must complete the air operator's flight training program annually.
7. Must complete a route check semi-annually with an approved check pilot to maintain route/aerodrome qualification.
8. complete a line check annually with an approved check pilot demonstrating their ability to operate the airplane over a typical route.

a) 1, 2, 5, 7
b) 2, 4, 6, 7
c) 1, 3, 5, 8
d) 2, 3, 6, 8

125. In an Airline Operation the consolidation period refers to:

a) Crew pairing restrictions applied with relation to the combined experience of the PIC and SIC new to an aircraft type.
b) The time requirement for crew members to complete line-indoctrination training after completing a PPC.
c) When a PPC, line check, or training is renewed within the last 90 days of its validity period.
d) The 90-day requirement for all annual training events flight crew members required.to complete.

126. What are pilots' currency requirements for carrying passengers at night?

a) 5 take-offs and landings within the preceding 6 months.
b) 3 take-offs and landings within the preceding 90 days.
c) 3 night take-offs and landings within the preceding 90 days.
d) 5 night take-offs and landings within the preceding 6 months

127. When and how often must pilots receive High Altitude training?

a) When operating an aeroplane above 13,000 feet ASL, annually.
b) When operating an aeroplane above 10,000 feet ASL, before the first assignment and every 3 years thereafter.
c) When operating an aeroplane above 13,000 feet ASL, before the first assignment and every 3 years thereafter.
d) When operating an aeroplane above 10,000 feet ASL, annually.

128. The subject areas that should be included in High Altitude Training for flight crew members are:

a) Respiration, hypoxia, the duration of consciousness at altitude without supplemental O2, gas expansion and gas bubble formation.
b) hypoxia, hyperventilation, barotrauma, high altitude-related vision problems and nutrition.
c) oxygen deprivation, nitrogen bubble formation within body tissues, vision problems associated with reduced oxygen partial pressure, explosive decompression and high altitude aerodynamics.
d) respiratory problems associated with the use of supplementary oxygen, Dalton's Law of Partial Pressures, embolic events, barotrauma, the Valsalva technique and nutrition.

129. At the completion of each Initial Ground Training phase provided by an Air Carrier, the proficiency of each pilot shall be determined by:

a) a flight test.
b) a simulator test.
c) a written test.
d) an oral test.

130. The validity period for a Transportation of Dangerous Goods (TDG) Training Certificate, after its date of issuance, is:

a) 36 months.
b) 24 months.
c) 18 months.
d) 12 months.

Commercial Operating Minimum

For questions 130 to 144 assume that you are flying a large turboprop aircraft in a commercial operation. The maneuvering speed for departures and arrivals is 125 kts. Your company has approval to conduct RVR 1200 /1/4 SM take-offs and has Approach Ban minimum visibility OPS Spec. The aircraft is certified for engine-out take-off, climb and missed approach performance requirements. The scenarios presented are representative of what may be encountered on a regular basis in real world operations. Refer to the approach plates on pages 1-31 to 1-35.

131. You are about to commence taxiing for departure in Halifax (CYHZ), the active runway is 23. The RVR for runways 14 is 1200 feet and 23 is 1000, the latest METAR indicates 1/4 sm visibility. Which of the following statements is correct?

a) The aerodrome operating visibility is deemed to be below minimum so you are not allowed to taxi to 23.
b) The ground visibility (METAR) takes precedence in this case and you are allowed to taxi to any runway.
c) You are permitted to taxi to runway 23 but take-off is not permitted until the RVR increases to 1200.
d) The Aerodrome Operating Visibility does not apply to Commercial Operators.

132. Which of the following statements listed below are regulatory requirements to conduct a RVR 1200 feet (1/4 mile) visibility take-off in a turbine-powered twin-engined aeroplane flown in a Commuter operation with more than 9 passengers?

1. The captain and first officer attitude instruments on the aircraft shall incorporate pitch attitude index lines in appropriate increments above and below zero pitch reference lines to at least 15°.
2. The captain and first officer must have received initial and recurrent RVR 1200 feet (1/4 mile) training if the captain and first officer are authorized to conduct lower than standard visibility take-offs.
3. The runway is equipped with all of the following: serviceable and functioning high intensity runway lights, runway centre line lights and centre line markings that are plainly visible to the captain.
4. The runway has at least two runway visual range sensors, one situated at the approach end and one situated at the mid-point reading not less than 1200 RVR.
5. The runway is equipped with at least one of the following: serviceable and functioning high intensity runway lights or runway centre line lights or with runway centre line markings that are plainly visible to the captain throughout the take-off run.
6. The captain shall have at least 200 hours of pilot-in-command on the aeroplane type.
7. A take-off alternate aerodrome is specified in the IFR flight plan that is located within a distance that can be flown in 60 minutes at normal cruise speed.
8. A take-off alternate aerodrome is specified in the IFR flight plan that is located within a distance that can be flown in 60 minutes at one-engine-inoperative cruise speed.

a) 1, 2, 4, 6
b) 1, 2, 5, 8
c) 2, 3, 6, 7
d) 2, 4, 6, 8

133. You have taxied out and are holding short of runway 32 at Halifax. The tower reports the latest METAR's ground visibility is 1/8 SM. The RVR for runways 14 is 1400 and 23 variable 800 to 1400, wind is not a factor. Can you depart?

a) No, the ground visibility is below take-off minima.
b) Yes, if you taxi and depart runway 14.
c) Yes you can depart runway 14 but are not allowed to taxi to the runway until the ground visibility improves to 1/4 SM.
d) Yes, you can taxi and depart on runways 14 and 23.

134. Holding short of runway 05 in Halifax, you receive the following weather report:

METAR CYHZ 131700Z 05020G25KT 3/8SM R23/V1000FT-1500FT/ RA FG VV002 08/08 A2929 RMK FG8

Are you permitted to depart runway 05?

a) No, the RVR is fluctuating above and below 1200 ft.
b) No, the reported ground visibility is below standard take-off minima.
c) Yes, since the RVR is fluctuating above and below 1200, provided you file a take-off alternate with 60 minutes at one-engine inoperative cruise speed.
d) Yes, provided you meet all the requirements for RVR 1200 (1/4 SM) visibility take-offs.

135. Pilots in a 705 Operation that have OPS SPEC approval, flying the RNAV (GNSS) RWY 28 approach to LNAV minima at Charlottetown are prohibited from continuing past the DUVEK unless the

a) RVR sensor on runway 28 indicates 3400 or better.
b) Reported ground visibility is 1/4 SM or RVR 1200 feet.
c) Reported ground visibility is at least 5/8 SM.
d) Visibility 1-1/4 SM or better.

136. Which of the following statements is true with reference to the RNAV (GNSS) RWY 28 approach procedure at Charlottetown?

a) Pilots using WAAS avionics on the LPV approach must perform a RAIM check at least once before the mid-point of the flight to Charlottetown.
b) Aircraft must be equipped with an FMS and TSO 115(a) GNSS avionics for crews to utilize the LNAV/VNAV minimums.
c) Pilots using WAAS avionics on the LPV approach must respect ROGDO 3410 feet crossing restriction.
d) Only certified receivers that are capable of selecting CH80581 are permitted for approach guidance on this procedure.

137. Flying the RNAV (GNSS) RWY 28 approach to Charlottetown airport (CYYG) at night, after passing DUVEK Charlottetown Radio informs you that the reported ground visibility is 3/8 of a mile and the RVR for runway 03 is 1400 feet. Can you continue the approach to a landing and taxi to the gate?

a) You are legal to land but are not permitted to taxi to the gate so you must conduct a missed approach and conduct a landing on runway 03 wind permitting.
b) Yes, because you received the visibility report after passing DUVEK.
c) No, because the runway level of service for 28 at night is 1/2 SM.
d) No, because of the commercial approach ban.

138. You are conducting an approach in IFR conditions to an uncontrolled aerodrome un uncontrolled airspace. From the list below what are the required communication procedures at aerodromes with Mandatory Frequencies or Aerodrome Traffic Frequencies?

1. Broadcast descent and approach intentions on 126.7 MHz before changing to the MF/ATF.
2. When passing the fix outbound, when the pilot-in-command intends to conduct a procedure turn, or, if no procedure turn is intended, when the aircraft first intercepts the final approach course,
3. Broadcast descent and approach intentions on the MF or ATF at least five minutes before the estimated time of commencing the approach, stating the estimated landing time,
4. When passing the final approach fix or three minutes before the estimated landing time where no final approach fix exists, and on final approach
5. When commencing a circling maneuver.
6. As soon as practicable after initiating a missed approach procedure.
7. When clear of the surface on which the aircraft has landed.

a) 1, 2, 4, 6
b) 1, 2, 5, 6
c) 2, 3, 6, 7
d) All of the above.

139. What broadcast reports are required to be transmitted while executing the RNAV (GNSS) RWY 28 at Charlottetown?

a) Within fifteen minutes of the ETA, five minutes prior to commencing the approach, intercepting the final approach course, passing the DUVEK and in the event of a missed approach.
b) As requested by Moncton Centre on 135.65 mHz.
c) Five minutes prior to commencing the approach, intercepting the final approach track, passing DUVEK, in the event of a missed approach and clearing all runways
d) Five minutes prior to commencing the approach, three minutes prior to landing, in the event of a missed approach and clearing runway 10/28.

140. With the engines off and parked on the apron at Charlottetown (CYYG), with reference to the METAR below, can you start the engines and taxi with the intention of departing?

METAR CYYG 151500Z 04018G23KT 1/8SM R03/1400FT/U FG VV002 06/06 A2951 RMK FG8 SLP998=

a) Yes.
b) Yes, if planning a departure on runways 03 or 21.
c) Yes, because the RVO stated on the aerodrome chart is RVR 1200 for runway 03.
d) No, because the ground visibility is reported as 1/8 SM.

141. On the ramp in CYYG at night what is the minimum visibility required to commence taxiing?

a) RVR 1200 and 1/4 SM for all runways.
b) For RWY 03 - RVR 1200, RWY 21 - 1/4 SM, and for RWYs 10 & 28 - 1/2 SM
c) For RWYs 03 & 21 - RVR 1200 and 1/4 SM, and for RWYs 10 & 28 - 1/2 SM & 2600 RVR.
d) 1/2 SM for all runways.

142. Taxiing for departure off runway 28 in CYYG at night, the visibility seems to be decreasing. Charlottetown Radio advises you of the following SPECI:

CYYG 240336Z 2825G35KT 1/2SM R03/3000 -RA BKN002 OVC008 06/05 A2956

Are you legal to takeoff?

a) Yes, since the RVR applies only to runway 03 and the reported visibility is 1/2 SM
b) No, because the visibility has to be greater than 1/2 SM to depart 28.
c) Yes, provided you file a take-off alternate within 60 minutes at the one-engine inoperative cruise speed.
d) No, since the weather is below landing minima.

143. You are transitioning for the approach to RWY 14 in Halifax (CYHZ), the RVR is fluctuating between 800 and 1400 feet with an observed visibility of 1/4 of a mile. Can you do the approach to a landing?

a) Yes, the RVR is fluctuating above and below the minima of 1200 feet and the ground visibility is ¼ sm.
b) No, the visibility has to be at least 1/4 mile.
c) No, the minimum RVR value must be 1200 feet or above as per the aerodrome level of service.
d) You can continue the approach, but landing is not permitted until the RVR is 1200 or above.

144. Pilots in an Airline Operation that does not have OPS SPEC approval flying the LOC only approach to RWY 14 at Halifax are prohibited from continuing past the FAF unless the visibility report is at least…

a) 1/2 sm or 2600 RVR.
b) 3/4 sm or the RVR or runway visibility is 4000 feet.
c) 1-1/4 sm or the RVR or runway visibility is 6000 feet.
d) 1-1/2 sm or the RVR or runway visibility is greater than 6000 feet.

145. You are conducting the ILS RWY 14 into Halifax Intl, NS (CYHZ) via TETAR. After passing IMANO, the tower informs you that the current RVR is 1000. Which of the following statements is correct? (Note: as previously mentioned, the operator does have an Ops Spec for approach minima).

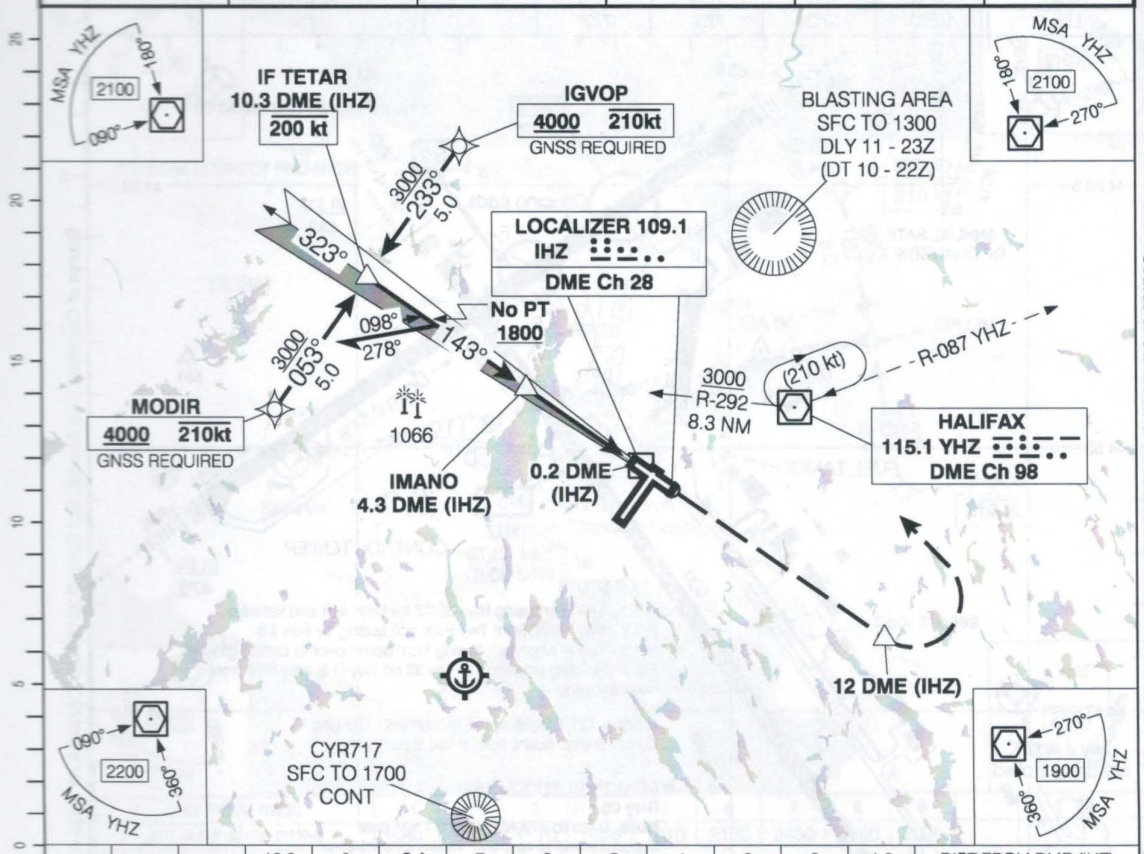
a) If the ground visibility is reported as 1/4 SM or greater, then the RVR does not matter for this approach.
b) The approach may be continued to either a landing or missed approach.
c) A missed approach must be initiated because the RVR value is below to the minimum RVR as per the approach ban.
d) You have already passed the FAF and can continue the approach to a landing unless the TOWER states "Unable to Issue Clearance"

NOT FOR NAVIGATIONAL USE HALIFAX/STANFIELD INTL, NS

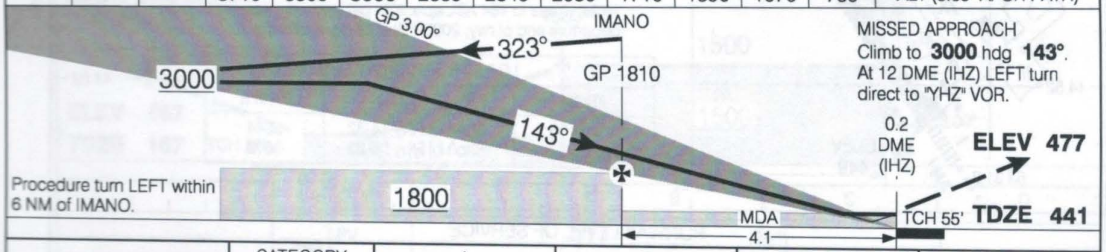
ILS RWY 14 — 445247N 0633037W VAR 18°W — CYHZ

ATIS – 121.0	TML – 119.2	TWR – 118.4 236.6	GND – 121.9 275.8

SAFE ALT 100 NM	LOC	APCH	GP	LDA
2800	IHZ 109.1	CRS 143°	IMANO 1810	7700



	10.3	9	8.1	7	6	5	4	3	2	1.0	DIST FROM DME (IHZ)
	3710	3300	3000	2660	2340	2030	1710	1390	1070	760	ALT (3.00° APCH PATH)



Knots	ft/min	Min:Sec
70	370	
90	480	
110	580	
130	690	
150	800	

CATEGORY	A	B	C	D
ILS/DME	641 (200) ½ RVR 26			
LOC/DME	760 (319) 1 RVR 50			
CIRCLING	980 (503) 1½		980 (503) 2	1080 (603) 2

ILS RWY 14 — CYHZ

EFF 10 NOV 16

FOR TRAINING PURPOSES ONLY

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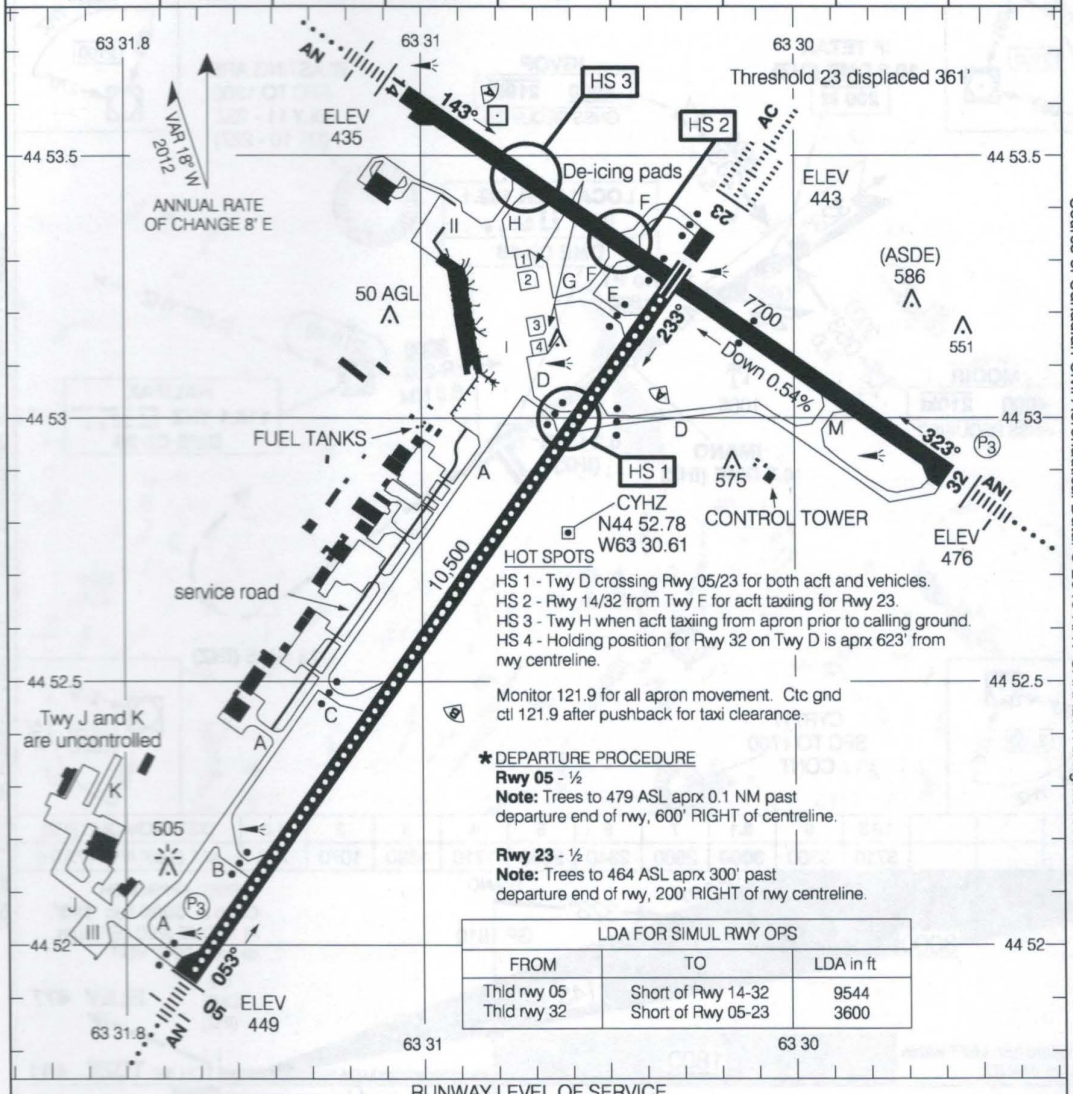
AERODROME CHART — CYHZ

ATIS – **121.0**	CLNC DEL – **123.95** GND – **121.9 275.8**	TWR – **118.4 236.6**	TML – **119.2**

DECL DISTS	05	23	14	32
TORA	10500	10500	7700	7700
TODA	11189	11189	8684	8684
ASDA	10500	10500	7700	7700
LDA	10500	10139	7700	7700



RUNWAY LEVEL OF SERVICE	
RVO	LVO
RWY 14, 23: RVR 1200 RWY 05, 32: (¼sm)	RWY 23: RVR 600
TAKE-OFF MINIMA	
Rwys 05, 23: * Rwys 14, 32: ½	SCALE IN FEET 2000 0 2000

AERODROME CHART — CYHZ

EFF 12 OCT 17

FOR TRAINING PURPOSES ONLY

NOT FOR NAVIGATIONAL USE

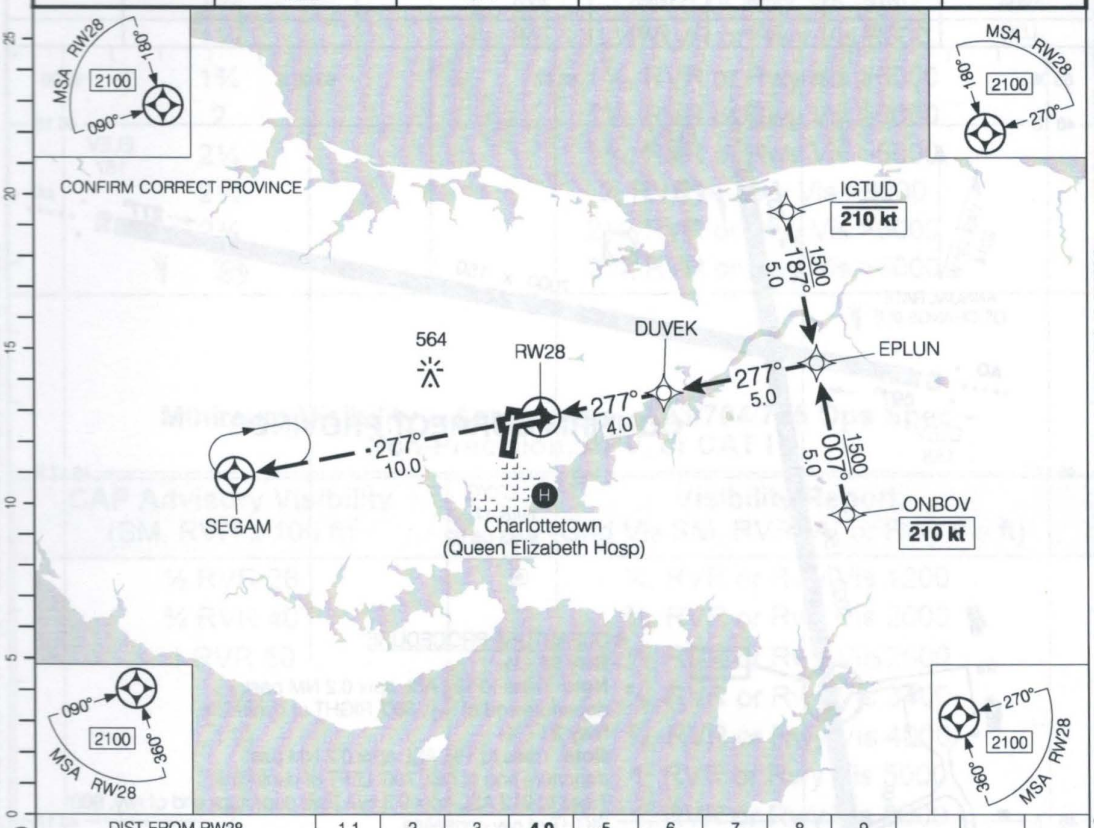
CHARLOTTETOWN, PE

RNAV (GNSS) RWY 28

461721N 0630655W VAR 18°W

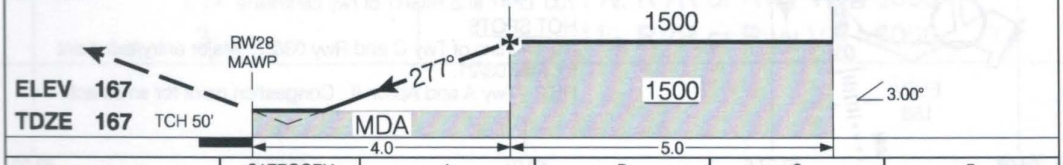
CYYG

	CTR Moncton – **135.65**	RADIO – **118.0** MF		
SAFE ALT 100 NM **2900**	WAAS **Ch 80582** W28A	APCH CRS **277°**	MIN ALT DUVEK **1500**	LDA **7000**



DIST FROM RW28	1.1	2	3	**4.0**	5	6	7	8	9			
ALT (3.00° APCH PATH)	580	850	1170	**1500**	1810	2130	2450	2760	3090			

MISSED APPROACH
Climb to **2100** track **277°**
to SEGAM.



Knots	ft/min	Min:Sec
70	370	
90	480	
110	580	
130	690	
150	800	

CATEGORY	A	B	C	D
LPV	**417**	(250)	1	
LNAV/VNAV (min. -19°C, max. 54°C)	**434**	(267)	1	
LNAV	**580**	(413)	1¼	
CIRCLING	**680** (513) 1½	**680** (513) 2	**780** (613) 2	

RNAV (GNSS) RWY 28 CYYG

EFF 12 OCT 17

FOR TRAINING PURPOSES ONLY

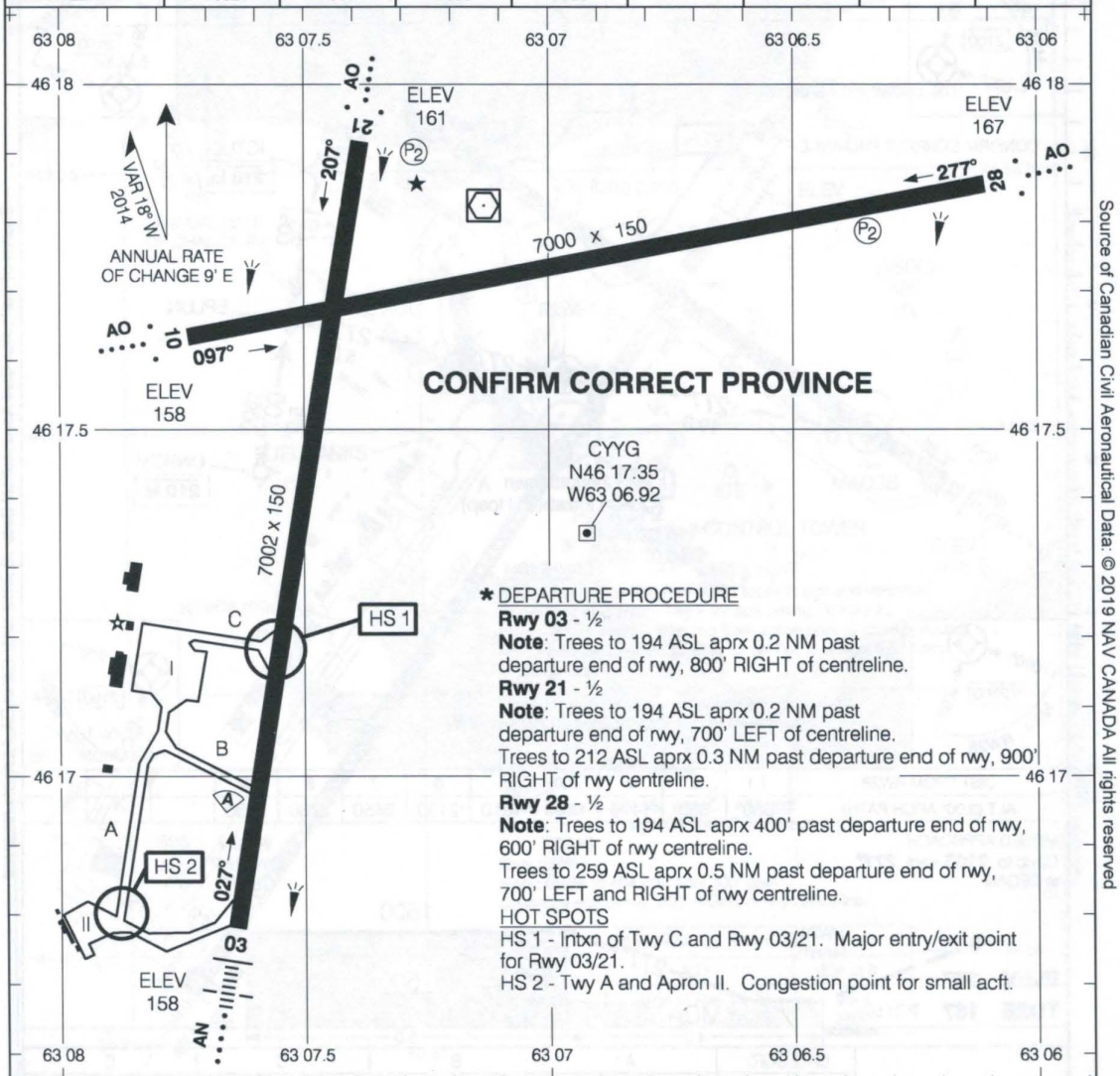
NOT FOR NAVIGATIONAL USE

AERODROME CHART

CHARLOTTETOWN, PE
CYYG

RADIO – **118.0**
CTR Moncton – **135.65**
MF

DECL DISTS	03	21	10	28				
TORA	7002	7002	7000	7000				
TODA	7769	7665	7984	7984				
ASDA	7002	7002	7000	7000				
LDA	7002	7002	7000	7000				



* DEPARTURE PROCEDURE

Rwy 03 - ½
Note: Trees to 194 ASL aprx 0.2 NM past departure end of rwy, 800' RIGHT of centreline.

Rwy 21 - ½
Note: Trees to 194 ASL aprx 0.2 NM past departure end of rwy, 700' LEFT of centreline.
Trees to 212 ASL aprx 0.3 NM past departure end of rwy, 900' RIGHT of rwy centreline.

Rwy 28 - ½
Note: Trees to 194 ASL aprx 400' past departure end of rwy, 600' RIGHT of rwy centreline.
Trees to 259 ASL aprx 0.5 NM past departure end of rwy, 700' LEFT and RIGHT of rwy centreline.

HOT SPOTS
HS 1 - Intxn of Twy C and Rwy 03/21. Major entry/exit point for Rwy 03/21.
HS 2 - Twy A and Apron II. Congestion point for small acft.

RUNWAY LEVEL OF SERVICE	
RVO	LVO
RWY 03: RVR 1200 RWY 10, 28: (¼sm) Day only RWY 21: (¼sm)	NOT AUTHORIZED

TAKE-OFF MINIMA	SCALE IN FEET
Rwy 10: ½ Rwy 03, 21, 28: *	1000 0 1000

AERODROME CHART
EFF 13 SEP 18

CYYG

FOR TRAINING PURPOSES ONLY

Minimum Visibility – Aeroplanes – Non-Precision, APV, or CAT I

CAP Advisory Visibility (SM, RVR x 100 ft)	Visibility Report (Gnd Vis SM, RVR "A" or Rwy Vis ft)
½ RVR 26	⅜, RVR or Rwy Vis 1600
¾ RVR 40	⅝, RVR or Rwy Vis 3000
1 RVR 50	¾, RVR or Rwy Vis 4000
1¼	1, RVR or Rwy Vis 5000
1½	1¼, RVR or Rwy Vis 6000
1¾	1½, RVR or Rwy Vis >6000
2	1½, RVR or Rwy Vis >6000
2¼	1¾, RVR or Rwy Vis >6000
2½	2, RVR or Rwy Vis >6000
2¾	2¼, RVR or Rwy Vis >6000
3	2¼, RVR or Rwy Vis >6000

Minimum Visibility – Aeroplanes – 703/704/705 Ops Spec – Non-Precision, APV, or CAT I

CAP Advisory Visibility (SM, RVR x 100 ft)	Visibility Report (Gnd Vis SM, RVR "A" or Rwy Vis ft)
½ RVR 26	¼, RVR or Rwy Vis 1200
¾ RVR 40	⅜, RVR or Rwy Vis 2000
1 RVR 50	½, RVR or Rwy Vis 2600
1¼	⅝, RVR or Rwy Vis 3400
1½	¾, RVR or Rwy Vis 4000
1¾	1, RVR or Rwy Vis 5000
2	1, RVR or Rwy Vis 5000
2¼	1¼, RVR or Rwy Vis 6000
2½	1¼, RVR or Rwy Vis >6000
2¾	1½, RVR or Rwy Vis >6000
3	1½, RVR or Rwy Vis >6000

CARs Answer Key

1. d	41. a	81. a	121. c
2. a	42. d	82. d	122. b
3. b	43. b	83. c	123. c
4. c	44. d	84. a	124. c
5. d	45. c	85. b	125. a
6. a	46. b	86. b	126. d
7. d	47. d	87. c	127. c
8. b	48. b	88. c	128. a
9. a	49. c	89. c	129. c
10. c	50. a	90. d	130. b
11. a	51. d	91. c	131. a
12. b	52. d	92. d	132. b
13. b	53. c	93. a	133. b
14. d	54. a	94. b	134. d
15. d	55. d	95. a	135. c
16. b	56. c	96. b	136. b
17. d	57. a	97. d	137. b
18. d	58. c	98. d	138. d
19. c	59. c	99. a	139. c
20. b	60. b	100. d	140. d
21. c	61. c	101. b	141. c
22. c	62. c	102. a	142. c
23. a	63. d	103. c	143. a
24. c	64. c	104. c	144. b
25. d	65. c	105. b	145. b
26. b	66. d	106. c	
27. b	67. c	107. a	
28. c	68. c	108. b	
29. a	69. a	109. d	
30. d	70. c	110. b	
31. d	71. a	111. b	
32. c	72. d	112. c	
33. b	73. b	113. a	
34. c	74. d	114. b	
35. d	75. c	115. d	
36. c	76. b	116. a	
37. c	77. b	117. d	
38. c	78. c	118. b	
39. d	79. c	119. a	
40. a	80. d	120. d	

MET GENERAL

1. That part of the earth's atmosphere where most of the clouds and precipitation are found is:

   a) The insolation zone.
   b) The mesosphere.
   c) The troposphere.
   d) The terrestrial radiation zone.

2. Pick the false statement with respect to the tropopause.

   a) The tropopause is lower over the poles.
   b) The tropopause is higher over the equator.
   c) The temperature at the tropopause is colder over the poles.
   d) The temperature at the tropopause is colder over the equator.

3. Is the height of the tropopause higher over the poles or equator?

   a) Poles – the density of the air in this region is greater and therefore higher
   b) Equator – the density of the air in this region is greater and therefore higher
   c) Poles – the density of the air in this region is less and therefore higher.
   d) Equator- the density of the air in this region is less and therefore higher.

4. The height of the tropopause will tend to be higher in:

   a) In a warmer air mass.
   b) When the MSL pressure is high.
   c) At a lower level in a warmer air mass.
   d) Both (a) and (b) are correct.

5. That region of the atmosphere between the stratopause and the mesopause is known as:

   a) The exosphere.
   b) The thermosphere.
   c) The ionosphere.
   d) The mesosphere

6. The sun emits large amounts of ultraviolet radiation and is largely absorbed by a colorless gas that is found at varying amounts throughout the atmosphere. This gas is known as:

a) Carbon monoxide.
b) Nitrogen pentoxide.
c) Ozone.
d) Methane.

7. The earth's surface is heated by:

a) Short wave solar (ultraviolet) radiation.
b) Kinetic activity in the lower troposphere.
c) Long wave solar (infrared) radiation.
d) Conduction.

8. What is the Intertropical Convergence Zone (ITCZ)?

a) It is the area on the earth where solar radiation is at its weakest.
b) It is the area on the earth where solar radiation is at its strongest.
c) It is where two highs converge together.
d) It is where two lows converge together.

9. Why does the ITCZ move south during the winter months?

a) The relationship between the earth, the sun and the moon slightly shifts earth's orbit causing the maximum solar radiation to shift south.
b) Where the cold air and warm air meet shifts the ITCZ southwards during the winter months.
c) The Northern Hemisphere tilts towards the sun during winter forcing the cold air southwards along with the ITCZ.
d) The Northern Hemisphere becomes tilted away from the sun during winter meaning the point of maximum solar radiation striking the earth moves southward.

10. The lower atmosphere is heated by:

a) Short wave solar (ultra violet) radiation.
b) Conduction
c) Long wave solar (infrared) radiation.
d) Both (b) and (c) are correct.

11. Temperatures in the lower stratosphere approximate those:

a) That exist at the 300 hPa pressure surface.
b) Of the stratopause.
c) That are observed at the midpoint of the earth's laminar boundary layer.
d) Of the tropopause.

12. In the International Standard Atmosphere (ISA) the temperature at Sea Level is 15°C and the pressure at that level is 1013.2 hPa. What would be the ISA temperature for FL300?

a) -75°C
b) -45°C
c) -60°C
d) -56.5°C

13. The actual temperature at FL280 is -48°C. How would this temperature be expressed in terms of an ISA deviation?

a) ISA -10°C
b) ISA +7°C
c) ISA -7°C
d) ISA +8°C

14. If you are flying at 34,000' with a SAT of -50°C and the tropopause was actually at 30,000' where SAT was -45°C, what is the deviation from ISA?

a) ISA-3°C
b) ISA+3°C
c) ISA+5°C
d) ISA-5°C

15. If you are flying at 38,000' with a SAT of -50°C and the tropopause was actually at 44,000' where SAT was -65°C, what is the deviation from ISA?

a) ISA+6°C
b) ISA-6°C
c) ISA+23°C
d) ISA+15°C

16. As air moves horizontally over the earth in the N. Hemisphere, the air is deflected to the right. This is known as the Coriolis and it is caused by the:

a) Rotation of the earth
b) Vorticity in the lower atmosphere
c) Mesoscale gravity waves
d) Geostrophic acceleration

17. Which of the following statements with respect to Coriolis is correct?

a) Coriolis is stronger closer to the equator.
b) Coriolis is weaker at the higher latitudes.
c) Coriolis is stronger nearer to the poles.
d) Coriolis does not change with a change in latitude.

18. Vertical air currents are often created within the atmosphere by varying means. A process that will lead to rising air is known as:

a) Advection.
b) Convection.
c) Dispersion.
d) Convergence.

19. Which of the following would experience the **least** diurnal range in temperature

a) Tropical rain forest.
b) Temperate zone oceans.
c) Desert.
d) Mountain valleys.

20. Which of the following statements is false.

a) Deserts and open fields on the Earth's surface heat up and cool down relatively easy promoting rising air during the nighttime.
b) Lakes and oceans will promote convection and rising air.
c) Convection is more likely to occur over water-free surfaces.
d) (a) and (b) are false.

21. The lifting process responsible for the choppy type of turbulence often encountered during flight within the lower 3000 feet of the troposphere is:

a) Orographic lift.
b) Convergence.
c) Mechanical turbulence.
d) Advectional cooling.

22. Which of the following is **not** a lifting agent?

a) Evaporation.
b) Convection.
c) Mechanical turbulence.
d) Convergence.

23. Meteorologists use the term **convergence** to depict air that is:

a) Flowing along the earth's surface from areas of higher pressure into and converging at an area of lower pressure.
b) Lifting orographically.
c) Spreading out from an area.
d) Becoming conditionally stable.

24. Which of the following processes can result in expansional cooling, subsequent condensation and formation of cloud?

a) Subsidence.
b) Divergence.
c) Frontolysis.
d) Overrunning.

25. Define "overrunning".

a) It refers to how fast the cold air rises vertically as it flows up along the frontal surface over the retreating warm air.
b) It is a term used to describe how fast the warm front is moving.
c) It is a term used to describe how fast the cold front is moving.
d) It refers to how fast warm air rises vertically as it flows up along the frontal surface over the retreating cold air.

26. The clouds and precipitation often associated with a **cyclone** are due to:

a) The presence of strong winds and associated mechanical turbulence.
b) The associated cold outflow leads to a steep lapse rate and instability.
c) Surface convergence and ascending air.
d) Advectional heating of moist air that inflows across the surface isobars.

27. Which of the following would be used to describe the process whereby a rising, expanding parcel of air does not undergo any heat transfer in or out of the parcel as it ascends?

a) Osmotic.
b) Diabatic.
c) Isentropic.
d) Adiabatic.

28. **Subsiding** air, even if it is initially saturated, will:

a) Continue to warm at the saturated adiabatic lapse rate
b) Warm at the dry adiabatic lapse rate
c) Warm at the environmental lapse rate
d) Increase in temperature at the ISA lapse rate.

29. With respect to air that is descending rapidly down the lee slopes of a mountain range, which of the following statements is true?

a) Considerable cloud will be found near the end of its descent.
b) This air will warm at the dry adiabatic lapse rate almost immediately after the start of its descent.
c) The relative humidity of this air increases rapidly during its descent.
d) Warming of this air will be at the saturated adiabatic lapse rate during most of its descent.

30. When air subsides, normally the:

a) Pressure gradient steepens.
b) Moisture content increases.
c) Temperature decreases.
d) Relative humidity decreases.

31. When air ascends, its ability to contain moisture:

a) Increases.
b) Remains unchanged.
c) Initially increases, then decreases.
d) Decreases.

32. During the condensation process which of the following is true?

a) The relative humidity of the surrounding air decreases.
b) Latent heat is released to the surrounding air.
c) Latent heat is absorbed from the surrounding air.
d) The condensed water vapor molecules will enter a higher energy state.

33. When condensation occurs in an unstable air mass, the stability of the air tends to become:

a) More unstable as heat is released to the surrounding air.
b) More stable as heat is released to the surrounding air.
c) More unstable as the surrounding air is cooled from absorption of latent heat.
d) More stable as the surrounding air is cooled from absorption of latent heat.

34. With a surface temperature of 28°C and a dewpoint temperature of 16°C reported at your airport, you would predict the base of any convective cloud that might form to be approximately:

a) 7600 feet AGL.
b) 6400 feet AGL.
c) 4900 feet AGL.
d) 2900 feet AGL.

35. With respect to a rising parcel of air which commences to ascend from a Sea Level airport where the temperature is 30°C, what would be its temperature at 14,000 feet above sea level if it became saturated at 6,000 feet above sea level?

a) +2°C.
b) +0°C.
c) -1°C.
d) +6°C.

36. When discussing the stability/instability of the atmosphere, we are referring to:

a) The diurnal fluctuations in the height of pressure surfaces aloft.
b) A property of the atmosphere that suppresses or promotes vertical motion.
c) The varying speeds and slopes of frontal surfaces and their effect on the surface temperature field.
d) The effects of macro-scale temperature distribution in the upper troposphere.

37. The stability of warm, dry air depends on the relationship between the:

a) Saturated adiabatic lapse rate and the dry adiabatic lapse rate.
b) Dry adiabatic lapse rate and the standard lapse rate.
c) Dry adiabatic lapse rate and the environmental lapse rate.
d) Saturated adiabatic lapse rate and the environmental lapse rate.

38. Stable air is most likely to be associated with:

a) Cold air advecting over a warm surface.
b) Showery precipitation.
c) Gusty winds.
d) Sustained low visibility.

39. Haze layers, drizzle and fog are features of:

a) Overrunning air.
b) Stable air.
c) A convergence zone.
d) Advectional heating of cold air.

40. One weather condition that may affect visibility in unstable air is:

a) Haze layers.
b) Snow showers.
c) Drizzle.
d) Fog.

41. Stable air becomes unstable as a result of:

a) Subsidence.
b) Radiational cooling.
c) Addition of moisture.
d) Heating from below.

42. A good signpost of mid-level instability would be the presence of:

a) Stratocumulus.
b) Cirrocumulus.
c) Altocumulus Castellanus.
d) Cumulus Fractus.

43. Which of the following effectively inhibits or blocks rising air?

a) A frontal depression.
b) A supercooled layer aloft.
c) An inversion.
d) A convergence zone.

44. The pilot of an aircraft would expect the smoothest low level flight during a hot summer afternoon when passing over which of the following surface features?

a) A forest
b) A plowed field
c) A lake
d) A vineyard

45. A pressure of 200 hPa is closest to which of the following levels in the ICAO Standard Atmosphere?

a) FL600.
b) FL450.
c) FL390.
d) FL340.

46. FL450 is associated with which pressure level in the ICAO Standard Atmosphere?

a) 250 hPa.
b) 150 hPa.
c) 200 hPa.
d) 300 hPa.

47. The vertical distance between any two specific pressure levels is:

a) Greater in cold air than in warm air.
b) Not affected by the temperature of the air.
c) Less in cold air than in warm air.
d) Solely determined by the adiabatic lapse rate.

48. The height of a pressure level (ex. 500MB) will be tend to be found at:

a) At a higher level in a colder air mass.
b) At a higher level when the MSL pressure is low.
c) At a lower level in a warmer air mass.
d) At a lower level in a colder air mass.

49. The height of a pressure level will:

a) Become lower when a Low is deepening.
b) Become higher when a Low is deepening.
c) Become lower when a Low is filling.
d) Remain unchanged whether a Low is deepening or filling.

50. Flying in the lower levels towards the centre of an anticyclone which has a strong pressure gradient, a pilot would expect:

a) High winds and increasing barometric pressure.
b) Light winds and relatively constant barometric pressure.
c) Clear weather and relatively low barometric pressure.
d) High winds and decreasing barometric pressure.

51. When flying towards a ridge of high pressure at FL200, what happens to the height of the pressure level and your true altitude?

a) Pressure level goes up and your true altitude goes down.
b) Pressure level goes up and your true altitude goes up.
c) Pressure level goes down and your true altitude goes down
d) Pressure level goes down and your true altitude goes up.

52. When flying at FL200 towards an area of colder air on the surface of the earth, what happens to the height of the pressure level and your true altitude?

a) Pressure level goes up and your true altitude goes down.
b) Pressure level goes up and your true altitude goes up.
c) Pressure level goes down and your true altitude goes down.
d) Pressure level goes down and your true altitude goes up.

53. When flying at FL 370 towards a ridge of high pressure and an area of warmer air on the surface of the earth, what happens to your indicated altitude (shown on your altimeter) and your true altitude?

a) Indicated altitude goes up, therefore your true altitude goes up.
b) Indicated altitude goes down, therefore your true altitude goes up.
c) Indicated altitude stays the same, but your true altitude goes down.
d) Indicated altitude stays the same, but your true altitude goes up.

54. An aircraft is parked on the apron. You go home for the night. During the evening, cold air moves into the vicinity of the airport. When you return to your aircraft in the morning, what does the altimeter show?

a) It will over-read and indicate a higher than normal altitude.
b) There will be no change in the altimeter's reading.
c) It will under-read and indicate a lower than normal altitude.
d) It will over-read and indicate a lower than normal altitude.

55. Which of the following statements relating to an anticyclone is **not** true?

a) Within this pressure region there is a general increase in relative humidity.
b) Fair weather and clear skies normally prevail within the region of an anticyclone.
c) An anticyclone is generally characterized by a downward vertical movement.
d) Anticyclones can be described as strong or weak and strengthening or weakening.

56. Surface Highs and Lows develop as a result of:

a) Converging or diverging air at the surface.
b) Strong pressure gradients along the surface.
c) Unstable air masses.
d) Upper level convergence and divergence forcing air to sink or rise respectively.

57. A **trough** is:

a) A wedge-shaped extension of an anticyclone.
b) An upper-troposphere contour pattern which is associated with warm air moving towards the North Pole.
c) An elongated area of relatively low atmospheric pressure.
d) An indefinite isobar configuration located between two highs and two lows.

58. A neutral area, not bounded by any one isobar, within which light winds are blowing and the weather is changing very slowly, exists between two high and two low pressure systems. The name given to this indefinite pressure area is:

a) A secondary depression.
b) A geostrophic divergence zone.
c) A surface occlusion.
d) A col.

59. During descent from 3000 feet AGL to the surface, you would expect the wind to:

a) Veer and increase.
b) Veer and decrease.
c) Back and increase.
d) Back and decrease.

60. The wind at 3000 feet over the land is parallel to the isobars at 30 kts. What would be the most probable angle to the isobars and speed of the surface wind assuming it is not affected by local topography?

a) 0° and 20 kts
b) 10° and 30 kts
c) 30° and 20 kts
d) 40° and 40 kts

61. Given the same pressure gradient over the land and over the adjacent water, what is the most probable wind angle to the isobars and wind speed over the water if the surface wind over the land is blowing across the isobars at an angle of 30° and at a speed of 30 kts?

a) 40° and 20 kts
b) 30° and 30 kts
c) 20° and 20 kts
d) 20° and 40 kts

62. A flight from Vancouver to Montreal at a constant pressure level experiences winds that gradually veer from the southwest to the northwest. The aircraft's actual height above mean sea level will have:(Hint: port drift-A/C true altitude is increasing; starboard drift-A/C true altitude is decreasing)

a) Increased steadily.
b) Increased for a time and then decreased steadily thereafter.
c) Decreased steadily.
d) Decreased for a time and then increased steadily thereafter.

63. If the temperatures to the southeast today are warmer than those to the northwest, the winds aloft would be blowing from the: (recall Buys-Ballot's Law – with your back to the wind, your left hand will point to the area of the lower pressure; for upper level winds, your left hand will point to area of lower temperatures …)

a) Northeast.
b) Southeast.
c) Northwest.
d) Southwest.

64. From the statements listed below which relate to **density altitude**, select the one which is **false**:

a) The calculation of the density altitude at a given aerodrome consists of correcting the existing pressure altitude with the ISA temperature for that level.
b) The density altitude is that altitude in the standard atmosphere which corresponds to a given density value.
c) An increase in density altitude corresponds to a decrease in density.
d) The density altitude for a given aerodrome is changing continually in response to changes in pressure and temperature.

65. An aerodrome's density altitude is calculated with a flight computer using the:

a) The aerodrome's published elevation matched with the ambient air temperature.
b) The aerodrome's pressure altitude matched with the aerodrome's outside air temperature corrected in terms of ASL.
c) The aerodrome's pressure altitude matched with the aerodrome's outside air temperature corrected in terms of AGL
d) The aerodrome altitude above sea level matched with the average sea level temperature during the previous 12 hours.

66. An aircraft's true altitude would be greater than its indicated altitude in conditions of:

a) Warm air and high pressure.
b) Warm air and low pressure.
c) Cold air and high pressure.
d) Cold air and low pressure.

67. Which of the following statements is true with respect to the term **MSL Pressure**?

a) It is station pressure reduced to MSL assuming ISA conditions.
b) It is station level pressure extracted from the appropriate synoptic chart.
c) It is station pressure reduced to MSL using the average surface temperature for the last 12 hours.
d) It is the average sea level pressure reading at a given station during the previous 3 hour period.

68. **Altimeter Setting** is:

a) Measured MSL pressure corrected for non-standard temperature.
b) Station pressure reduced to sea level with a 12 hour average temperature correction applied to it.
c) Measured MSL pressure with ISA deviation correction applied.
d) Station level pressure reduced to MSL assuming ISA conditions.

69. It is essential that a pilot flying in the Standard Pressure Region closely monitor terrain clearance, when:

a) Pressures are high and temperatures are high.
b) Operating in an air mass having a variable pressure gradient
c) Pressures are low and temperatures are low.
d) The current altimeter setting is greater than 31.00 inches (Hg).

70. An aircraft descends from FL380 for an approach to the Kelowna Airport. During the descent, the pilot forgets to reset the altimeter subscale. If the published decision height (D.H.) is 2060 ft.ASL, what would be the actual height of the aircraft on reaching the indicated D.H.? (Refer to the following METAR)
METAR CYLW 281700Z 18010KT 5SM-SHRA OVC015 10/06 A2962 RMK SF8 SLP150=

a) 2060 feet ASL
b) 2360 feet ASL
c) 1760 feet ASL
d) 1460 feet ASL

71. Compare two aircraft on approach – the 1st aircraft is flying the approach in standard atmospheric conditions; the second aircraft in colder than standard conditions. Both aircraft arrive over the final approach point/fix at the altitude that is shown on the approach plate (no temperature corrections applied). What is the second aircraft's altimeter reading in relation to the first, and what is the result (Hint: HLHL)?

a) The second aircraft's altimeter will be over-reading, and therefore the aircraft will be lower than the published altitude.
b) The second aircraft's altimeter will be under-reading, and therefore the aircraft will be lower than the published altitude.
c) The second aircraft's altimeter will be under-reading, and therefore the aircraft will be higher than the published altitude.
d) The second aircraft's altimeter will be over-reading, and therefore the aircraft will be higher than the published altitude.

72. Consider that same two aircraft in the question above on a RNAV/RNP style approach. What will happen to the slope of the approach flown by the second aircraft?

a) No difference.
b) The second aircraft will fly a steeper approach path and touchdown with zero temperature error on the altimeter.
c) The second aircraft will fly a shallower approach path and touchdown with a temperature error on the altimeter.
d) The second aircraft will fly a shallower approach path and touchdown with zero temperature error on the altimeter.

73. The relationship between the amount of water vapor actually present in the air and the maximum possible amount of water vapor that could be held by the air at that temperature and pressure (without condensation occurring) is expressed by which of the following terms?

a) Dewpoint temperature.
b) Saturation vapour pressure.
c) Relative humidity.
d) Saturation index.

74. The height of a cloud base is most dependent upon the:

a) Moisture content of the air.
b) The dry adiabatic lapse rate.
c) The amount of cooling that is taking place at the earth's surface.
d) The strength of any vertical motion present at the 400 hPa level.

75. Clouds and precipitation are common in areas:

a) Of subsiding air.
b) Located immediately above an isothermal layer.
c) Where katabatic flow is present.
d) Of ascending air.

76. Which of the following types of cloud frequently forms as a result of evaporation from rain rather than from expansional cooling?

a) Orographic cloud.
b) Altocumulus castellanus.
c) Cumulus fractus.
d) Stratus cloud .

77. If the air mass is moist and stable with mechanical turbulence present in the lower levels, what type of clouds can you expect to be present?

a) Stratus cloud.
b) Stratocumulus cloud.
c) Cumulus fractus.
d) Stratus and Stratocumulus cloud.

78. Rain droplets or snowflakes that fall from cumuliform cloud and evaporate or sublimate before reaching the ground is called:

a) Refractive cloud.
b) Curtain cloud.
c) Virga.
d) Nimbostratus opacus.

79. Flying through or underneath virga usually results in:

a) Smooth flying conditions due to the cooling effect as water droplets evaporate back into a gaseous state.
b) Choppy conditions from the condensation process.
c) Choppy flying conditions due to the cooling effect as water droplets evaporate back into a gaseous state causing the more dense air to sink rapidly creating a form of wind shear.
d) Choppy flying conditions through the virga but smooth underneath the virga.

80. **Drizzle** forms through the:

a) Splitting of large supercooled droplets into smaller droplets as they descent from higher altitudes.
b) Melting of large snowflakes at the base of stratocumulus cloud.
c) Condensation process.
d) Condensation and coalescence processes occurring in stratus cloud.

81. Snow falling from a layer of stratocumulus cloud would indicate that:

a) The liquid water content in the cloud is decreasing.
b) The population of large supercooled water droplets will increase in the cloud as the snow continues to fall.
c) An above-freezing layer is present aloft.
d) The liquid water content of the cloud will increase due to the melting of the ice crystals.

82. An airport weather observer reports snow grains; this type of precipitation would imply:

a) That freezing rain exists aloft.
b) That a layer of snow aloft had melted and then, during its descent, had passed through a sub-freezing layer.
c) That a layer composed of ice pellets lies above the airport.
d) That freezing drizzle is present aloft.

83. A large area of land or ocean of relatively uniform characteristics and above which an air mass can form, is known as a:

a) Synoptic region.
b) Source region.
c) Semi-permanent air mass cell.
d) Tropospheric mixing zone.

84. A true statement with respect to air masses would be:

a) They have uniform properties of temperature and moisture in the vertical.
b) Air masses are classified according to their moisture content.
c) The transition zone between adjacent air masses is always very wide and diffuse.
d) Air masses are seldom more than several hundred kilometres across.

85. When Continental Arctic (cA) air moves southbound over the Great Lakes during the winter you would expect:

a) Steam fog over the southern shorelines.
b) Freezing rain over the southern portions of the lakes.
c) Radiation fog to form over the northern shorelines.
d) Snow showers immediately to the south of the southern shorelines.

86. Which of the following would you expect to occur when Maritime Tropical (mT) air moves northwards over the Great Lakes in the spring and early summer?

a) Scattered thunderstorm activity.
b) The formation of nimbostratus cloud layers over the middle of the lakes.
c) Rain showers over the southern shores.
d) Low stratus cloud, drizzle and fog over the north shores.

87. As Continental Arctic (cA) air moves southbound over the Great Lakes in early autumn, it often produces:

a) Extensive stratocumulus cloud development over the northern shorelines.
b) Widespread advection fog over the southern shorelines.
c) Steam fog over the northern portions of the lakes.
d) Snow showers over the middle portions of the lakes.

88. Fronts are named according to:

a) The steepness of the lapse rate in the warmer air mass.
b) The colder air mass and its direction of movement.
c) The pressure gradient across the frontal surface.
d) The warmer air mass and its direction of movement.

89. Which of the following warm fronts would most likely be present on Canadian weather charts during the winter months?

a) Maritime Polar and Maritime Tropical.
b) Continental Arctic and Maritime Polar.
c) Maritime Arctic and Maritime Polar.
d) Continental Arctic and Maritime Arctic.

90. As you fly towards a warm front where the warm air is moist and unstable, the sequence of clouds that you would expect to encounter would be:

a) CI, CS, AS, NS.
b) CI, CS, AS, NS, and embedded CB's.
c) CS, AC, SC, SF.
d) CI, CC, ADD, ST.

91. The extensive stratiform cloud decks commonly associated with warm fronts are caused by:

a) The cold air being conditionally unstable.
b) Pronounced conductive cooling of the warm air.
c) The cold air having a high relative humidity.
d) Expansional cooling of the overrunning warm air.

92. During flight in the lower levels toward a warm front (i.e., from the cold air side), you notice that the precipitation changes from steady rain to heavy showers. You would then assume that:

a) The front was slow moving but had a steep frontal slope.
b) The cold air was moist and unstable.
c) The front had a shallow slope but was retreating rapidly.
d) The warm air was moist and unstable.

93. As you fly in the lower levels of the cold air mass side toward a winter warm front (mA air overrunning cA air), you encounter ice pellets. In this case, you would know that there was:

a) Very unstable air aloft.
b) Freezing rain above.
c) Widespread sublimation occurring in the layer immediately above.
d) A region of dry snow immediately above you.

94. Which of the following cold fronts are likely to be found on Canadian during the summer months?

a) Continental Arctic and Maritime Arctic.
b) Maritime Arctic and Maritime Polar.
c) Maritime Polar and Maritime Tropical.
d) Continental Arctic and Maritime Polar.

95. Cold frontal weather is determined by:

a) The stability of the warm air mass.
b) The moisture content of the warm air mass.
c) The speed of the front and the steepness of its frontal surface.
d) All of the above.

96. The cloud and precipitation associated with a cold front develop because:

a) The warm air that is in contact with the cold air is cooled conductively.
b) The warm air that is lifted up the frontal surface cools by expansion.
c) The cold air becomes saturated as it overruns the warm air.
d) Advectional heating of the cold air occurs as it advances over ground recently occupied by the warm air.

97. A rapidly moving cold front with a steep frontal surface has moved into your region. You note however, that no extensive areas of convective cloud have formed along the front. This would indicate that:

a) The warm air mass has a low relative humidity.
b) An inversion was present in the cold air mass.
c) The warm air must have been conditionally stable.
d) The cold air mass has a low relative humidity.

98. An approaching cold front that initially has a shallow frontal surface, steepens some distance behind the surface front. You experience a wind shift and a drop in temperature, when would you expect clouds and precipitation to occur?

a) It would have already occurred.
b) At the same time as the wind shift.
c) Will occur later.
d) No weather change is expected.

99. You are at an airport that experiences the passage of a cold front in the early afternoon. Shortly afterwards, the clouds scatter out leaving a clear sky. During the next 12 hours, you would expect the temperature to:

a) Decrease, then increase slightly.
b) Steadily decrease.
c) Remain relatively constant.
d) Increase slightly then decrease.

100. A cold front with a steep frontal surface that is advancing rapidly upon moist, unstable air produces a suitable environment for:

a) A frontal depression.
b) A squall line of thunderstorms.
c) Orographic subsidence.
d) A "bent back" occlusion.

101. A combination of both cold front and warm front weather conditions would most likely be associated with which of the following?

a) An upper cold front.
b) An occluded front
c) A trowal.
d) Both (b) and (c) are correct.

102. In the Northern Hemisphere, the future movement of a mature frontal depression and its associated frontal wave will tend to be parallel to the:

a) Isobars behind the cold front.
b) Warm sector isobars.
c) Surface isobars in the air immediately to the north of the crest of the wave.
d) Contours of the 500 hPa surface.

103. At a **stationary** front, the cold air moves:

a) Towards the front.
b) Against a steep surface pressure gradient.
c) Parallel to the front.
d) Away from the front.

104. The transition zone between two different air masses where there is a sudden change in temperature and moisture content is called:

a) The mixing zone.
b) A col.
c) A stagnation zone.
d) A front.

105. When the properties of two air masses along a front are becoming increasing different in temperature and moisture, it is referred to as what?

a) Frontolysis.
b) Cyclogenesis.
c) Frontogenesis.
d) Deepening.

106. A **land breeze:**

a) Blows from the water to the land during the day.
b) Blows from the land to the water during the night.
c) Is always more pronounced and more regular than the sea breeze.
d) May spring up very suddenly, especially during the mid-morning.

107. A condition favourable for the development of strong **katabatic** winds would be:

a) A region of extensive glaciers.
b) Sloping terrain whose temperature is warmer than the air that rests upon it.
c) An area of gently rolling hills that adjoin a snow-covered plain.
d) Daytime heating of ice-free slopes in the Canadian Arctic during the summer months.

108. A **warm** katabatic wind found in very hilly terrain is known as a:

a) Mistral wind.
b) Coast winter outflow wind.
c) Bora.
d) Chinook wind.

109. **Anabatic** winds can best be characterized as:

a) Strong winds associated with mid-latitude cyclones and frontal boundaries.
b) A gusty mountain breeze that results from nocturnal cooling.
c) Very cold and intense winds that have been funnelled through narrow mountain passes and are pulled towards low pressure systems to the east.
d) Upslope winds that develop on mountain slopes as they are heated by the sun.

110. An aircraft flies over an airport on radar vectors for an approach. The pilot notes that he/she can see the airport through a thin layer of fog. What can the pilot foresee as he/she turns onto final approach?

a) The airport will not be clearly seen since flight visibility will be less.
b) The airport will be clearly seen, as there will be no difference in flight visibility.
c) The airport will be clearly seen, as there will be no difference in slant range visibility.
d) The airport will not be clearly seen since slant range visibility will be less.

111. What adds to a whiteout illusion (i.e. no depth perception) besides a snow covered surface?

a) No wind condition.
b) Uniformly overcast sky.
c) Moderate snow.
d) During the night time hours.

112. The requirement for the formation of all types of fog is:

a) High relative humidity
b) Cloudless nights
c) Light breezes that do not exceed 13 kts.
d) The presence of an inversion

113. A south-westerly flow of mT air moving over the Labrador Current would produce:

a) Steam fog.
b) Advection fog.
c) Radiation fog.
d) Adiabatic fog.

114. In the answers below, choose the answer that bests describes the fog that would develop as the air flows from the Pacific Ocean towards the Rockies:

a) Advection fog.
b) Upslope fog.
c) Radiation fog.
d) Steam fog.

115. The fog that forms ahead of a warm front is the result of:

a) Rain that is falling from the overrunning cold air.
b) Radiational cooling of the warm air as it advects over the cold ground.
c) Expansional cooling of the cold air as it is forced aloft.
d) The evaporation of rain as it falls from the warm air into the cold air below.

116. Which of the following cooling processes is involved in the formation of the fog that frequently follows a warm front?

a) Expansion.
b) Radiation.
c) Advection.
d) Evaporation.

117. Which of the following types of fog forms as a result of raising the dewpoint up to the outside air temperature

a) Steam fog, Arctic Sea Smoke, and Frontal Fog.
b) Steam Fog, Arctic Sea Smoke, and Upslope fog.
c) Steam Fog and Advection fog.
d) Arctic Sea Smoke and Upslope fog.

118. Steam fog forms when:

a) Warm moist air moves over a cooler surface.
b) A strong wind blows moist, cool air towards the land during the winter.
c) Moist air is cooled expansionally.
d) Water evaporates into very cold air in contact with it.

119. When very cold, dry air drifts across the relatively warm waters of lakes, streams or marsh surfaces during cold autumn mornings, you would expect the formation of:

a) Radiation fog.
b) Stratocumulus cloud.
c) Ice fog.
d) Steam fog.

120. Both steam fog and radiation fog require which of the following for their formation?

a) Cold, moist air moving horizontally over a cold surface.
b) Condensation nuclei.
c) Expansional cooling.
d) Contact with a surface that is undergoing radiational cooling.

121. From the conditions listed below, choose those that are favourable for the production of radiation fog:

1) High relative humidity
2) An overcast sky at approximately the 6000 to 8000 ft. ASL level.
3) The presence of industrial smoke.
4) An air temperature that is much higher than the dewpoint temperature.
5) Light winds (2-5 kts.).
6) The presence of an anticyclone.
7) A very small spread between the frost point and the dewpoint.

a) 1, 2, 4, 6.
b) 2, 3, 5, 7.
c) 1, 3, 4, 7.
d) 1, 3, 5, 6.

122. Radiation fog does not form over the ocean surface since:

a) Favourable low-level, anticyclonic conditions do not prevail over the oceans.
b) The continuous presence of strong winds over the ocean surface prevents radiational cooling.
c) A dry layer aloft that arises from subsidence and which enhances radiation cooling at the surface never exists over an ocean.
d) This surface does not cool by radiation at night.

123. The development of radiation fog can be aided by:

a) A mid-level overcast layer of cloud.
b) The presence of pronounced low-level subsidence.
c) The absence of any wind at the surface.
d) The presence of industrial smoke.

124. When comparing advection fog to radiation fog, you would know that:

a) Both advection and radiation fog depend on the presence of clear skies at night for their formation.
b) Advection fog requires a considerably higher relative humidity for its formation than does radiation fog.
c) Advection fog can form over both land and water, whereas radiation fog forms only over the land.
d) Both advection and radiation fog require a very strong wind to assist in their formation.

125. Adiabatic cooling causes which of the following types of fog to form

a) Advection fog.
b) Upslope fog.
c) Radiation fog.
d) Ice fog.

126. When moist air moves from the east to west across the Prairies you would expect which of the following to occur?

a) Widespread rain showers and low level turbulence.
b) Extensive build-ups of stratocumulus cloud with good visibilities underneath and moderate turbulence.
c) Unstable conditions with considerable convective cloud development.
d) Widespread upslope fog increasing toward the foothills of the Rocky Mountains.

127. The physical process involved in the formation of Ice Fog is:

a) Expansional cooling.
b) Sublimation.
c) Advectional cooling.
d) Condensation.

128. During the spring, what is the name of the air mass and the associated front that can lead to advection fog occurring in the vicinity of South Western Ontario?

a) Maritime Tropical/Polar Front.
b) Maritime Arctic/Maritime Front.
c) Continental Arctic/Arctic Front.
d) Continental Polar/Continental Front.

129. When temperatures are very low, a jet aircraft that takes off from a northern airport can trigger the formation of which of the following types of fog?

a) Upslope fog
b) Prefrontal fog
c) Advection fog
d) Ice fog

130. With respect to airframe icing, choose from the factors listed below those that determine the rate of catch (collection efficiency):

1) Supercooled water droplet size.
2) The number of freezing layers present.
3) The temperature of the individual supercooled droplets.
4) The number of supercooled water droplets present.
5) Aircraft speed.
6) The length of time that the aircraft has been flying in cloud.
7) Shape of the aircraft wing.

a) 2,3,4,7
b) 1,4,5,7
c) 2,3,5,6
d) 1,2,4,6

131. Large supercooled water droplets are most likely to be found in the:

a) Upper levels of cloud that has formed in stable air where temperatures are well below freezing.
b) Lower levels of cloud that has formed in stable air where temperatures are well below freezing.
c) Upper levels of cloud that has formed in unstable air where temperatures are well below freezing.
d) Lower levels of cloud that has formed in unstable air where temperatures are only a few degrees below freezing.

132. If you inadvertently flew through a TCU or CB, you would expect moderate to severe icing down to what temperature?

a) -10°C with light icing down to temperatures of approximately -25°C
b) -25°C with no further icing at colder temperatures.
c) -25°C with light icing down to temperatures of approximately -40°C.
d) -40°C with no further icing at colder temperatures.

133. You would expect that rime ice accumulation rather than mixed or clear ice accumulation would occur when the rate of catch is:

a) Low and the droplets are small.
b) High and the droplets are large.
c) Low and the droplets are large.
d) High and the droplets are small.

134. During an IFR cross-country flight, your aircraft has been encountering light to moderate mixed icing. You notice that an increasing number of ice crystals are beginning to form within the cloud and would, therefore, expect that the further accumulation type and intensity would change to:

a) Clear icing and increasing intensity.
b) Rime icing and decreasing intensity.
c) Clear icing and decreasing intensity.
d) Rime icing and increasing intensity.

135. The shape of the wing is an important factor in determining its collection efficiency. When comparing a thin wing to a thick wing traveling at the same airspeed, it can be demonstrated that the leading edge of a thin wing will collect:

a) The same amount of ice per square inch when flying through cloud whose liquid water content is high.
b) Less ice per square inch.
c) The same amount per square inch when skin temperatures are not far below freezing and the droplets are large.
d) More ice per square inch.

136. With respect to airborne icing, the collection efficiency of a wing would be increased with:

a) Thin leading edges, high speeds, and large droplets.
b) Thick leading edges, low speeds and small droplets.
c) Thin leading edges, high speeds and small droplets.
d) Thick leading edges, low speeds and large droplets.

137. There is considerable variation in the liquid water content in the vertical of a cloud that has been formed in stable air. In fact, the amount of supercooled water droplets in this type of cloud usually:

a) Remains relatively constant with height when temperatures are far below freezing.
b) Increases with height when temperatures are not far below freezing.
c) Decreases with height when temperatures are not far below freezing.
d) Increases with height when temperatures are far below freezing.

138. Which of the following statements is true with respect to **freezing drizzle**?

a) This type of precipitation always requires a layer of warm air aloft for its formation.
b) Freezing drizzle always forms a deposit of rime ice on an airframe.
c) Freezing drizzle is most often associated with cumuliform clouds that have a relatively low liquid water content.
d) Icing in freezing drizzle is at its worst near the base of the cloud.

139. **Freezing rain** occurs when:

a) Supercooled water vapor sublimates upon being disturbed.
b) Rain falls into a sub-freezing layer of air.
c) Snow melts and becomes very small supercooled cloud droplets.
d) Supercooled rain falls into an above-freezing layer of air.

140. **Rime ice** forms when:

a) Supercooled water droplets partly freeze on contact with the wing leading edge and then flow backwards for some distance before completely freezing.
b) Water vapor sublimates onto an airframe whose temperature is below freezing.
c) Snow or ice pellets adhere to the airframe, then melt and almost immediately refreeze.
d) Supercooled water droplets freeze almost instantaneously without spreading.

141. Water droplets instead of ice crystals (IC) exist within the atmosphere at temperatures down to approximately -10°C due to the fact that:

a) Ice nuclei are not present until temperatures drop below -10°C.
b) Condensation nuclei are too small for a crystalline particle (IC) to form.
c) Condensation nuclei are too big for a crystalline particle (IC) to form.
d) Both (a) and (b) are correct.

142. Ice nuclei are important in the formation of snowflakes because it allows:

a) The water vapour molecules to spontaneously freeze onto them.
b) The water vapour molecules to sublimate onto the IC in a crystalline format.
c) The microscopic ice molecules present in the atmosphere to join together and become visible.
d) Water droplets to spontaneously freeze onto them.

143. An aircraft that is flying through which of the following phenomena could accumulate a deposit of rime ice on its wings?

a) Snow grains.
b) Hail.
c) Freezing fog.
d) Ice pellets.

144. If a METAR is reporting snow grains (SG) or snow pellets (GS), what does this indicate to you?

a) No icing in cloud as they are solid particles.
b) Some type and intensity of airframe icing will be experienced in either situation due to supercooled water droplets present in the clouds above.
c) Airframe icing if SG is reported but no airframe icing if GS is reported.
d) Airframe icing if GS is reported but no airframe icing if SG is reported.

145. Supercooled rain that freezes while falling through a sub-freezing layer becomes:

a) Snow grains.
b) Graupel.
c) Sleet.
d) Ice pellets.

146. Snowflakes that receive a coating of rime ice as it falls through a layer of supercooled water droplets and reaches the earth's surface will reported as:

a) Ice pellets.
b) Snow grains.
c) Hail.
d) Snow pellets.

147. Drizzle that falls through a below-freezing layer and freezes before reaching the earth`s surface will be reported as:

a) Ice pellets.
b) Snow grains.
c) Hail.
d) Snow pellets.

148. Aggregation refers to:

a) Water droplets colliding together to form bigger droplets.
b) The growth of snowflakes as they collide together forming larger snowflakes.
c) The transformation of water vapour into water droplets.
d) The transformation of water droplets into ice crystals.

149. The term used to describe the growth of a descending ice particle as it collides with nearby water droplets which then freeze onto the particle is:

a) Aggregation.
b) Frosting.
c) Sublimation.
d) Riming.

150. You have just landed after completing a flight at a high altitude lasting for several hours. You are to make a station stop lasting about 30 minutes to pick up some passengers before departing without taking on any further fuel. There is light wet snow falling at the airport with a temperature of +3°C. How and when would you check for surface contamination?

a) It does not matter as the temperature is above 0°C.
b) Visual inspection just prior to closing the cabin door as you can readily spot any contamination.
c) Tactile feel upon arrival to determine if cold soaking has lead to frost forming.
d) Tactile feel just prior to closing the cabin door as you will be unable to determine visually if the melted snow has refrozen or not.

151. The formation of **clear ice** on an aircraft is due to:

a) The sublimation of water vapor onto a very cold airframe.
b) The slow freezing of a heavy concentration of small supercooled droplets intercepted by the airframe.
c) The melting and instant re-freezing of ice pellets that impact the airframe.
d) Relatively large supercooled water droplets striking the airframe at a high catch rate which slowly freeze allowing the droplets to spread rearwards before freezing entirely.

152. Can you take-off with frost on the underside of the wing?

a) No, not under any circumstances.
b) Yes as long as you complete a pre-takeoff deicing procedure.
c) Yes as long as it doesn't exceed the aircraft manufacturer's recommendation.
d) Yes as long as the frost on the underside of the wing covers less than 50% of the area.

153. Which of the following statements relating to the effects of **aerodynamic heating** of an airfoil in overall icing conditions is true?

a) An airspeed of 350 to 450 knots is required to de-ice airfoil surfaces.
b) An airspeed of at least 500 knots is required to ensure no ice will collect.
c) There will be an increased risk of leading edge icing if the wing temperature rises to just above 0°C.
d) An airspeed of 500 to 600 knots is required to remove any airfoil ice.

154. As well as a lifting force or triggering action, the other conditions necessary for the formation of a well-developed thunderstorm are:

a) A low relative humidity and conditionally stable air at the surface.
b) A copious amount of moisture and a stable atmosphere to great heights.
c) A steep lapse rate in the lower atmosphere and a low relative humidity.
d) An abundant supply of moisture and a steep lapse rate.

155. The commencement of the **dissipating stage** of a storm cell is characterized by:

a) Intense rain showers at the surface.
b) The presence of downdrafts throughout nearly the whole cell.
c) The appearance of accessory clouds at the cell's trailing edge.
d) The domination of updrafts in the interior of the cell.

156. Flight beneath the anvil cloud of a thunderstorm cell should be avoided due to:

a) The serious hazard of encountering hail that has been thrown out of this overhanging cloud by the strong upper wind flow.
b) The possibility of entering a region of very large supercooled water droplets, even at temperatures less than -40°C.
c) The fact that serious lightning strikes often occur in this region.
d) The possibility of large altimeter errors caused by the accelerated horizontal airflow that exists in this underlying area.

157. At what stage of development of a thunderstorm cell would the most serious icing problem be present?

a) Midway through the mature stage.
b) At the beginning of the dissipating stage.
c) Just before the cell enters the mature stage.
d) Midway through the cumulus stage.

158. **Mammatus** clouds are frequently associated with:

a) Violent thunderstorms and tornadoes.
b) Low level nocturnal jet stream flow over the prairies.
c) Outflow winds from coastal inlets.
d) Frontogenesis of a stationary front.

159. What is the name given to a low-level, tube-shaped, detached cloud that is frequently observed on the leading edge side along a line of strong cumulonimbus clouds?

a) Nacreous cloud.
b) Shelf cloud.
c) Roll cloud.
d) Undulatus cloud.

160. **Funnel** clouds can form as cone-shaped columns or protuberances extending downwards from the main cloud base of a towering cumulus or cumulonimbus cloud. From the statements that follow relating to funnel clouds, select the one that is false:

a) A funnel cloud is a vortex of condensed water vapor and air spinning at high velocity.
b) If a funnel cloud is in contact with the ground, then it becomes a tornado.
c) Conditions of very low humidity and the absence of vorticity in the air favor the formation of funnel clouds.
d) If a debris swirl is present on the ground underneath a funnel cloud, then meteorologists classify it as a tornado.

161. Meteorologists involved with the forecasting of severe weather phenomena would agree that one of the identifiable features associated with tornado development would be:

a) The frequency of upper trough movement over a given area.
b) Satellite measurement of the heat balance in the upper atmosphere.
c) Mesocyclonic movement detected by high-resolution Doppler radars.
d) The continued presence of an omega high over an area which has a very low relative humidity.

162. The recommended technique following the inadvertent penetration of a thunderstorm cell is:

a) Slow to turbulence penetration speed and execute an immediate 180° turn.
b) Slow to endurance speed and turn 90° to your present track to escape.
c) Slow to minimum cruise speed and descend to smoother conditions.
d) Slow to turbulence penetration speed, do not attempt to maintain a rigid altitude or airspeed and maintain present heading.

163. An echo that has a distinct hook depicted on an aircraft's weather radar could be a sign of what?

a) Tornado.
b) Cumulonimbus cells.
c) Severe Icing.
d) Radar malfunction.

164. What distance should thunderstorms be avoided by?

a) 5 nm when below the freezing level.
b) 10 nm when above the freezing level.
c) 20 nm when reported as severe.
d) All of the above.

165. Where should you scan a thunderstorm with your weather radar?

a) Start in the mid levels and then below.
b) Start in the mid levels and then above.
c) Start in the high levels and then below.
d) Scan the upper and lower levels and compare intensities.

166. The amount of energy that is returned to the weather radar antenna is dependent upon 3 factors:
- The type of the precipitation,
- The concentration of the precipitation, and
- The water droplet's size.

Which one is the most important?

a) The type of the precipitation.
b) The concentration of the precipitation.
c) The water droplet's size.
d) They are all equally important.

167. What is an advantage of a stormscope over a weather radar set?

a) Not subject to the same amount of attenuation.
b) At lower altitudes, it will detect possible thunderstorms around higher terrain.
c) It tends to be a lower cost item.
d) All of the above.

168. What is attenuation with respect to an aircraft's weather radar?

a) A radar signal degrades with distance.
b) A radar signal doesn't reflect well off of solid precipitation.
c) One area of heavy rain blocks out other areas of rain in behind the 1st.
d) Both (a) and (c) are correct.

169. Pick the answers that best describe the characteristics of a downburst.

1) Downbursts can be described in terms of size as being "micro" or "macro".
2) Air within the downbursts tend to be warmer than the surrounding air due to the electrical discharges heating up the air before it descends and strikes the ground.
3) Downbursts are colder than the surrounding air due to the cooling process as the rain droplets partially evaporate as they descend to the ground.
4) Due to the warmer air within the downburst, the speed of the descending air tends to be decreased.
5) Due to the evaporational cooling effect, the air accelerates downwards increasing the severity of the downburst.
6) A downburst can create both an increased performance shear and/or a decreased performance shear situation for an aircraft on approach or during take-off.

a) 1,2,4,6.
b) 1,3,5,6.
c) 2,4,5,6.
d) 1,3,6.

170. What could the term "Virga" imply in a METAR?

a) That term is reserved for SIGMETs only!
b) Snow is falling from the cloud but sublimates before reaching the ground.
c) **V**ery **I**ntense **R**adar **G**round **A**ttenuation.
d) Microburst

171. The shaft of a microburst at the surface is normally about _____ wide?

a) 15 nm or less
b) 2.2 nm or less
c) 5 nm
d) 20 nm

172. A large change in wind direction or speed over a short distance is known as:

a) Zonal wind flow.
b) Vorticity.
c) Wind shear.
d) Free convection

173. A condition or phenomenon associated with potentially dangerous wind shear, especially during take-off and landing, would be:

a) A low level temperature inversion (with strong winds above the inversion).
b) A quasi-stationary front that is undergoing frontolysis.
c) A warm high with a mid-level isothermal layer.
d) The presence of an anticyclone that has undergone considerable elongation.

174. With respect to low level Nocturnal Jet Streams, which of the following statements are true?

1) They occur mostly in winter.
2) They are always associated with a surface occlusion.
3) They occur mostly in summer.
4) They generally form over flat terrain during the presence of southwest winds.
5) They are usually associated with temperature inversions
6) They require unstable air up to high altitudes for their formation.

a) 2,3,6
b) 4,5,2
c) 1,4,3
d) 3,4,5

175. Where is a low level frontal jet stream (LLJ) located?

a) Parallel to the warm front located about 50 – 100 nm in front of it.
b) Perpendicular to the warm front causing it to rise up along the frontal surface.
c) Perpendicular to the cold front causing it to rise up along the frontal surface.
d) Parallel to the cold front in the warm sector of the frontal wave.

176. Where is the CAT associated with the LLJ located?

a) About 1 – 3 hours prior to the passage of the cold front.
b) Along the cold front.
c) About 1 – 3 hours prior to the passage of the warm front.
d) Along the warm front.

177. When are LLJ depicted in a GFA?

a) When the core speed is expected to be 50 kts or more.
b) When the jet core is located within 6,000 feet ASL, except as required over higher terrain.
c) The height of the jet is not indicated.
d) All of the above.

178. A pilot taxiing an aeroplane for take-off notes that rain is falling from the base of a convective cloud that is located relatively high above the ground but is evaporating before it reaches the ground. He/she should be aware that this occurrence could signal the presence of:

a) A low level temperature inversion.
b) A dry microburst.
c) A warm occlusion at the 700 hPa level.
d) An air mass within which the environmental lapse rate is considerably less steep than both the DALR and the SALR.

179. Which of the following statements is <u>false</u> with reference to 'dry' microbursts?

a) They usually occur in areas where the air is very humid.
b) They can often be identified by the presence of 'virga'.
c) They are linked with high-based cumulus and altocumulus type clouds.
d) With this type of microburst, evaporative cooling intensifies the downdraft.

180. Downdrafts associated with a microburst could be as strong as:

a) 2500 feet/minute.
b) 4000 feet/minute.
c) 6000 feet/minute.
d) 7500 feet/minute.

181. Localized meteorological conditions that produce intense wind shears at Arctic airports as well as at airports situated along the coasts of Canada's mountainous regions could be due to the presence of:

a) Nocturnal jet streams.
b) High level temperature inversions.
c) Eroding anticyclonic ridges.
d) Valley, katabatic, or funnel winds.

182. One of the signposts for the existence of a **mountain wave** is:

a) Widespread convective cloud development downwind of the mountain range.
b) The presence of very strong anabatic winds.
c) The formation of scud roll cloud downwind from the first wave crest.
d) The presence of altocumulus standing lenticular clouds.

183. The lowest group of stationary clouds associated with a mountain wave is:

a) Altocumulus standing lenticular.
b) Rotor cloud.
c) Wall cloud.
d) Altocumulus castellanus.

184. Rotor Clouds found during mountain wave activity are located:

a) Over the mountain tops several thousand feet above.
b) Located at ridge top heights with their bases often extending below.
c) Beneath the wave crests within the mountain wave.
d) Both (b) and (c) are correct.

185. Where are lenticular clouds located in a mountain wave?

a) Over the top of the mountain peaks.
b) At the wave crests.
c) Under the wave crest at ridge-top heights downstream of a mountain range.
d) At the troughs of the mountain waves.

186. The most powerful rotor associated with the presence of a mountain wave is located:

a) In the proximity of the first wave crest.
b) Approximately 50 nm. downwind from the lee slopes.
c) Always well below the crest of the mountain ridge and usually topped at 2000 feet above the ground.
d) Just below the tropopause, downwind of the third wave crest.

187. The part of a mountain wave system that usually presents the most severe turbulence is located:

a) In that area where the cap clouds spill over the leeward slopes.
b) Near the wave that is farthest from the mountain range.
c) Within that layer that is bounded by the ground and the top of the rotor cloud.
d) Just above the downwind portion of each wave crest.

188. Severe turbulence at very high altitudes is likely to be associated with a mountain wave system when:

a) A warm high pressure system at the 400 hPa level lies just upwind of the mountain range and parallel to it.
b) The wavelength of the standing wave is less than 5nm.
c) The air mass is statically unstable and a very unstable layer lies above the mountain range.
d) There is a jet stream wind aloft that is oriented perpendicular to the axis of the mountain range.

189. Which of the following statements is correct with reference to a mountain wave system?

a) Altimeter readings are likely to over-read when flying through the crest of a mountain wave.
b) This system can be easily located because characteristic cloud types are always present.
c) The freezing level is at a uniform altitude downwind from the range.
d) The most severe wave is the one that is the greatest distance downwind from the mountain range.

190. The **tropopause** is defined as the boundary between the troposphere and the stratosphere. The tropopause can be identified during a climb in the upper troposphere by the occurrence of:

a) A sudden change in the direction of the thermal wind.
b) An abrupt change in the temperature lapse rate.
c) A marked increase in air density.
d) A dramatic increase in the static air temperature.

191. The tropopause:

a) Shows little change in height across upper fronts.
b) Is lower over the equator than over the pole.
c) Is located just above a region of very weak westerly flow.
d) Acts as a lid on the clouds and weather of the troposphere.

192. There is an abrupt change in the height of the tropopause over each:

a) Region of surface pressure-field change.
b) Major topographical feature such as a prominent mountain range.
c) Latitude interval of 15 degrees.
d) Frontal surface.

193. Which of the following air masses would most likely have the highest tropopause height?

a) mT.
b) mA.
c) mP.
d) cA.

194. The tropopause is:

a) Higher and colder over a warm air mass.
b) Lower and warmer over a warm air mass.
c) Higher and colder over a cold air mass.
d) Lower and colder over a cold air mass.

195. With respect to the tropopause, which of the following is a true statement?

a) It is found at a constant altitude over North America.
b) Its altitude is greater over the polar region than over the equatorial region.
c) The International Standard Atmosphere assumes the height of the tropopause to be 39,060 feet ASL.
d) Its altitude is lower over the polar region than over the equatorial region.

196. In the International Standard Atmosphere the height of the tropopause and its temperature are specified as:

a) 29,000 ft. and -43°C.
b) 36,090 ft. and -56.5°C.
c) 39,060 ft. and -55.6°C.
d) 45,000 ft. and -75°C.

197. What causes jet streams to form?

a) A strong pressure gradient force between a low and a high pressure area.
b) A strong pressure gradient force that is derived from a strong temperature contrast on the earth's surface that upsets the height of the pressure levels.
c) The Hadley Cell of circulation in the subtropics undergoes a long and slow acceleration as Coriolis deflects the air to the right in the Northern Hemisphere.
d) Both (b) and (c) are correct.

198. Along with presence of steep horizontal pressure gradients, which of the following constitutes a major factor in the formation of **jet streams**?

a) Centripetal force.
b) Linear momentum.
c) Mesoscale force.
d) Coriolis.

199. Select the true statement from those listed below concerning jet streams:

a) Jet streams occur on the warm side of the frontal surface with their jet cores positioned just beneath the tropopause.
b) A jet stream located in or near the tropics is generally stronger than one that is present in the mid-latitudes.
c) Extensive, dense cirrus cloud, when associated with a jet stream, is located on the cold air side of the jet core.
d) The cores of jet streams can usually be found just above the warm air tropopause.

200. You would expect a north-to-south jet stream flow when:

a) The temperatures below the jet core are colder to the north than to the south.
b) The air beneath the jet stream is colder to the east than to the west.
c) The 200 hPa contours are higher to the north than to the south.
d) The air is considerably warmer than ISA above the jet stream core.

201. Why do jet streams suddenly accelerate and decelerate?

a) Centrifugal forces around sharp ridges and troughs.
b) Changing pressure gradient forces along the earth's surface.
c) Neither (a) or (b) are correct.
d) Both (a) and (b) are correct.

202. There are several jet streams that affect the weather in Canada. How are they named?

a) Three of the jet streams are named after their under-lying front, and the fourth is called the Subtropical Jet Stream, which is due to the circulation within the Hadley Cell located in the subtropics.
b) All of the jet streams are named after their under-lying fronts.
c) The names are in honour of famous meteorologists.
d) Two of the jet streams are named after their under-lying front, and the third is called the Subtropical Jet Stream derived within the Hadley Cell.

203. The height of the jet stream core that is located above the Polar Front is:

a) Lower than the jet stream core located above the Arctic Front.
b) Located at roughly the same height as the one above the Arctic Front.
c) Higher than the Sub Tropical Jet Stream core.
d) Higher than the jet stream core located above the Arctic Front.

204. One of the prime areas where CAT (Clear Air Turbulence) is found is in the vicinity of jet streams. Several statements relating to CAT and jet streams appear below. Identify those which are correct:

1) Severe CAT is likely to be present when the vertical wind shear associated with a jet stream attains a value of at least 2 kts./1000 feet.
2) The threshold wind speed of a jet stream for the occurrence of CAT is approximately 90 kts.
3) Curving jet streams are more likely to have turbulent edges than straight jet streams especially those which curve around a deep pressure trough.
4) The most severe CAT associated with a very fast-moving jet stream is always located on the high pressure side of the jet stream core.
5) Wind shear and the accompanying CAT adjacent to jet streams are most intense above and to the lee side of mountain ranges.
6) The confluence of two jet streams can be a producer of CAT.

a) 1, 2, 3.
b) 2, 4, 6.
c) 3, 5, 6.
d) 1, 3, 5.

205. The directional changes that occur as very fast, high level winds flow around upper level troughs and ridges can result in the development of CAT. Select the statement that best describes the shear and resulting turbulence that can be expected with such mesoscale features.

a) Upper level ridges tend to curve more sharply than do upper level troughs.
b) Turbulence associated with upper level ridges usually tends to be more severe than with upper level troughs.
c) Upper level troughs and ridges usually have the same contour curvature since they are both elongations of pressure systems.
d) Turbulence associated with upper level troughs tends to be more severe than with upper level ridges.

206. The vertical extent of clear air turbulence associated with a jet stream will be the greatest on the _____ side of the jet stream core. From the choices listed below select the one which is correct.

a) Low pressure, warm air mass.
b) Low pressure, cold air mass.
c) High pressure, warm air mass.
d) High pressure, cold air mass.

207. While flying across a jet stream in North America, an aeroplane encounters some CAT. The pilot checks the OAT gauge and notes a temperature rise. To quickly escape from the turbulence, he/she should:

a) Climb the aeroplane.
b) Descend the aeroplane.
c) Alter the aeroplane's track to the south.
d) Alter the aeroplane's track to the north.

208. Which of the following statements is true with respect to the **Polar Jet Stream.**

a) Its core speeds will be less when there is a marked temperature contrast across the upper front.
b) This jet stream moves north in the winter and its core speeds are less than in the summer.
c) The most severe turbulence associated with this jet stream is usually encountered on the equatorial side.
d) This jet stream moves south during the winter and generally has higher core speeds than in the summer.

209. Jet streams having speeds above _____ at the core will have areas of significant turbulence near them in the sloping tropopause above the core, in the jet stream front below the core and on the cold air (low-pressure) side of the core. Fill in the blank.

a) 50 knots
b) 90 knots
c) 110 knots.
d) 150 knots

210. Flying near a jet stream in a crosswind situation and encountering moderate CAT, the pilot checks the OAT and notes that it remains constant. In this case, in order to escape from the turbulence, the pilot should:

a) Maintain the current altitude.
b) Alter track so as to parallel the jet stream axis..
c) Alter track to the south.
d) Either climb or descend the aircraft.

211. CAT is also related to vertical wind shear, so when the shear is greater than ____kts/1,000 feet, turbulence is likely. Fill in the blank.

a) 2
b) 5
c) 10
d) 25

ANSWER KEY MET GENERAL

1. c	48. d	95. d	142. b	189. a
2. c	49. a	96. b	143. c	190. b
3. d	50. a	97. a	144. b	191. d
4. d	51. b	98. c	145. d	192. d
5. d	52. c	99. d	146. d	193. a
6. c	53. d	100. b	147. b	194. a
7. a	54. b	101. d	148. b	195. d
8. b	55. a	102. b	149. d	196. b
9. d	56. d	103. c	150. d	197. d
10. d	57. c	104. d	151. d	198. b
11. d	58. d	105. c	152. c	199. a
12. b	59. d	106. b	153. b	200. b
13. c	60. c	107. a	154. d	201. a
14. b	61. d	108. d	155. b	202. a
15. a	62. b	109. d	156. a	203. d
16. a	63. d	110. d	157. c	204. c
17. c	64. a	111. b	158. a	205. d
18. d	65. b	112. a	159. c	206. b
19. b	66. a	113. b	160. c	207. a
20. d	67. c	114. b	161. c	208. d
21. c	68. d	115. d	162. d	209. c
22. a	69. c	116. c	163. a	210. d
23. a	70. c	117. a	164. d	211. b
24. d	71. a	118. d	165. a	
25. d	72. d	119. d	166. c	
26. c	73. c	120. b	167. d	
27. d	74. a	121. d	168. d	
28. b	75. d	122. d	169. b	
29. b	76. d	123. d	170. d	
30. d	77. d	124. c	171. b	
31. d	78. c	125. b	172. c	
32. b	79. c	126. d	173. a	
33. a	80. d	127. b	174. d	
34. c	81. a	128. a	175. d	
35. b	82. d	129. d	176. a	
36. b	83. b	130. b	177. d	
37. c	84. b	131. d	178. b	
38. d	85. d	132. c	179. a	
39. b	86. d	133. a	180. c	
40. b	87. c	134. b	181. d	
41. d	88. b	135. d	182. d	
42. c	89. d	136. a	183. b	
43. c	90. b	137. b	184. d	
44. c	91. d	138. d	185. b	
45. c	92. d	139. b	186. a	
46. b	93. b	140. d	187. c	
47. c	94. b	141. a	188. d	

MET PRACTICAL

MET Exercise 1

CHARLOTTETOWN/PE

```
METAR CYYG 211700Z 20012KT 15SM SCT005 OVC008 04/03 A2997 RMK SF3SC5 SLP151=
METAR CYYG 211600Z 19016KT 12SM SCT005 OVC008 03/03 A3000 RMK SF3SC5 SLP164=
SPECI CYYG 211529Z 18017KT 10SM OVC005 03/02 A3002 RMK SF8 CIG RAG SLP169=
METAR CYYG 211500Z 18017KT 10SM -RA OVC004 02/02 A3005 RMK SF8 CIG RAG PRESFR SLP178=

TAF AMD CYYG 211321Z 2113/2124 16012G22KT 2SM -RA -DZ BR OVC004 TEMPO 2113/2118 6SM BR
OVC006 PROB30 2113/2114 4SM -FZRA BR
FM211800 22012G22KT P6SM OVC006 BECMG 2122/2124 25018G28KT
RMK NXT FCST BY 211800Z=
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DEER LAKE/NL

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METAR CYDF 211600Z 04005KT 5SM -SN OVC028 M09/M12 A3012 RMK SC8 PRESFR SLP202=
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METAR CYDF 211400Z 05005KT 360V060 8SM -SN OVC038 M10/M15 A3027 RMK SC8 SLP253=

TAF AMD CYDF 211509Z 2115/2202 08005KT 6SM -SN OVC020
TEMPO 2115/2117 21/2SM -SN OVC012
FM211700 08006KT 3SM -FZRA BR OVC020 TEMPO 2117/2122 6SM -PL BKN008 OVC020
FM212200 20012G22KT 5SM -RA BR OVC015
RMK NXT FCST BY 212000Z=
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FREDERICTON INTL/NB

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METAR CYFC 211700Z AUTO 00000KT 1/4SM R09/2200FT/N FG VV003 02/02 A2999 RMK SLP158=
METAR CYFC 211600Z AUTO 00000KT 1/8SM R09/2200FT/N FG VV003 01/01 A3001 RMK SLP166=
SPECI CYFC 211501Z AUTO 00000KT 1/8SM R09/1400FT/N FG VV003 00/00 A3004 RMK SLP175=
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SLP175=

TAF AMD CYFC 211608Z 2116/2124 VRB03KT 1/8SM FG VV003 TEMPO 2116/2118 2SM BR
OVC006 BECMG 2116/2118 22012G22KT
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FM212100 23010G20KT P6SM -SHRA BKN025 OVC180
RMK FCST BASED ON AUTO OBS. NXT FCST BY 211800Z=
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GANDER/GANDER INTL/NL

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RMK SC4SC3AC1 PRESFR SLP239=
SPECI CYQX 211537Z 17010KT 20SM -SN SCT027 BKN050 OVC080 M08/M15 A3024
RMK SC3SC4AC1 VIS LWR W-NW PRESFR SLP253=
METAR CYQX 211500Z 18010KT 20SM FEW025 BKN058 OVC080 M09/M15 A3026
RMK SC1SC6AC1 SLP262=

TAF AMD CYQX 211624Z 2116/2212 16012KT 6SM -SN SCT020 OVC040
TEMPO 2116/2120 2SM -SN OVC020
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FM220100 20015G25KT 3SM -RA BR BKN015 OVC080 BECMG 2202/2204 30025G40KT
FM220500 30025G40KT 4SM -SHSN BKN025
BECMG 2206/2208 30025G40KT
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MONCTON/GREATER MONCTON ROMEO LEBLANC INTL/NB

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SPECI CYQM 211511Z 17011KT 15SM FEW004 SCT260 06/04 A3000 RMK SF2CI1 SLP163=
METAR CYQM 211500Z 18010KT 15SM BKN004 BKN260 05/04 A3001 RMK SF5CI1 SLP166=

TAF AMD CYQM 211525Z 2115/2212 17012G22KT P6SM OVC004 TEMPO 2115/2118 SCT004
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SAINT JOHN/NB

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METAR CYSJ 211700Z 21010KT 1/4SM R23/1600FT/N FG VV001 06/06 A3004 RMK FG8 SLP180=
METAR CYSJ 211600Z 20014G20KT 1/4SM R23/1200FT/N FG VV001 05/05 A3008 RMK FG8 SLP191=
METAR CYSJ 211500Z 19011G19KT 1/4SM R23/1400FT/N FG VV001 05/05 A3008 RMK FG8 SLP193=

TAF AMD CYSJ 211511Z 2115/2124 19010G20KT 1/4SM -DZ FG VV001
TEMPO 2115/2124 1SM BR OVC004
RMK NXT FCST BY 211800Z=
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ST. JOHN'S INTL/NL

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METAR CYYT 211500Z 16008KT 120V200 15SM BKN025 OVC120 M06/M10 A3031
RMK SC5AC3 CLD ESTD SLP276=
METAR CYYT 211400Z 13009KT 15SM BKN030 OVC120 M07/M11 A3033
RMK SC5AC3 CLD ESTD SLP281=

TAF AMD CYYT 211642Z 2116/2212 07008KT P6SM SCT012 OVC100 TEMPO 2112/2116 BKN012
OVC100
FM211600 15015KT 6SM -SN SCT015 BKN080 TEMPO 2116/2119 21/2SM -SN BKN015 OVC080
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FM220000 19020G30KT 3SM -RA BR OVC008 BECMG 2202/2204 27022G32KT
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FM221000 31030G40KT P6SM SCT025
RMK NXT FCST BY 211800Z=
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STEPHENVILLE/NL

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SPECI CYJT 211610Z 16013KT 12SM -RA FEW015 FEW018 OVC030 00/M02 A3005
RMK CF1SC1NS7 CF TR SLP178=
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RMK CF1SC1NS7 CF TR SLP181=
METAR CYJT 211500Z 15015G21KT 12SM -FZRA FEW018 OVC030 M01/M04 A3014
RMK SC1NS7 PRESFR SLP208=
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TAF AMD CYJT 211625Z 2116/2212 16012KT P6SM -RA FEW015 OVC030 TEMPO 2116/2122 21/2SM -
RA BR BKN006 OVC012 BECMG 2116/2118 18015G25KT
FM212200 23015G25KT 11/2SM -RA BR OVC003
FM220100 28015G25KT 3SM -RA BR BKN008 OVC025
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RMK NXT FCST BY 211800Z=
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SYDNEY/J.A. DOUGLAS MCCURDY/NS

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A3006 RMK ST5ST3 PRESFR SLP184=
SPECI CYQY 211656Z 19017G23KT 3/4SM R06/6000FT/D -DZ BR SCT002 OVC003 01/01 A3007
RMK ST3ST5 SLP186=
SPECI CYQY 211628Z 19012G19KT 3SM -DZ BR OVC003 01/00 A3010 RMK ST8 SLP198=
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SPECI CYQY 211539Z 19012G20KT 1SM -DZ BR OVC003 01/00 A3015 RMK ST8 SLP215=
SPECI CYQY 211523Z 18010G16KT 2SM -DZ OVC004 01/00 A3016 RMK ST8 SLP219=
SPECI CYQY 211509Z 18010G18KT 4SM -DZ FEW004 OVC006 01/M00 A3017 RMK ST2ST6 SLP222=
METAR CYQY 211500Z 19014KT 4SM -DZ BKN004 OVC006 01/M00 A3019 RMK ST6ST2 SLP227=

TAF AMD CYQY 211408Z 2114/2124 18008KT 2SM -DZ BR OVC005 TEMPO 2114/2115 6SM BR OVC010
PROB30 2114/2115 4SM -FZDZ BR
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YARMOUTH/NS

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METAR CYQI 211500Z 20010KT 1/4SM FG VV002 07/07 A3018 RMK FG8 SLP224=

TAF CYQI 211138Z 2112/2124 19005KT 1/8SM -DZ FG VV002 TEMPO 2112/2124 1SM -RA BR
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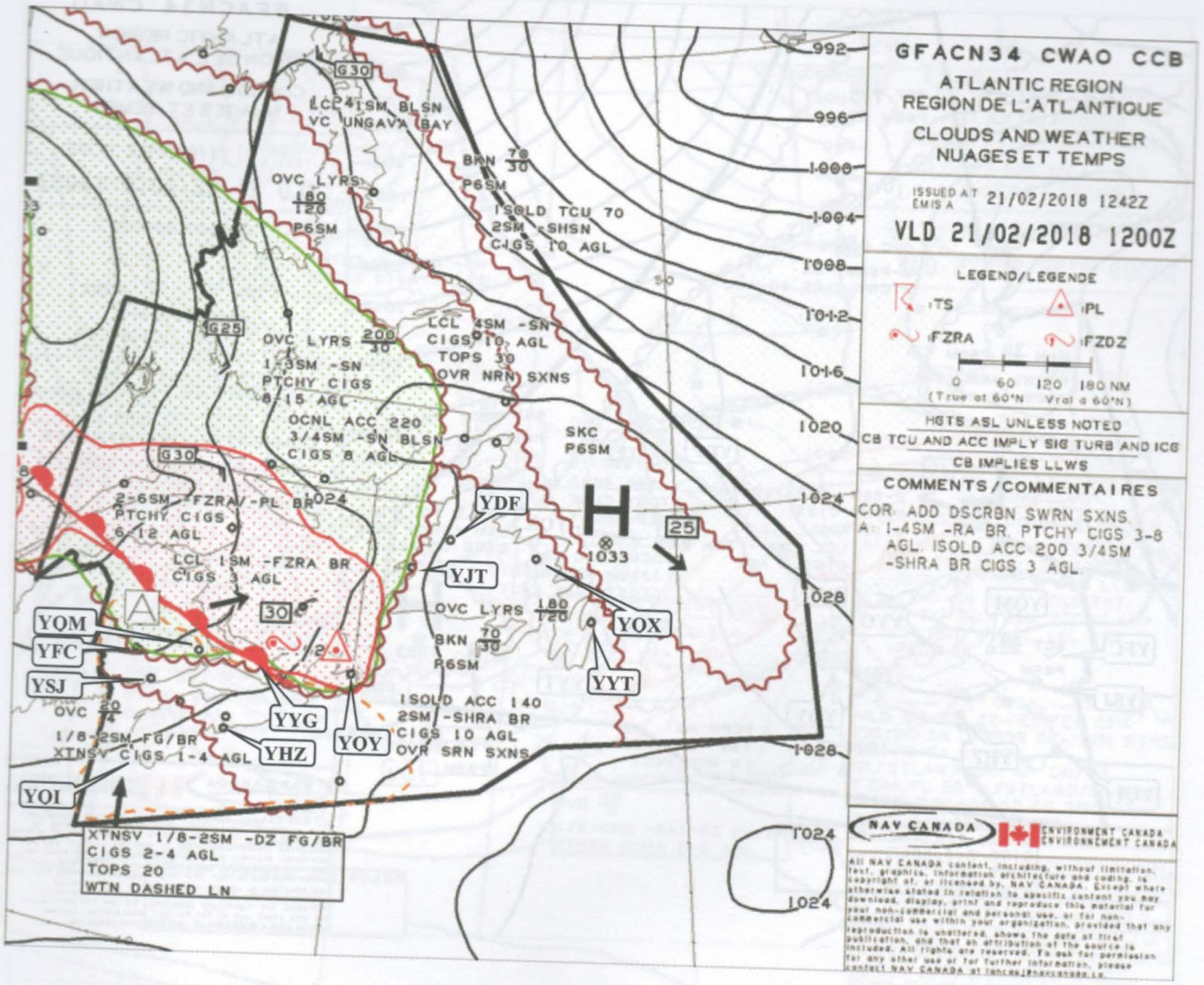
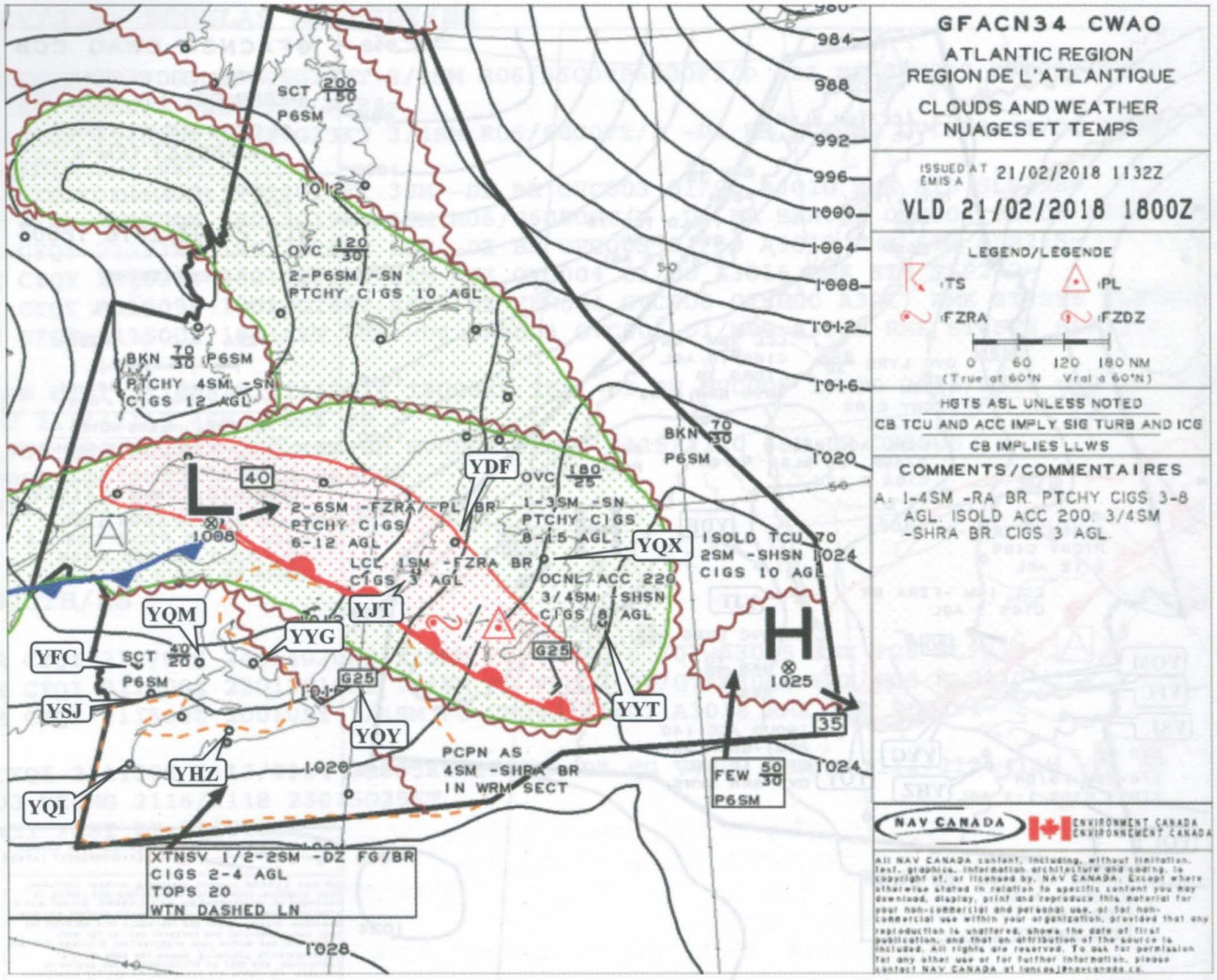
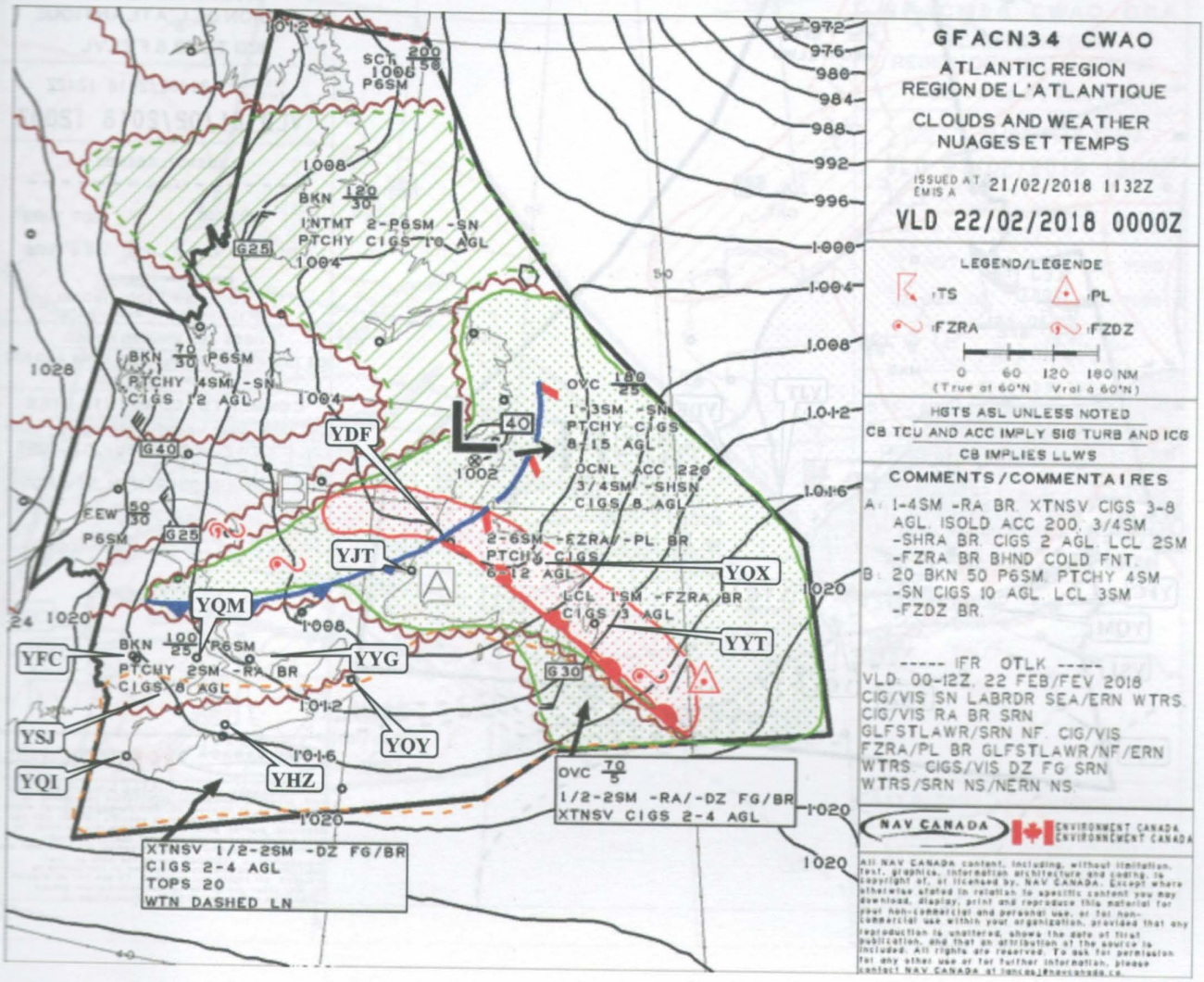


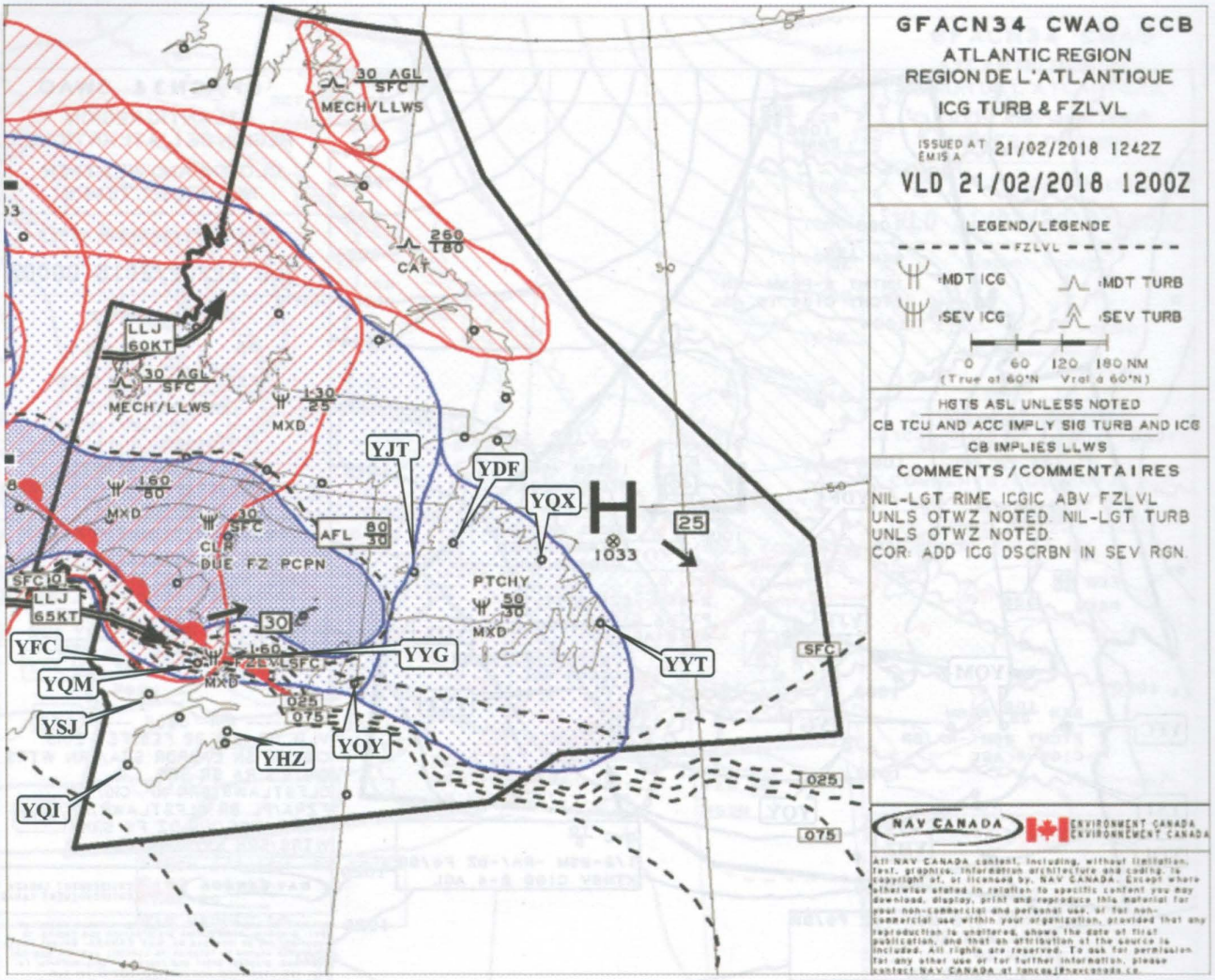
Deer Lake	YDF	Saint John	YSJ
Charlottetown	YYG	St. John's	YYT
Fredericton	YFC	Stephenville	YJT
Gander	YQX	Sydney	YQY
Halifax	YHZ	Yarmouth	YQI
Moncton	YQM		



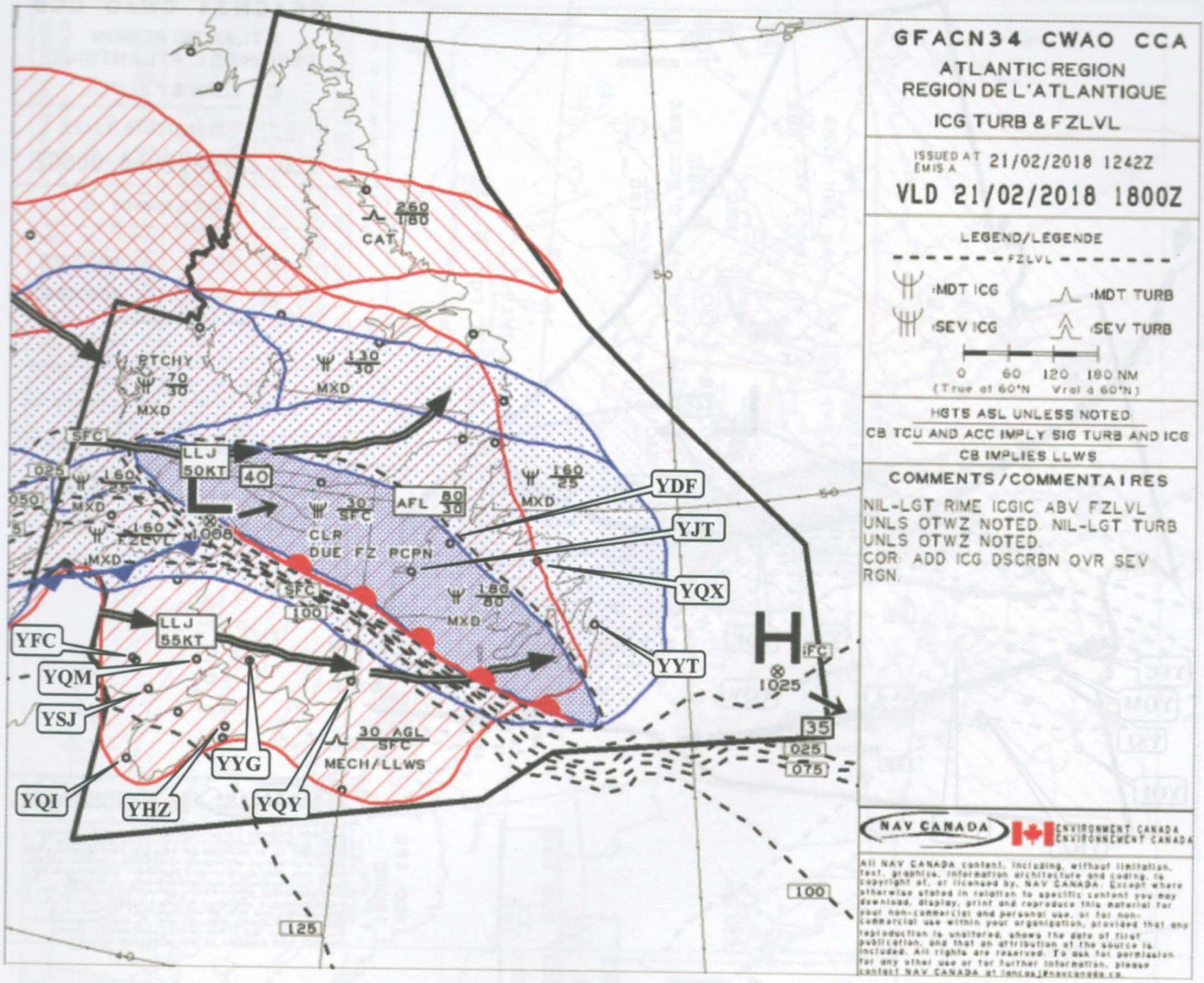
Deer Lake	YDF	Saint John	YSJ
Charlottetown	YYG	St. John's	YYT
Fredericton	YFC	Stephenville	YJT
Gander	YQX	Sydney	YQY
Halifax	YHZ	Yarmouth	YQI
Moncton	YQM		



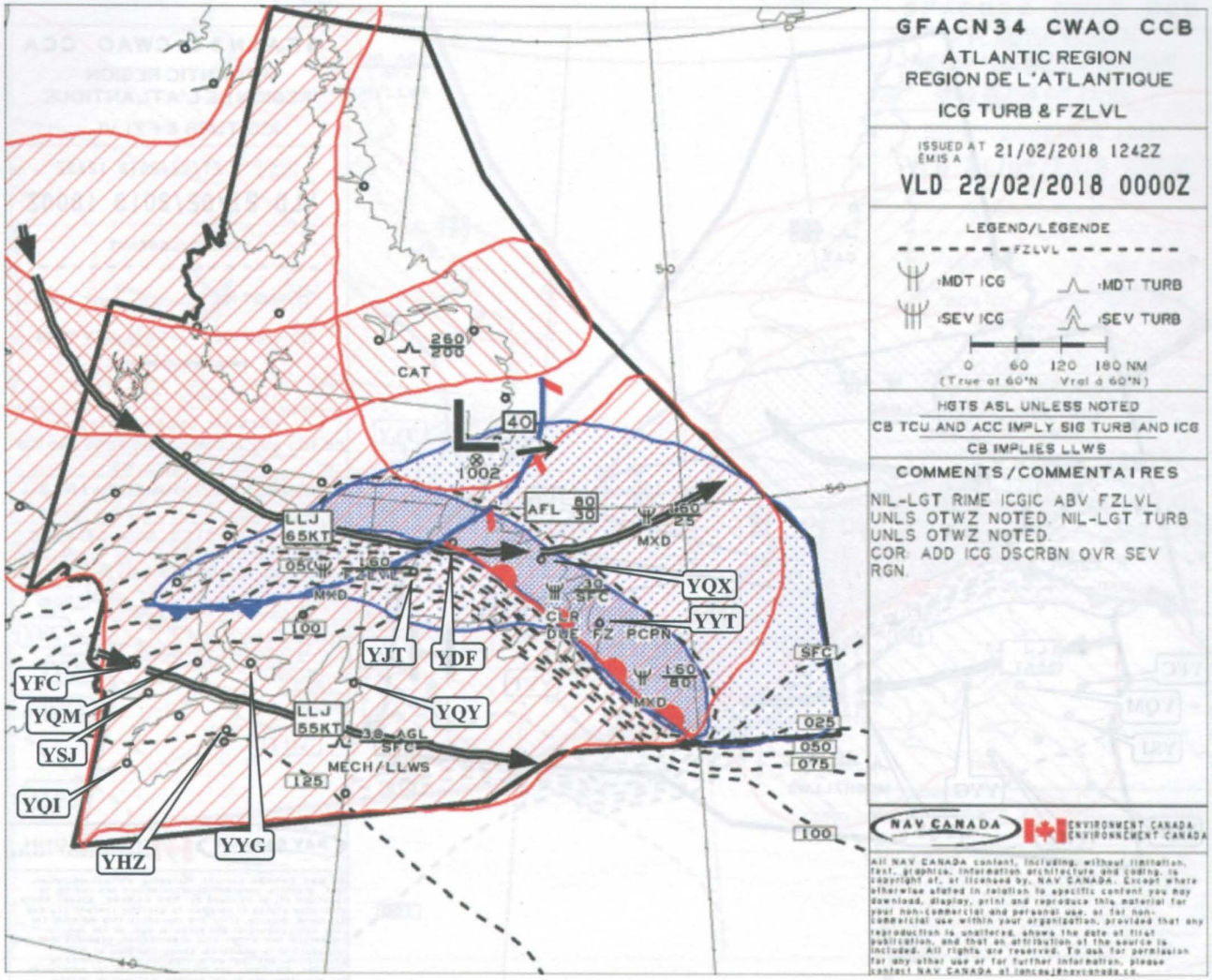
Deer Lake	YDF	Saint John	YSJ
Charlottetown	YYG	St. John's	YYT
Fredericton	YFC	Stephenville	YJT
Gander	YQX	Sydney	YQY
Halifax	YHZ	Yarmouth	YQI
Moncton	YQM		



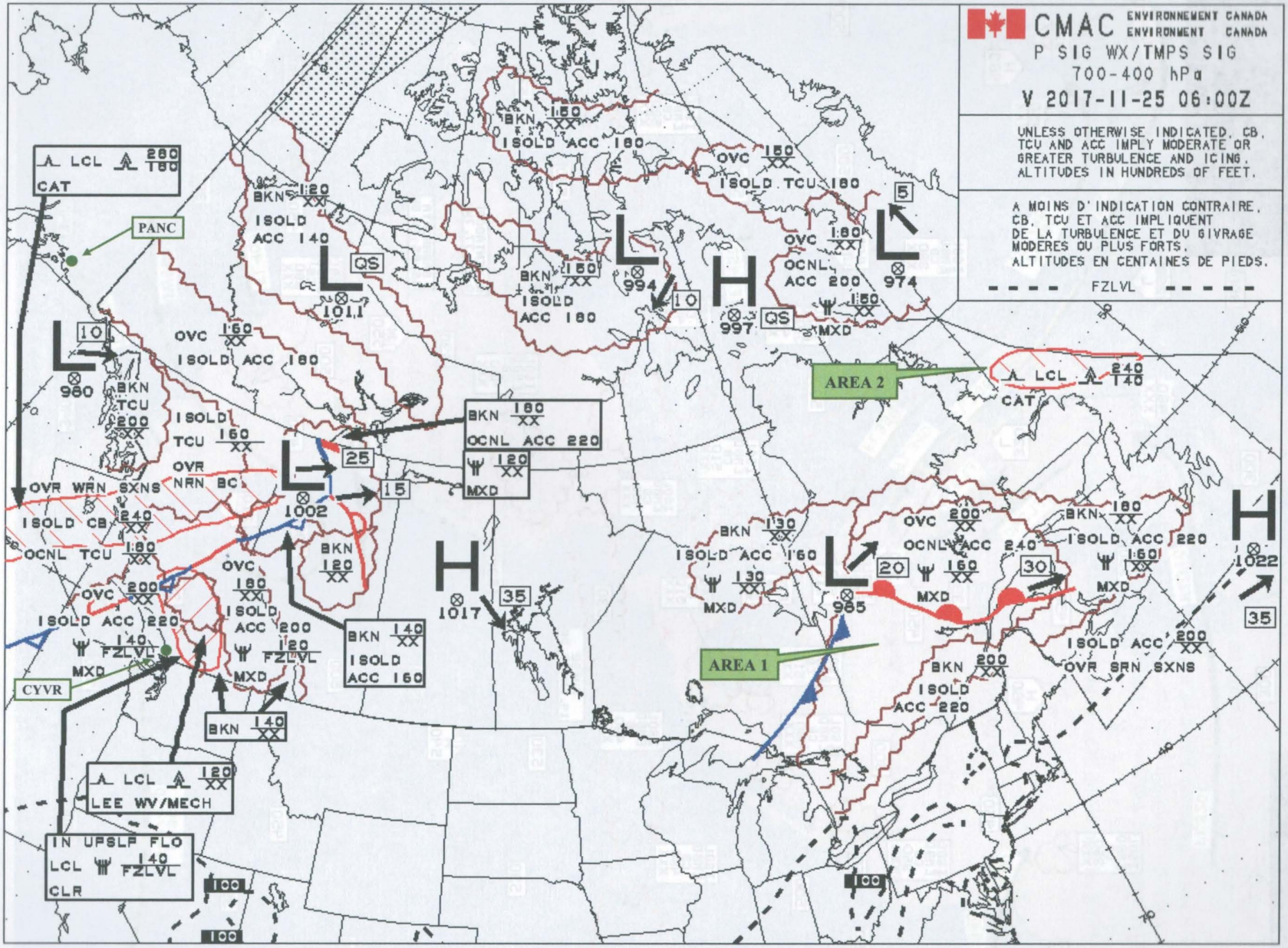
Deer Lake	YDF	Saint John	YSJ
Charlottetown	YYG	St. John's	YYT
Fredericton	YFC	Stephenville	YJT
Gander	YQX	Sydney	YQY
Halifax	YHZ	Yarmouth	YQI
Moncton	YQM		



Deer Lake	YDF	Saint John	YSJ
Charlottetown	YYG	St. John's	YYT
Fredericton	YFC	Stephenville	YJT
Gander	YQX	Sydney	YQY
Halifax	YHZ	Yarmouth	YQI
Moncton	YQM		



Deer Lake	YDF	Saint John	YSJ
Charlottetown	YYG	St. John's	YYT
Fredericton	YFC	Stephenville	YJT
Gander	YQX	Sydney	YQY
Halifax	YHZ	Yarmouth	YQI
Moncton	YQM		


CMAC ENVIRONNEMENT CANADA
ENVIRONMENT CANADA
P SIG WX/TMPS SIG
700-400 hPa
V 2017-11-25 06:00Z
UNLESS OTHERWISE INDICATED, CB, TCU AND ACC IMPLY MODERATE OR GREATER TURBULENCE AND ICING. ALTITUDES IN HUNDREDS OF FEET.
A MOINS D'INDICATION CONTRAIRE, CB, TCU ET ACC IMPLIQUENT DE LA TURBULENCE ET DU GIVRAGE MODERES OU PLUS FORTS. ALTITUDES EN CENTAINES DE PIEDS.
FZLVL
LCL 280 180 CAT
PANC
CYVR
AREA 1
AREA 2
LCL 240 140 CAT
LCL 120 LEE WV/MECH
IN UPSLP FLO LCL 140 FZLVL CLR
OVR WRN SXNS
OVR NRN BC
OVR SRN SXNS
OCNL TCU
OCNL ACC 240
OCNL ACC 220
ISOLD CB 240
ISOLD TCU 160
ISOLD ACC 220
ISOLD ACC 200
ISOLD ACC 180
ISOLD ACC 160
ISOLD ACC 140
OVC 200
OVC 180
OVC 160
OVC 150
BKN 200
BKN 180
BKN 160
BKN 150
BKN 140
BKN 130
BKN 120
BKN TCU 200
OCNL ACC 220
MXD
FZLVL
QS
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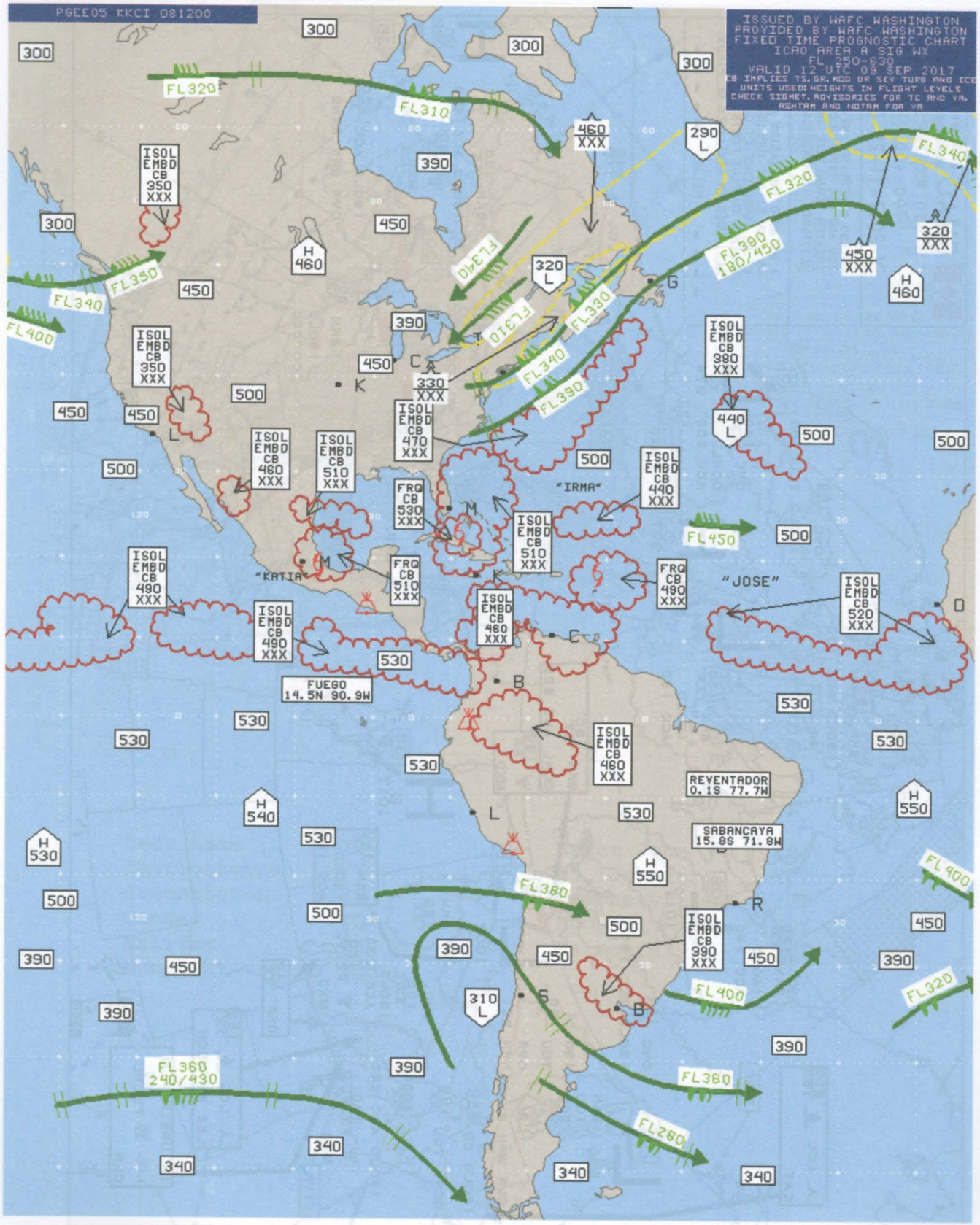
PGEE05 KKCI 081200
ISSUED BY WAFC WASHINGTON
PROVIDED BY WAFC WASHINGTON
FIXED TIME PROGNOSTIC CHART
ICAO AREA A SIG WX
FL 250-630
VALID 12 UTC 09 SEP 2017
CB IMPLIES TS,GR,MOD OR SEV TURB AND ICE
UNITS USED: HEIGHTS IN FLIGHT LEVELS
CHECK SIGMET, ADVISORIES FOR TC AND VA,
ASHTAM AND NOTAM FOR VA
"IRMA"
"KATIA"
"JOSE"
FUEGO
14.5N 90.9W
REVENTADOR
0.1S 77.7W
SABANCAYA
15.8S 71.8W

Questions 1 through 28 are based on the information provided on pages 3-1 to 3-10.

1. With reference to the GFACN34 CWAO forecast which of the following statements is correct?

   a) The GFA was issued at 1242 UTC on the 21 of the February and is a 24 hour forecast valid from 1200 UTC.
   b) The GFA was issued on the 21st of the month and is a 12-hour forecasts valid from their respective VLD times.
   c) The GFA was issued at 1200 UTC on the 21 of February and is valid for 6 hours, with the next routine graphic area forecast due out at 1800Z.
   d) The GFA was issued on February 21 and is valid from 1200Z for 12 hours with an outlook for a further 12 hours on the 22nd.

2. With reference to the Title Box on the GFA chart on page 3-5 which of the following is true?

   a) The GFA Clouds and weather chart is an amended GFA T+0 chart and is valid from 1242Z until 0000Z on the 22nd.
   b) This chart is the second correction for the T+0 chart. It was issued at 1242Z and the Comments Box describes the correction.
   c) The GFA clouds and weather chart was issued at 1200Z on the 21st and is based on observed weather taken at 1130.
   d) The GFA clouds and weather chart was issued at 1242Z on the 21st and is valid from 1200Z on the 21st to 1200Z on the 22nd.

3. According to the GFA's, what is the probable location of the warm front at 16Z if the system were to move as forecast?

   a) Just east of Sydney
   b) 30 nm southwest of Gander
   c) 60 nm west of Halifax
   d) Just east of Deer Lake.

4. Referring to the GFA charts, what clouds and weather are forecast over Gander (YQX) at 1900Z?

   a) Overcast cloud with bases at 2,500 feet and tops at 18,000 feet ASL. Visibilities of 2-6 miles in freezing rain, ice pellets, mist. Locally 1 sm freezing rain, mist and ceilings 300 AGL
   b) Broken cloud between 2,500 and 10,000 feet ASL. Visibilities better than 6 miles.
   c) Overcast cloud between 2,500 and 18,000 feet ASL, visibilities of 1-3 miles in light snow and patchy ceilings of 800 to 1500' AGL. Occasional altocumulus castellanus to 22,000 feet giving 3/4 miles in light snow showers.
   d) Overcast cloud between 500 and 7,000 feet ASL. Visibilities of 1/2-2 miles in light rain, drizzle and mist. Ceilings 200 to 400 feet AGL.

5. Referring to the GFA's, what is the lowest clouds and visibility could a crew expect for the Yarmouth (YQI) area at 18Z.

   a) Extensive visibilities between 1/2 to 2 miles in drizzle, fog and mist, and ceilings 200 to 400 feet above ground with tops 2,000 feet within dashed line.
   b) Overcast cloud with bases at 2,500 feet and tops at 18,000 feet ASL. Visibilities of 2-6 miles in freezing rain, ice pellets, mist. Locally 1 sm freezing rain, mist and ceilings 300 AGL
   c) Scattered cloud between 2,000 and 4,000 feet ASL. Visibilities better than 6 miles.
   d) Overcast cloud between 3,000 and 7,000 feet ASL. Visibilities of 4 miles in light rain and mist.

6. According to the GFA charts what is the forecast surface wind east of the warm front at 1800Z?

   a) Less than 20 kts
   b) 160° magnetic at 25 kts.
   c) 160° true at 15 gusting to 25 kts.
   d) 240° true at 15 gusting to 25 kts

7. Which of the following statements is true with regards to expected icing and turbulence on departure from St John's (CYYT), departing at 18Z, on a westbound flight, climbing to FL240.

   a) Severe icing in the climb to 3000 feet then moderate icing 2,500 feet up to 16,000 feet and moderate turbulence to 3000 feet AGL.
   b) Moderate mixed icing 2,500 feet up to 18,000 feet.
   c) Moderate icing up to 16,000 feet and moderate turbulence to 3000 feet AGL.
   d) Severe icing during the climb to 3000 feet then moderate icing from approximately 8,000 feet up to 16,000 feet and moderate turbulence to 3000 feet AGL.

8. What flight conditions can be expected during descent to the Deer Lake (CYDF) airport from FL230 at 2000Z, assuming the weather systems move as forecast?

   a) Moderate mixed icing from 18,000 feet to approximately 8,000 feet, severe clearing due to freezing rain below 3000 feet and moderate turbulence below 3000 feet AGL due to low-level wind shear.
   b) No icing until 3,000 feet then severe clear icing in freezing precipitation.
   c) Light rime icing in cloud until below the freezing level and moderate turbulence below 3000 feet AGL due to low level wind shear.
   d) Moderate mixed icing in cloud and severe clear icing in the descent below 8000 feet in freezing precipitation.

9. Referring to the GFACN34, what turbulence can be expected on approach into Charlottetown (CYYG) at 20Z?

   a) Occasional light turbulence below 18,000' ASL.
   b) Moderate mechanical and low-level wind shear below 3000' AGL associated with a low level jet stream.
   c) Severe mechanical below 3,000 feet ASL
   d) Moderate CAT between 26,000 and 18,000 feet above sea level

10. Referring to the GFA charts, which of the following statements is true with reference to the conditions forecast for flight operations near Stephenville (CYJT) at 2300Z?

    a) 1 to 4 sm in light rain and mist with extensive ceilings 3-8 hundred AGL. Isolated ACC to 20,000 feet giving 3/4 sm light rain showers and ceilings of 200' AGL.
    b) Moderate mechanical turbulence and low level windshear below 3,000' AGL.
    c) Clear icing due to localized light freezing rain is forecast for the Stephenville area.
    d) Both a and b are correct.

11. In the IFR Outlook portion, "CIGS/VIS DZ FG SRN WTRS/SRN NS/NERN NS" would be decoded as:

    a) IFR conditions due to drizzle and fog with ceilings between 1000 and 3000' ASL.
    b) IFR conditions due to snow and freezing rain causing visibilities of less than three miles.
    c) IFR conditions due to ceilings and visibility due to drizzle and fog over southern waters, southern and northeastern Nova Scotia.
    d) IFR conditions due to ceilings and fog/mist causing visibilities of less than one mile.

12. Referring to the outlook section of the GFACN34, which of the following statements is correct with reference to the expected weather over Gulf of St Lawerence, Newfoundland, and eastern waters?

a) After 1800Z the ceiling is expected to less than 1000 feet AGL, visibility is expected to be less than 3 statue miles due to snow.
b) After 0000Z the ceiling is expected to between 1000 and 3000 feet AGL, visibility is expected to be between 3 and 5 statue miles due to snow, mist and fog.
c) After 0000Z the ceiling is expected to less than 1000 feet AGL, visibility is expected to be less than 3 sm due to freezing rain, ice pellets and mist.
d) After 0000Z the ceiling is expected to less than 1000 feet ASL, visibility is expected to be less 3 statue miles due to rain and mist.

13. Which of the following statements is true with reference to the following SIGMET:

WSCN33 CWTO 162128
SIGMET B1 VALID 162130/170130 CWTO-
CZYZ TORONTO FIR SVR TURBC RPRTD BY B777 130 NM N OF TORONTO FL380/390. PTCHY SVR TURB FCST WTN 30 NM OF LN /N4548 W08235/90 NW WIARTON - /N4559 W07855/30 SE NORTH BAY FL220/390. LTL MOVEMENT. LN GRDLLY DSIPTG DURG PD.

a) This SIGMET is valid on the 30 of the month between 1621Z to 1701Z.
b) Patchy severe turbulence is forecast on a line thru 90 Northwest Wiarton to 30 Southeast North Bay between FL220 and FL390 and it is forecast to gradually dissipate during the period.
c) A Boeing 777 reported severe turbulence between FL380 and 390 outside the forecasted area.
d) Severe turbulence is forecast within 90 nm of a line 30 nm Northwest Wiarton to 30nm Southeast North Bay.

14. What is the date of issue and validity period for Fredericton's aerodrome forecast?

a) Feb 21 and it is valid for 8 hours starting at 1600Z
b) Feb 21 and it is valid from 1200Z to 1200Z on Feb 22
c) Feb 21 and it is valid from 1200Z to 0000Z on Feb 22
d) Feb 21 and it is valid from 1600Z for 6 hours.

15. What is the validity period for the following aerodrome forecast?

TAF CYMH 211938Z 2120/2203 14020G30KT 1SM -SN VV010 TEMPO 2100/2202 1/4SM -SN BLSN VV004 RMK BASED ON AUTO OBS NXT FCST WILL BE ISSUED AT 220845Z=

a) 0000Z on Feb 22nd to 1200Z on Feb 22nd
b) 1800 local on the 21st of the month to 0300 local on the 22nd
c) 2000Z on the 21st of the month for 31 hours.
d) 2000Z on the 21st of the month for 7 hours.

16. As you approach CYSJ at 1730Z, the latest ATIS states: wind 22010KT, visibility 1 SM in mist, ceiling 400 overcast, temp 5, dew point 6, altimeter 3008, runway 23 in use.

a) The weather is about as forecast.
b) The ceiling and visibility is greater than forecast.
c) The terminal forecast is not reliable.
d) The winds are greater than forecast.

17. If you were considering using Gander as an alternate aerodrome, what is the lowest forecast visibility and ceiling at 1900Z Feb 21? (Use the TAF given below)

TAF AMD CYQX 211615Z 2116/2212 17020G30KT 3SM –SN OVC020 TEMPO 2117/2120 1SM -SN OVC012 FM212000 17020G35KT 2SM -SNPL BLSN OVC012 PROB30 2120/2201 2SM –FZRA BR FM2201 17015G25KT 1SM -RA BR OVC015 BECMG 2206/2208 P6SM OVC080 RMK NXT FCST BY 210800Z=

a) 1 SM and overcast cloud at 1500' AGL.
b) 3 SM and overcast cloud at 2000' AGL.
c) 1 SM and overcast cloud at 1200' AGL.
d) 1 SM and overcast cloud at 1200' ASL.

18. Which of the following airports could be used as a legal alternate, if you have determined the alternate minima to be 600-2 for all the aerodromes? Your estimated time of arrival is 19Z. (Refer to the TAFs on pages 3-1 to 3-4).

a) CYQI
b) CYFC
c) CYSJ
d) CYQY

19. After reviewing Gander's approach plates you have determined the alternate Minima to be 600-2. What would be the earliest time you could depart Halifax for St. John's and use Gander as a legal alternate, assuming a two-hour flight time between Halifax and St. John's and an hour flight time between St John's and Gander? (Refer to the amended Gander terminal forecast below.)

TAF AMD CYQX 071940Z 2120/2218 13025G35KT 1SM -PLSN OVC005 TEMPO 2120/2122 3SM -SN OVC010 FM212200 10030G45KT 2SM PLSN SCT004 OVC008 TEMPO 2122/2204 1SM -FZRA BR OVC004 FM220400 16O30G40KT 1SM -RA BR OVC004 FM221000 20025G40KT 1 1/2SM -RA OVC007 NXT FCST BY 080000Z=

a) 21Z
b) 10Z
c) 07Z
d) According to the TAF Gander can't be used as a legal IFR alternate.

20. According to the weather forecasts (TAFs & GFAs), what would be the probable location of the warm front at 23Z if the system were to move as forecast?

a) Near Stephenville (CYJT).
b) Just west of Gander (CYQX).
c) East of St John's (CYYT).
d) 60 nm east of Sydney (CYQY).

21. According to the forecasts, what time is the warm and cold fronts forecast to pass thru St John's Airport (CYYT)?

a) The warm front at 2200Z on the 21st and the cold front at 0000z on the 22nd.
b) The warm front at 0100Z and the cold front at 0400z on the 22nd.
c) The warm front at 0000Z and the cold front at 0700z on the 22nd.
d) The warm front at 2000Z on the 21st and the cold front at 0010z on the 22nd.

22. Referring to the forecasts for Gander (YQX), what flight conditions would you expect during decent and approach if your ETA was 1900Z?

a) Moderate mixed icing in cloud from 16,000 to 2,500' ASL and moderate mechanical turbulence and low level windshear below 3000 feet.
b) Moderate mixed and severe clear icing and moderate turbulence below 3000 feet AGL.
c) Moderate mixed icing below FL200 and moderate mechanical turbulence below 3,000 feet ASL.
d) Moderate mixed icing in decent below 16,000 feet to approximately 8,000 feet then severe clear icing below 3,000 feet in freezing rain and moderate mechanical turbulence below 3,000 feet AGL.

23. An aircraft departs CYQM at 17Z on a three-hour flight to CYDF at FL230 ft. ASL. What icing and turbulence can be expected during the climb, enroute and descent segments, assuming the weather systems move as forecast.

a) Moderate mixed icing in cloud until nearing Newfoundland and no icing thereafter. Turbulence associated with scattered ACC is forecast.
b) No icing and turbulence during climb and cruise. In descent moderate mixed and severe clear icing and moderate turbulence below 3000 feet AGL.
c) Moderate turbulence below 3,000 feet ASL. Moderate icing during cruise and in descent moderate mechanical turbulence below 3,000 feet ASL.
d) Moderate turbulence on departure to 3,000 feet AGL, nil to light rime icing in cloud above the freezing level. Moderate mixed icing in decent below 18,000 feet to approximately 8,000 feet then severe clear icing below 3,000 in freezing rain and moderate turbulence below 3,000 feet AGL.

24. When included in a METAR; **R36/1000V2400FT/D** would mean:

a) The runway visual range for the runway 36 is 1000 feet for RVR A and 2400 feet for RVR B.
b) Departing runway 36, windshear has been reported between 1000 feet and 2400 feet AGL
c) The wind on runway 36 is varying from 100° true to 240° true and the speed exceeds 3 knots.
d) The runway visual range for the touchdown zone on runway 36 is fluctuating between 1000 feet and 2400 feet; and the trend is downward.

25. Given the following Aviation Weather Report. What is the minimum increase in opacity of the surface based layer at YQY, in order for it to constitute a ceiling?

METAR CYQY 211600Z 09012KT 1/2SM SN OVC010 M03/M05 A2966 RMK SN5SF3 SLP994=

a) none, it already constitutes a ceiling
b) 2/8
c) 3/8
d) 1/8

26. On checking the hourly weather reports (METARs) for Deer Lake (CYDF), this information would indicate that the weather system was moving in the same direction...

a) and speed as forecast on the GFA
b) but slower than forecast as indicated on the GFA
c) with the fronts merging.
d) but faster than forecast as indicated on the GFA

27. From the statements below, select the one that best represents the following symbol depicted on GFA charts:

a) An area where a strong upper flow is forecast.
b) Surface winds greater than 20 knots and gusts greater than 30 knots.
c) An area where strong low-level windshear and mechanical turbulence are frequently associated.
d) Movement and speeds of frontal waves

28. Which of the following statements true with reference to the LLJ depicted on the 18Z GFA panel, if you planned an approach to CYYG at 17Z (Note forecast wind 160 at 12 gusting 22 favouring runway 21)?

a) Low level windshear and moderate mechanical turbulence can be anticipated below 3,000' ASL.
b) On final approach a strong quarterly headwind can be anticipated along with moderate mechanical turbulence below 3,000' AGL.
c) On final approach a strong quarterly tailwind can be anticipated along with moderate mechanical turbulence below 3,000' AGL and low level windshear.
d) None of the above.

Questions 29 to 41 are based on the P SIG WX/TMPS 700 – 400 hPa Chart provided on page 3-11.

29. The 700-400 hPa SIG PROG chart forecasts significant weather for what altitudes?

a) FL070 to FL400.
b) FL100 to FL240.
c) FL100 to FL 180.
d) FL180 to FL240.

30. When is a 700-400 hPa SIG PROG chart issued?

a) Approximately 2 to 3 hours after the weather has been analyzed.
b) About 30 minutes prior to the validity time.
c) 16 hours prior to the valid time.
d) Approximately 12 hours before the valid time.

31. What does the "XX" indicate if used on the 700-400 hPa SIG PROG WX chart with regards to icing, turbulence and/or cloud heights?

a) It indicates that the base of the phenomenon is at ground level; therefore, the base of the phenomenon will change throughout the chart.
b) It indicates that the base of the phenomenon is below 8,000 feet ASL or the top is above 24,000 feet ASL.
c) It indicates the base of the phenomenon is below the level of the chart (10,000 feet ASL) or the top is above 24,000 feet ASL.
d) It indicates that the base or top varies, so it is not given an assigned altitude.

32. Referring to the Sig Prog WX chart legend on page 3-11, which of the following statements is true with reference to the time of issue and the validity period?

a) The chart was issued at 06Z on November 25 and is valid for 12 hours
b) The chart was issued at 06Z on November 24 and is valid at 24 hours.
c) The chart is based on 06Z data and was issued 2 to 3 hours after the observation.
d) The chart was issued at 18Z on November 24 and is valid at 06Z on the 25th.

33. Which of the following is not true with reference to P SIG WX/TMPS SIG 700 – 400 hPa charts?

a) The primary purpose of these charts is to meet pre-flight planning requirements.
b) Areas of moderate or severe icing is depicted in the same border that is used to depict areas of significant cloud.
c) Scalloped lines are only used to depict areas of organized clouds indicating its horizontal extent; the bases and tops in terms of flight levels are also indicated.
d) An area of moderate or severe clear air turbulence is depicted by a solid red line with hatched shading.

34. On a 700-400 hPa P SIG WX chart what do the following symbols refer to;

a) Areas of significant cloud, severe turbulence, severe icing and thunderstorms (CB)
b) Clear air turbulence, moderate turbulence, severe icing and thunderstorms
c) Clear air turbulence, severe turbulence, moderate icing and freezing rain
d) Areas of significant cloud, moderate icing, severe turbulence and thunderstorms

35. The term CB, TCU and ACC on SIG Prog charts implies:

a) Severe thunderstorms
b) Moderate or greater turbulence and icing.
c) Moderate icing and severe turbulence.
d) Severe icing in thunderstorms

36. What does "OCNL EMBD TCU" mean when used on a SIG Wx PROG chart?

a) Embedded TCU has less than 25% coverage depicted within the scalloped border.
b) Embedded Towering cumulus with coverage between 25 & 75 percent is forecast within the scalloped border.
c) Towering cumulus with coverage of 50-75% is embedded within an area of significant cloud.
d) Greater than 75% chance that TCU will develop within an area of significant cloud.

37. The term "ISOL CB 240" represents?

a) Embedded thunderstorms with coverage between 26 and 50 percent of the area.
b) Thunderstorms with tops of 24,000 feet, with coverage greater than 50 percent of the area.
c) Thunderstorms that are well separated with coverage between 40 & 70 percent in the scalloped border.
d) Individual thunderstorms with tops up to 24,000 feet with coverage of less than 50% within the scalloped border.

38. Fronts and pressure centres depicted on P SIG WX charts are representative of:

a) their positions at FL180.
b) their positions at the surface two to three hours before the chart was issued.
c) their surface positions at the chart valid period.
d) an average height of 10,000 feet in the atmosphere.

39. Freezing levels are drawn in at what interval on the 700-400 hPa SIG PROG chart?

a) Every 5,000 feet ASL.
b) Every 2,500 feet ASL.
c) Every 3,000 feet AGL.
d) Every 5,000 feet AGL, using 10,000 feet AGL as the datum.

40. Which of the following statements is true with reference to "**Area 1**" (in eastern Canada) depicted on the P SIG WX/TMPS SIG chart?

a) Broken cloud with tops of 18,000 feet and isolated ACC topped at 22,000 feet. Moderate or greater turbulence and icing are associated with the ACC.
b) Broken cloud from below 10,000 to 13,000 feet. Moderate mixed icing is forecast below 13,000 feet.
c) Isolated ACC with bases below 10,000 feet and tops of 20,000 feet is forecast in the area.
d) Overcast cloud topped at 20,000 feet with bases below the level of the chart. Occasional ACC topped at 24,000 feet. Moderate mixed icing is forecast below 16,000 feet to below the level of the chart.

41. Reviewing the P SIG WX chart in preparation for a flight from Vancouver (CYVR) to Anchorage (PANC) Alaska, what significant weather would you expect to encounter at a planned cruise altitude of FL230?

a) Moderate mixed icing, locally severe clear in upslope flow, to 14,000 feet and overcast cloud to 20,000 feet. Isolated ACC topped at 22,000 feet. Over central BC a narrow band of moderate locally severe CAT and isolated CBs over western sections topped at 240. No significant weather thereafter.
b) Overcast cloud until climbing above 18,000 feet. Moderate, locally severe turbulence to 12,000 feet and moderate icing to 14,000 feet. Isolated CBs over western BC topped at 24,000 feet. Over central BC a narrow band of moderate locally severe CAT. No significant weather is forecasted thereafter.
c) Moderate turbulence to 12,000 feet due to mountain waves and ACC up to 22,000 feet. Overcast cloud with moderate mixed icing during the climb to 14,000 feet. Nearing central BC moderate CAT with a narrow band of patchy severe.
d) Scattered ACC with moderate turbulence and icing in the climb to 16,000 feet. Possible moderate to severe clear air turbulence is forecasted in a narrow band after levelling off at FL250.

Questions 42 through 49 are based on the WAFC SIG WX FL250- FL630 chart provided on page 3-12.

42. Which of the following statements is true with reference to the SIG WX FL250 - FL630?

a) It was issued at 1130Z on September 09 and is valid at 1200Z.
b) It depicts significant weather between FL250 to FL630 and it was issued at 1200 UTC on September 09.
c) The observed weather depicted on this chart occurred 2 to 3 hours before the chart issue time.
d) It was issued on September 8 at approximately 19 - 20Z and is valid at 12Z on the 9th.

43. What is the lowest level of the tropopause depicted on the SIG WX chart?

a) FL290
b) FL310
c) FL320
d) 38,000 feet.

44. What does the following symbol represent when it is depicted on a jet stream?

a) A jet stream break
b) A marked change in direction of 10° or more.
c) Either an increase or decrease in wind velocity of 20 knots.
d) The jet stream's height equates to that of the tropopause in the area where the symbol is indicated.

45. What does the following text box indicate when it is depicted on a SIG WX chart?

REVENTADOR
0.1S 77.7W

a) Location of the highest spot height of the tropopause.
b) The eruption of the Reventador volcano along with its latitude and longitude.
c) The release of radioactive materials and its location if known.
d) Location of significant mountain ranges where lee mountain waves are present.

46. Reviewing the SIG WX chart, what flight conditions could a flight crew expect on a two hour flight from Toronto to St John's NF at FL310 departing at 10Z on the 9th?

a) Moderate to severe turbulence the entire trip until in descent at St. John's.
b) Moderate turbulence until approximately the mid-way point, then a narrow band of severe turbulence until east of the associated jet stream. Smooth for the remainder of the flight.
c) Moderate turbulence for the entire flight at FL310 with a narrow band of severe turbulence associated with a jet stream at the midway point.
d) Moderate turbulence until east of the jet stream at approximately the midway point. Smooth for the remainder of the flight.

47. Which of the following statements is true with reference to forecast flight conditions associated with tropical storm "IRMA"

a) Frequent thunderstorms with tops up to FL490 are forecast within the red scalloped border.
b) Isolated thunderstorms with tops up to FL510 and bases below the level of the chart within the red scalloped border.
c) A smaller area of frequent thunderstorms with tops up to FL530 is enclosed with an area of isolated thunderstorms with tops up to FL510.
d) Isolated thunderstorms with tops up to 44,000 feet.

48. What would the following text box indicate when it is associated with a red scalloped border?

OCNL
EMBD
CB
520
XXX

a) Thunderstorms with spatial coverage from 50% to 75% inclusive within the depicted area, tops up to FL520 and bases below the level of the chart.
b) Thunderstorms with tops up to 52,000 feet has spatial coverage of more than 50% of the depicted area and bases below the level of the chart.
c) Thunderstorms with little or no separation within the border, tops up to FL520 and bases below the level of the chart.
d) Thunderstorms with tops as high as 52,000 feet, bases as low as 10,000 feet and has spatial coverage of less than 50% within the depicted area.

49. Are ISOL CBs ever depicted on a SIG Wx FL250-630 chart?

a) Yes within the standard scalloped border or as a general notation outside of the scalloped borders.
b) Yes as a general notation without any borders depicted.
c) Yes, only when embedded in cloud within the standard scalloped border.
d) No unless there are identified as being severe.

MET Exercise 2

HAMILTON/ON

SPECI CYHM 011950Z 06007KT 3/8SM R12/3500V5500FT/D -SHRA FG SCT004 BKN062 OVC096 11/11 A2949 RMK FG3SF1SC3AC1 PRESFR SLP991 DENSITY ALT 900FT=
METAR CYHM 011900Z 10007KT 2SM -SHRA BR FEW006 SCT070 OVC096 10/10 A2955 RMK SF2AC1AC5 RETS SLP013=
SPECI CYHM 011845Z 09007KT 2SM -SHRA BR FEW006 SCT070 OVC092 10/10 A2955 RMK SF2AC2AC4 RETS PRESFR SLP012=
SPECI CYHM 011825Z 07005KT 050V130 3SM -TSRA BR FEW004 SCT024CB OVC092 10/10 A2957 RMK SF2CB2AC4 SLP018=
METAR CYHM 011800Z 28009G22KT 250V350 1 1/2SM R12/3500VP6000FT/U RA BR OVC003 10/10 A2960 RMK FG3SF5 PRESRR SLP031=
SPECI CYHM 011743Z 02008KT 3/4SM R12/6000FT/D -RA BR OVC002 08/08 A2956 RMK FG5SF3 SLP016=
METAR CYHM 011700Z 06008KT 1 1/2SM -RA BR OVC002 08/08 A2960 RMK FG2SF6 PRESFR SLP029=

TAF CYHM 011739Z 0118/0218 06008KT 3SM -SHRA BR SCT002 OVC015 TEMPO 0118/0121 VRB20G35KT 11/2SM +TSRA BR BKN002 OVC030CB
FM012100 18015KT P6SM FEW015 BKN040 TEMPO 0121/0206 P6SM -SHRA BECMG 0122/0124 23012G22KT
FM020600 23015KT P6SM -SHRA SCT015 BKN025
FM021500 23020G35KT 6SM -SHRA BR BKN020 OVC040
RMK NXT FCST BY 020000Z=

KITCHENER/WATERLOO/ON

SPECI CYKF 011905Z AUTO 12013KT 6SM -RA BR FEW004 BKN090 OVC110 13/13 A2950 RMK PRESRR SLP995 DENSITY ALT 1500FT=
METAR CYKF 011900Z AUTO 11014KT 3SM -RA BR OVC090 13/13 A2947 RMK PRESFR SLP986 DENSITY ALT 1600FT=
SPECI CYKF 011836Z AUTO 11010KT 3SM -RA BR SCT004 BKN055 OVC096 13/13 A2950 RMK LTNG DIST SE PRESFR SLP996 DENSITY ALT 1500FT=
SPECI CYKF 011802Z AUTO 16005KT 110V190 3SM -RA BR OVC002 12/12 A2957 RMK LTNG DIST SE SLP018 DENSITY ALT 1300FT=
METAR CYKF 011800Z AUTO 16007KT 110V190 2 1/2SM -RA BR OVC002 12/12 A2956 RMK LTNG DIST SE PCPN 1.5MM PAST HR SLP017 DENSITY ALT 1300FT=
SPECI CYKF 011753Z AUTO 12006G15KT 110V180 2 1/4SM RA BR OVC002 12/12 A2956 RMK LTNG DIST S SLP014 DENSITY ALT 1300FT=
METAR CYKF 011700Z AUTO 11006KT 3SM -RA BR OVC002 11/11 A2957 RMK SLP021 DENSITY ALT 1200FT=

TAF CYKF 011938Z 0120/0208 12012KT P6SM -SHRA SCT005 BKN080 TEMPO 0120/0121 3SM -SHRA BR BKN005 OVC030 BECMG 0120/0121 17015G25KT
FM012100 17015G25KT P6SM SCT005 BKN030 TEMPO 0121/0124 5SM BR BKN005 OVC030 BECMG 0122/0124 22015G25KT
FM020000 22015G25KT P6SM FEW012 BKN050 TEMPO 0200/0208 BKN012 BKN050 BECMG 0201/0203 24012G22KT
RMK FCST BASED ON AUTO OBS. NXT FCST BY 020200Z=

KINGSTON/ON

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METAR CYGK 011900Z 08008KT 3SM -RA BR BKN006 OVC014 13/12 A2965
RMK SF5NS3 PRESFR SLP044 DENSITY ALT 400FT=
SPECI CYGK 011820Z 08004KT 2SM -RA BR BKN008 OVC014 12/12 A2969 RMK SF6NS2 SLP058=
METAR CYGK 011800Z 06006KT 4SM -RA BR FEW004 OVC014 12/12 A2969 RMK SF2SC6 SLP058=
SPECI CYGK 011752Z 08003KT 4SM -RA BR FEW004 OVC016 12/11 A2970 RMK SF2SC6 SLP060=
METAR CYGK 011700Z 04004KT 5SM -RA BR BKN025 OVC065 11/11 A2973 RMK SC5SC3 SLP070=

TAF CYGK 011938Z 0120/0203 08008KT 3SM -RA BR BKN005 OVC015 TEMPO 0120/0124 6SM -RA BR
SCT005 OVC015 PROB30 0120/0124 VRB20G30KT 1/2SM +TSRA FG BKN003CB
FM020000 17006KT P6SM FEW005 BKN160 TEMPO 0200/0201 BKN005
RMK NXT FCST WILL BE ISSUED AT 021145Z=
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LONDON/ON

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METAR CYXU 011900Z 16006KT 10SM SCT007 OVC033 15/15 A2949 RMK SF4SC4 SLP989
DENSITY ALT 1600FT=
SPECI CYXU 011826Z 19006KT 8SM BKN007 OVC042 15/15 A2950 RMK SF7SC1 SLP993
DENSITY ALT 1600FT=
METAR CYXU 011800Z 21007KT 110V210 8SM -SHRA OVC005 15/15 A2950 RMK SF8 CIG RAG
PRESFR SLP994 DENSITY ALT 1600FT=
METAR CYXU 011700Z 20018G25KT 8SM -SHRA OVC009 17/16 A2953 RMK SF8 CIG RAG SLP004
DENSITY ALT 1700FT=

TAF CYXU 011739Z 0118/0218 20015G25KT P6SM -SHRA SCT005 OVC025 TEMPO 0118/0119 4SM -
SHRA BR BKN005 OVC012 PROB30 0118/0119 VRB20G35KT 1SM +TSRA BR BKN004 OVC010CB
FM011900 20015G30KT P6SM SCT020 BKN050 TEMPO 0119/0123 SCT050
FM012300 22012G25KT P6SM -SHRA SCT015 OVC050
FM020200 23015KT P6SM SCT015 BKN040
FM021200 23015G25KT P6SM -SHRA BKN015 OVC100
BECMG 0214/0216 24020G35KT
RMK NXT FCST BY 020000Z=
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MONTREAL/PIERRE-ELLIOTT-TRUDEAU INTL/QC

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METAR CYUL 011900Z 04011KT 8SM -RA BKN006 OVC010 09/08 A2978 RMK SF6ST2 SLP088=
SPECI CYUL 011833Z 04012KT 10SM -RA SCT005 OVC010 09/08 A2978 RMK SF4ST4 SLP086=
METAR CYUL 011800Z 04014KT 5SM -RA BR BKN005 OVC010 09/08 A2980 RMK SF5ST3 SLP093=
METAR CYUL 011700Z 04011KT 8SM -RA SCT005 OVC010 09/08 A2982 RMK SF3ST5 SLP101=

TAF CYUL 011738Z 0118/0218 04012KT P6SM -RA SCT005 OVC010
TEMPO 0118/0121 5SM -SHRA BR OVC005
FM012100 05015KT 6SM -SHRA BR SCT004 OVC010 TEMPO 0121/0201 3SM SHRA BR BKN004 OVC010
PROB30 0121/0201 VRB15G25KT 11/2SM TSRA BR BKN004 OVC010CB
FM020100 05010KT 6SM -SHRA BR SCT004 OVC010 TEMPO 0201/0204 2SM SHRA BR BKN004 OVC010
PROB40 0201/0204 VRB20G35KT 1SM +TSRA BR BKN004 OVC010CB
FM020400 05008KT 3SM -SHRA BR BKN004 OVC020
PROB30 0206/0209 11/2SM -SHRA BR OVC003
FM020900 VRB03KT 11/2SM BR OVC004 BECMG 0210/0212 23015G25KT
FM021200 23015G25KT P6SM BKN012 OVC030
FM021700 23015G25KT P6SM -SHRA OVC030
RMK NXT FCST BY 012100Z=
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OTTAWA/MACDONALD-CARTIER INTL/ON

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METAR CYOW 011900Z 08010KT 6SM -RA BR OVC005 08/08 A2972 RMK SF8 SLP068=
METAR CYOW 011800Z 08011KT 6SM -RA BR OVC006 08/07 A2974 RMK SF8 SLP078=
METAR CYOW 011700Z 09009KT 5SM -RA BR OVC007 07/07 A2977 RMK SF8 SLP085=

TAF CYOW 011738Z 0118/0218 08010KT P6SM -RA OVC008 TEMPO 0118/0119 5SM -SHRA BR
OVC005
FM011900 08010G20KT 6SM -SHRA BR OVC006 TEMPO 0119/0122 2SM SHRA BR OVC004
PROB30 0119/0122 VRB15G25KT 11/2SM +TSRA BR BKN008 OVC025CB
FM012200 07008KT 6SM -SHRA BR OVC008 TEMPO 0122/0202 2SM SHRA BR OVC004
PROB40 0122/0201 VRB20G35KT 1SM +TSRA BR BKN004 OVC025CB
FM020200 07008KT 6SM BR SCT008 BKN015 OVC050 TEMPO 0202/0207 5SM -SHRA BR BKN008
OVC015 PROB30 0202/0207 3/4SM BR OVC003
FM020700 22010G20KT 6SM BR SCT006 BKN040 BKN100
FM021300 23015G25KT P6SM -SHRA BKN025 OVC080
RMK NXT FCST BY 012100Z=
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OTTAWA/GATINEAU/QC

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METAR CYND 011900Z 09013KT 3SM -RA BR OVC006 08/07 A2973 RMK SF8 SLP069=
METAR CYND 011800Z 09013KT 2 1/2SM -RA BR OVC007 08/07 A2975 RMK SF8 SLP078=
SPECI CYND 011719Z 09010KT 5SM -RA BR OVC005 08/07 A2977 RMK ST8 SLP083=
METAR CYND 011700Z 09011KT 2 1/2SM RA BR OVC005 08/07 A2977 RMK FG1ST7 PRESFR SLP086=

TAF CYND 011738Z 0118/0201 08010KT P6SM -RA OVC008 TEMPO 0118/0119 5SM -SHRA BR
OVC005
FM011900 08010G20KT 6SM -SHRA BR OVC008 TEMPO 0119/0122 2SM SHRA BR OVC004
PROB30 0119/0122 VRB15G25KT 11/2SM +TSRA BR BKN008 OVC025CB
FM012200 08008KT 6SM -SHRA BR OVC008 TEMPO 0122/0201 2SM SHRA BR OVC004
PROB40 0122/0201 VRB20G35KT 1SM +TSRA BR BKN004 OVC025CB
RMK NXT FCST WILL BE ISSUED AT 021245Z=
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PETERBOROUGH/ON

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SPECI CYPQ 011952Z AUTO 31009KT 4SM +RA BR OVC003 13/12 A2958
RMK SLP022 DENSITY ALT 800FT=
METAR CYPQ 011900Z AUTO 08003KT 020V100 6SM -RA BR OVC003 12/12 A2958
RMK SLP024 DENSITY ALT 800FT=
SPECI CYPQ 011839Z AUTO 04003KT 360V080 6SM -RA BR OVC005 12/12 A2960
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PROB30 0120/0121 VRB25G40KT 1SM +TSRA BR BKN003 OVC050CB
FM012200 21006KT P6SM SCT007 BKN050 OVC100
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QUEBEC/JEAN LESAGE INTL/QC

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ST. CATHARINES/NIAGARA DISTRICT/ON

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TORONTO/LESTER B. PEARSON INTL/ON

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FM020000 22010KT P6SM SCT020 BKN050 TEMPO 0200/0202 P6SM -SHRA
FM020300 23010G20KT P6SM BKN025
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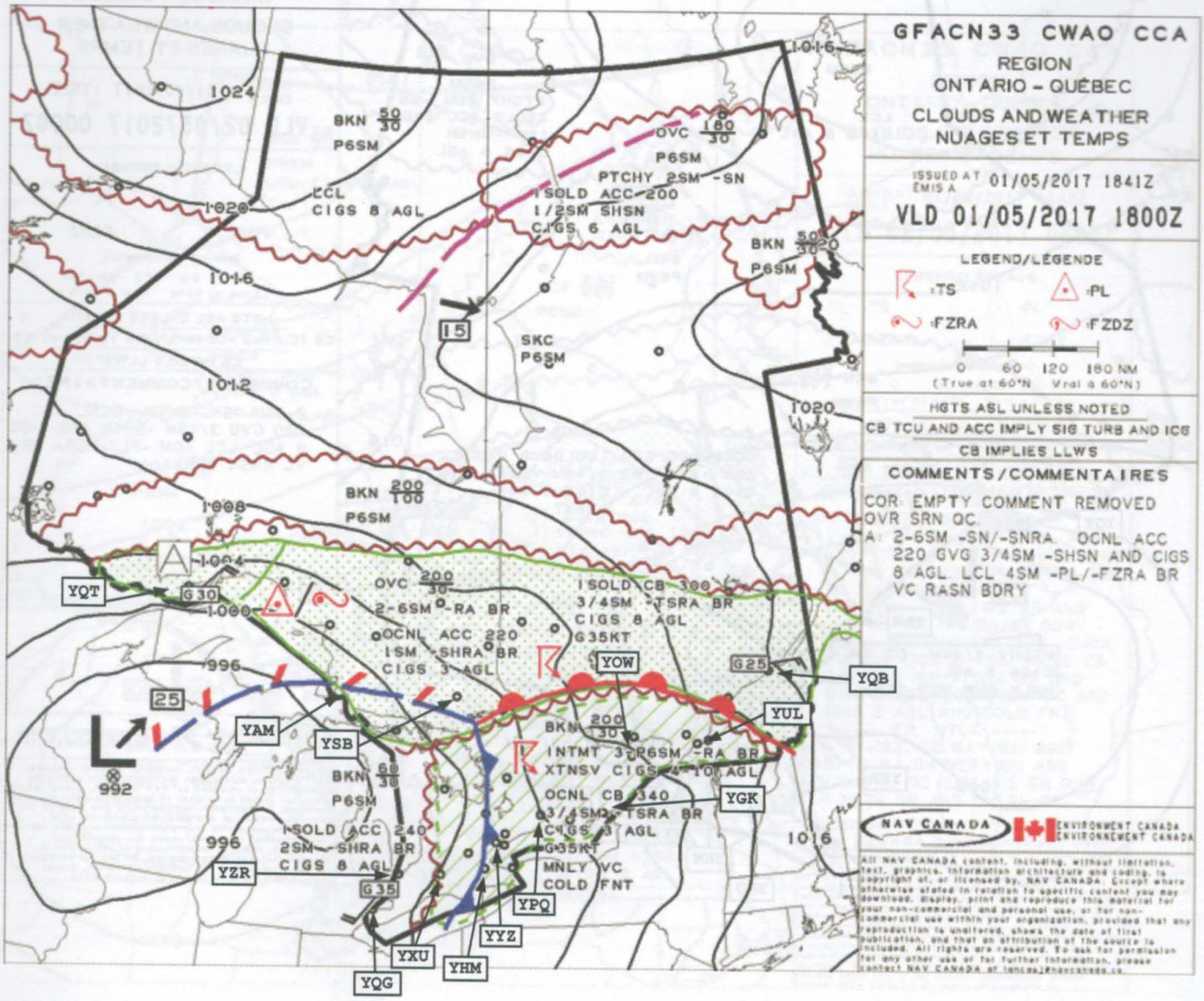
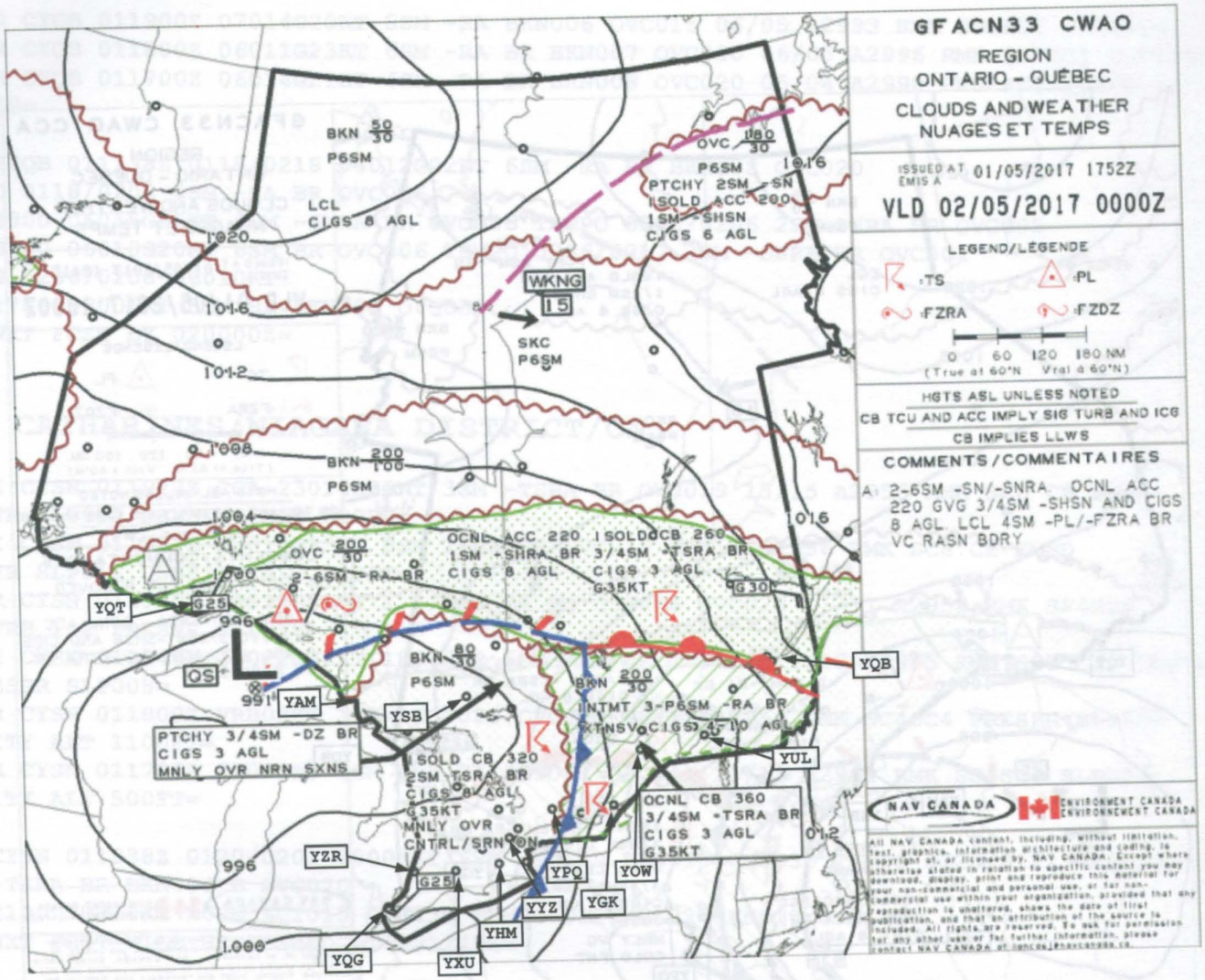
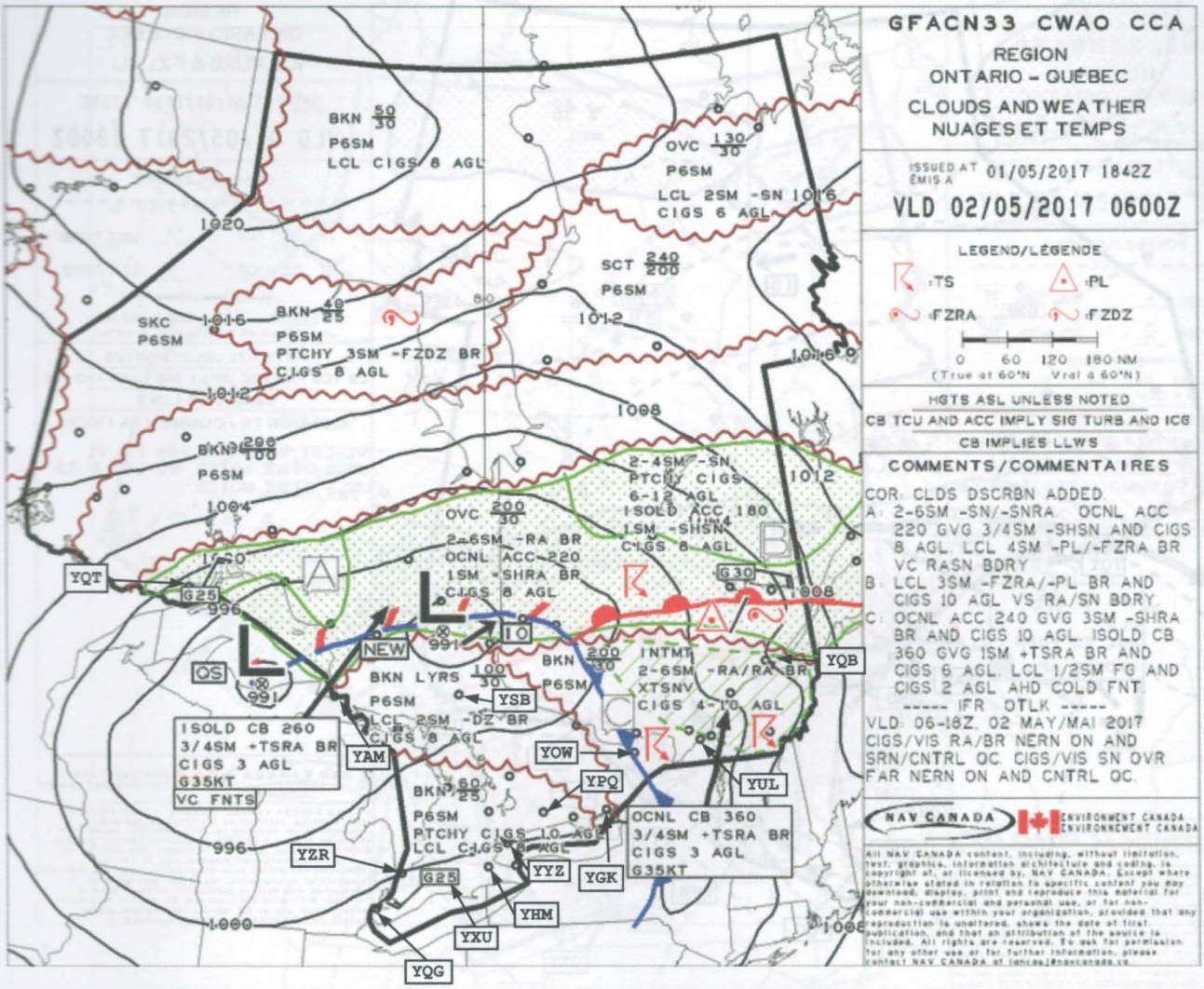


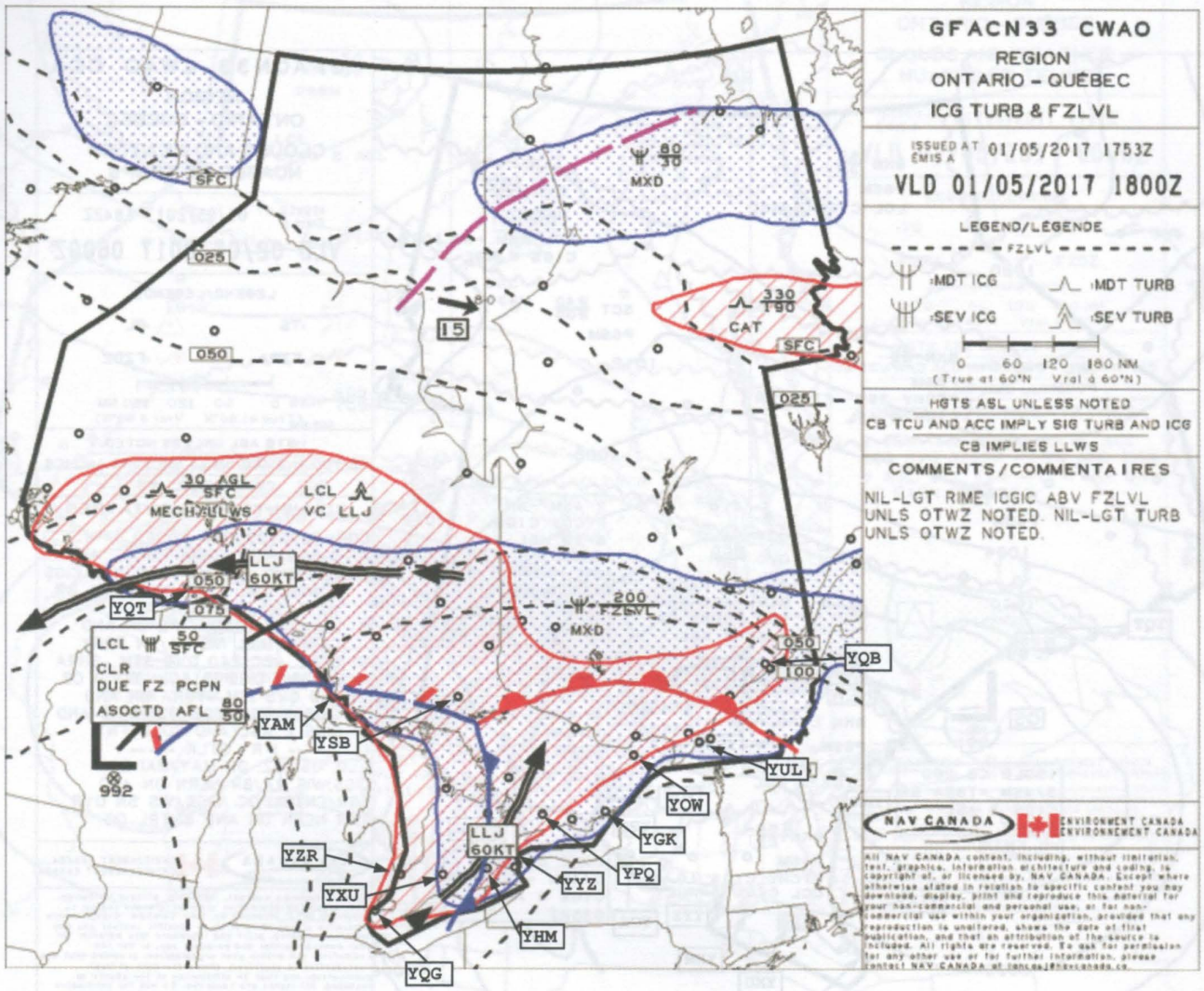
Hamilton	YHM	Peterborough	YPQ
Kingston	YGK	Quebec	YQB
Kitchener/Waterloo	YKF	Sarnia	YZR
London	YXU	Sudbury	YSB
Montreal (Trudeau)	YUL	Toronto	YYZ
North Bay	YYB	Windsor	YQG
Ottawa	YOW		



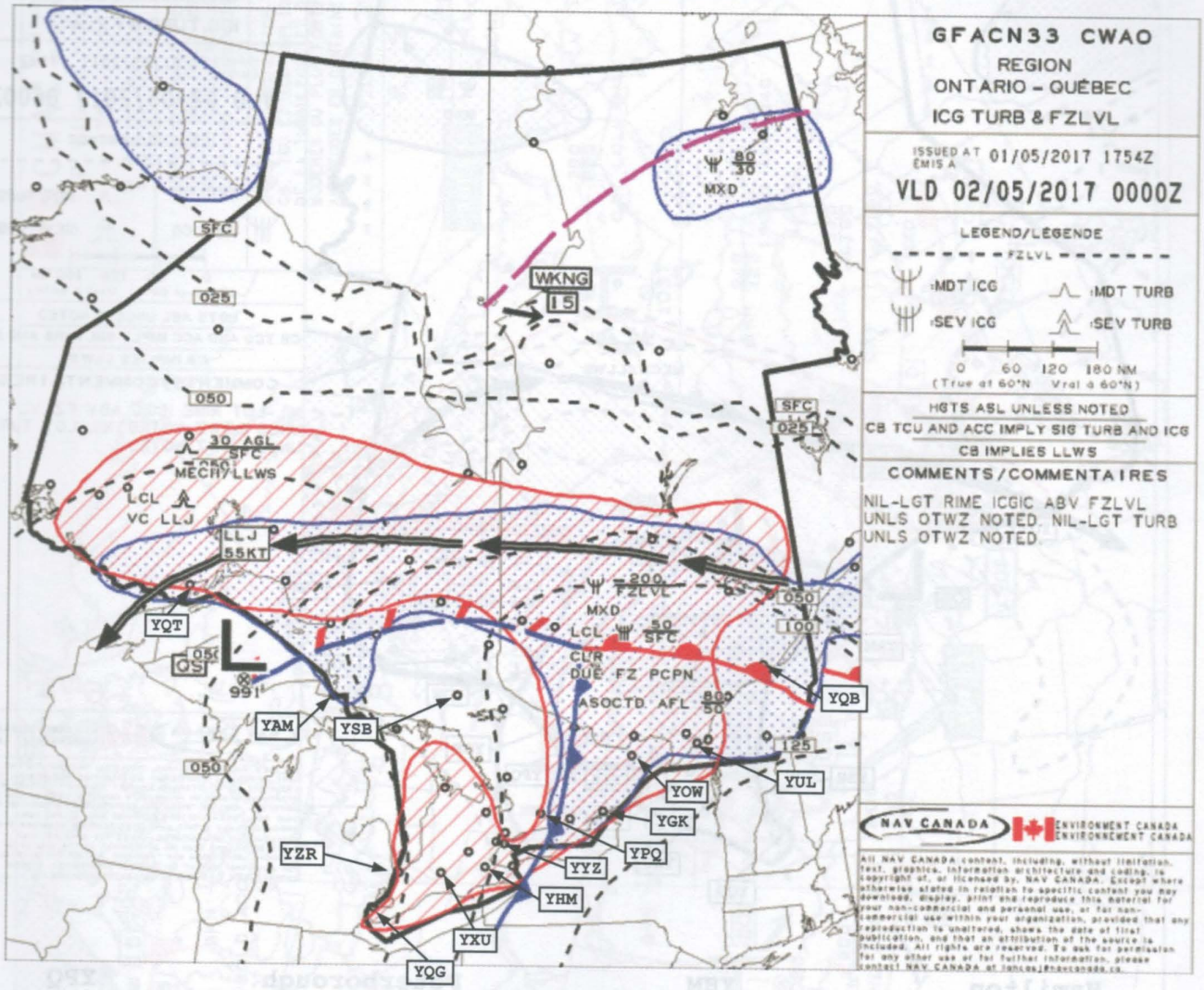
Hamilton	YHM	Peterborough	YPQ
Kingston	YGK	Quebec	YQB
Kitchener/Waterloo	YKF	Sarnia	YZR
London	YXU	Sudbury	YSB
Montreal (Trudeau)	YUL	Toronto	YYZ
North Bay	YYB	Windsor	YQG
Ottawa	YOW		



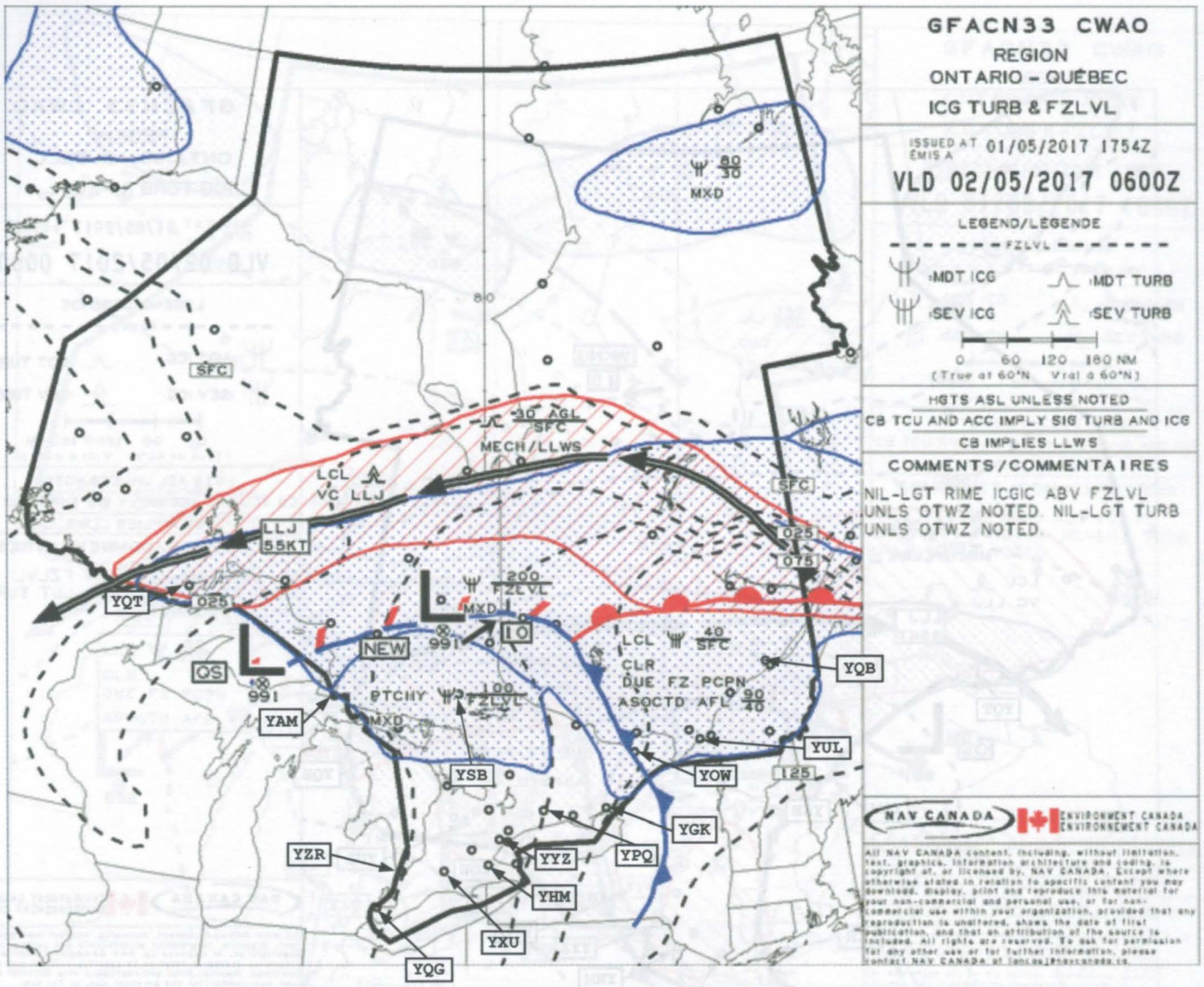
Hamilton	YHM	Peterborough	YPQ
Kingston	YGK	Quebec	YQB
Kitchener/Waterloo	YKF	Sarnia	YZR
London	YXU	Sudbury	YSB
Montreal (Trudeau)	YUL	Toronto	YYZ
North Bay	YYB	Windsor	YQG
Ottawa	YOW		



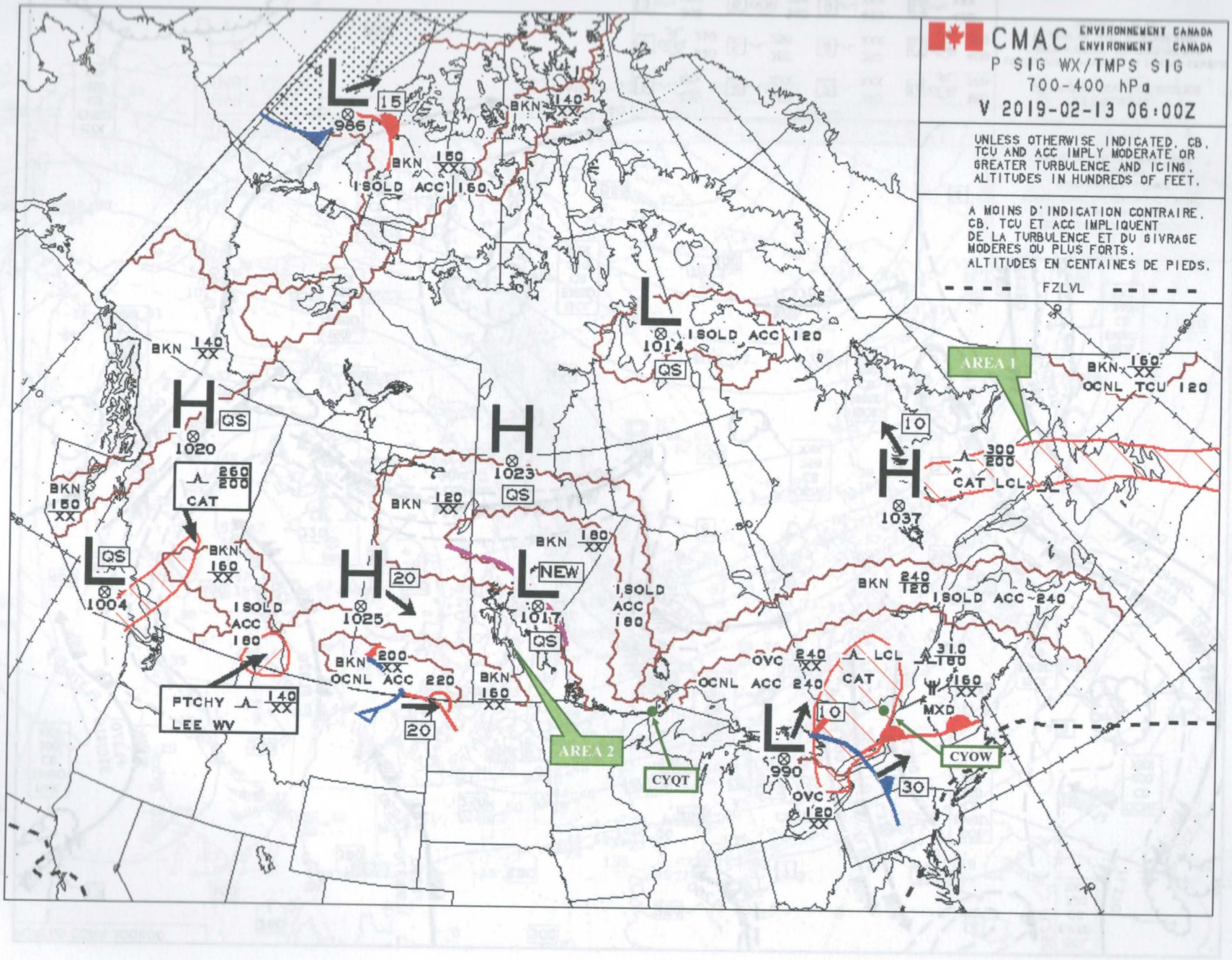
Hamilton	YHM	Peterborough	YPQ
Kingston	YGK	Quebec	YQB
Kitchener/Waterloo	YKF	Sarnia	YZR
London	YXU	Sudbury	YSB
Montreal (Trudeau)	YUL	Toronto	YYZ
North Bay	YYB	Windsor	YQG
Ottawa	YOW		



Hamilton	YHM	Peterborough	YPQ
Kingston	YGK	Quebec	YQB
Kitchener/Waterloo	YKF	Sarnia	YZR
London	YXU	Sudbury	YSB
Montreal (Trudeau)	YUL	Toronto	YYZ
North Bay	YYB	Windsor	YQG
Ottawa	YOW		



Hamilton	**YHM**	**Peterborough**	**YPQ**
Kingston	**YGK**	**Quebec**	**YQB**
Kitchener/Waterloo	**YKF**	**Sarnia**	**YZR**
London	**YXU**	**Sudbury**	**YSB**
Montreal (Trudeau)	**YUL**	**Toronto**	**YYZ**
North Bay	**YYB**	**Windsor**	**YQG**
Ottawa	**YOW**		


CMAC ENVIRONNEMENT CANADA ENVIRONMENT CANADA
P SIG WX/TMPS SIG
700-400 hPa
V 2019-02-13 06:00Z
UNLESS OTHERWISE INDICATED, CB, TCU AND ACC IMPLY MODERATE OR GREATER TURBULENCE AND ICING. ALTITUDES IN HUNDREDS OF FEET.
A MOINS D'INDICATION CONTRAIRE, CB, TCU ET ACC IMPLIQUENT DE LA TURBULENCE ET DU GIVRAGE MODERES OU PLUS FORTS. ALTITUDES EN CENTAINES DE PIEDS.
FZLVL
AREA 1
AREA 2
CYQT
CYOW
BKN 140 XX
BKN 150 XX
ISOLD ACC 150
BKN 140 XX
BKN 160 XX
OCNL TCU 120
ISOLD ACC 120
BKN 120 XX
BKN 180 XX
ISOLD ACC 180
BKN 240 120
ISOLD ACC 240
OVC 240 XX
OCNL ACC 240
OVC 120 XX
BKN 160 XX
OCNL ACC 220
BKN 200 XX
CAT
MXD
LCL
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1025
1014
1017
990
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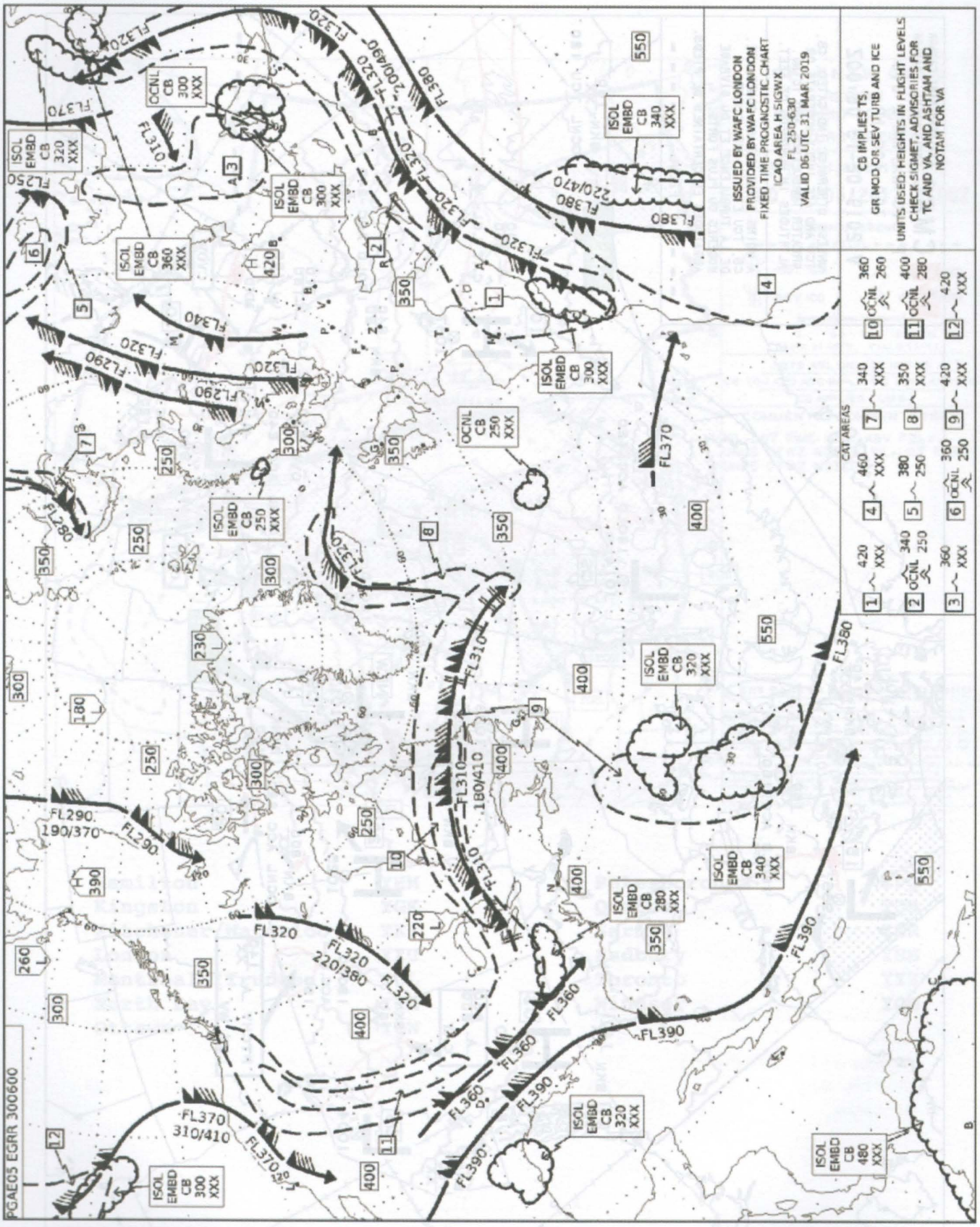
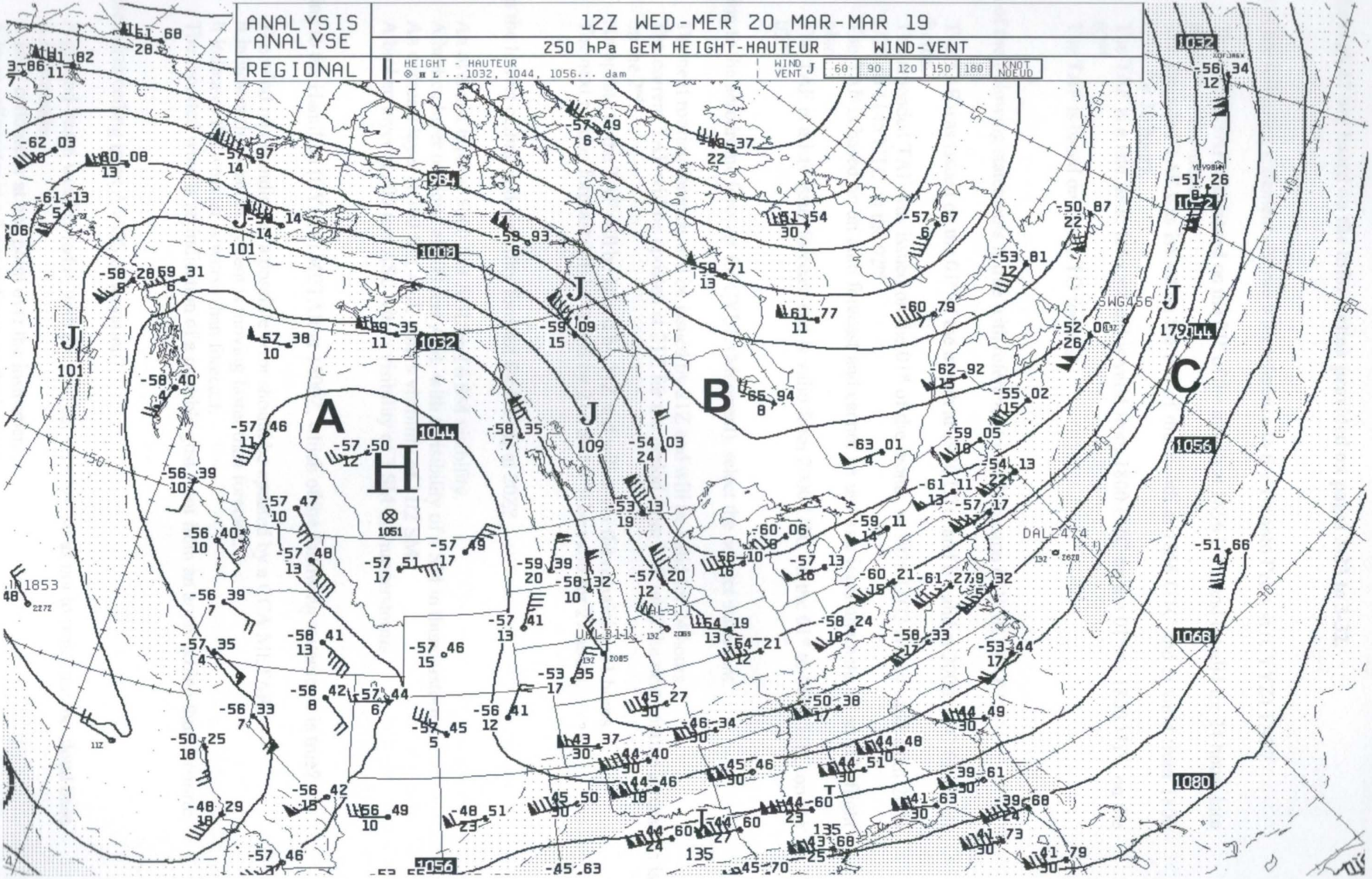

ISSUED BY WAFC LONDON
PROVIDED BY WAFC LONDON
FIXED TIME PROGNOSTIC CHART
ICAO AREA H SIGWX
FL 250-630
VALID 06 UTC 31 MAR 2019
CB IMPLIES TS,
GR MOD OR SEV TURB AND ICE
UNITS USED: HEIGHTS IN FLIGHT LEVELS
CHECK SIGMET, ADVISORIES FOR
TC AND VA, AND ASHTAM AND
NOTAM FOR VA
CAT AREAS
PGAE05 EGRR 300600


ANALYSIS
ANALYSE
REGIONAL
12Z WED-MER 20 MAR-MAR 19
250 hPa GEM HEIGHT-HAUTEUR WIND-VENT
HEIGHT - HAUTEUR
H L ...1032, 1044, 1056... dam
WIND VENT J
60 90 120 150 180 KNOT NOEUD
A
H
B
C
J
1044
1032
1008
1056
1080
1068
964
1051

Questions 50 through 67 are based on the information provided on pages 3-23 to 3-32.

50. Which of the following statements is true with reference to the Toronto Pearson (CYYZ) TAF?

a) The update TAF was issued on the 01st of the month at 1856 UTC and is valid for 24 hours into the 02nd of the month.
b) The amended TAF was issued on the 01st of the month at 1856 UTC and is valid from 1800 UTC for 30 hours.
c) The TAF is a late issue forecast and is valid from 1800 UTC on the 01st to 1800 UTC on the 02nd..
d) The TAF is based on an AUTO forecast.

51. Which of the following statements is true with reference to the Kingston (CYGK) TAF?

a) The TAF was issued on the 01st of the month at 1938 UTC and is valid at 2000 UTC for seven hours.
b) The amended TAF was issued on the 01st of the month at 1938 UTC and is valid from 2000 UTC to 1145 UTC on the 02nd.
c) The TAF is based on an auto forecast and cannot be use as a legal alternate on an IFR flight plan.
d) The TAF is a late issue forecast and is valid from 2000 UTC on the 01st to 0600 UTC on the 02nd.

52. Referring to the aerodrome forecast for CYUL (Montreal), select the correct statement.

a) The next routing forecast will be issued by 21Z and will be valid for 24 hours.
b) The current TAF will be updated at 21Z for the period from 21Z until the next routine forecast is issued at 00Z on the 2nd.
c) An update to the TAF will be issued by 21Z and will cover the remaining 21 hours.
d) The next routing forecast will be issued by 21Z and will be valid for 27 hours.

53. What is the lowest ceiling and visibility forecast for CYPQ at 20Z?

a) An overcast layer at 5000 feet AGL and 6 SM visibility.
b) A broken layer of cloud at 300 feet AGL with a visibility of 1 SM in thunderstorms.
c) An overcast layer at 300 feet AGL with a visibility of 11/2 SM.
d) A broken layer at 500 feet ASL with a visibility of 3 SM in thunderstorms.

54. Referring to the Hamilton (CYHM) METAR at 1800Z, which of the following statements is true?

a) The wind report indicates a possible error should be updated by a CCA METAR.
b) It indicates the weather system is moving faster than forecast.
c) It indicates the weather is worse than forecast.
d) The reported wind is an indication of a possible gust front from an approaching thunderstorm.

55. What measures ceiling in an AWOS observation?

a) A ground-based weather radar, with the gain set very low so as not to penetrate the cloud base.
b) A radiosonde.
c) A laser ceilometer at one point over the instrument.
d) A laser ceilometer in a 5 nm radius over the instrument.

56. The lowest weather forecast for Ottawa (CYOW) at 0400Z is;

a) 6 statue miles in light rain showers mist, ceiling of 800 feet and wind 070° true at 8 kts.
b) 6 statue miles in mist broken cloud at 1500 feet and wind 070° true at 8 kts.
c) 5 statue miles in light rain showers mist, broken cloud at 800 feet and wind 070° true at 8 kts.
d) 3/4 statue miles in mist, overcast at 300 feet, and 070° true wind at 8 kts.

57. After reviewing the latest Ottawa/Gatineau (CYND) TAF, METARs and SPECIs, you determine that the weather is…

a) basically as forecast.
b) the visibility and ceiling is lower than forecast.
c) the visibility and ceiling higher than forecast.
d) the wind is not as forecast.

58. With reference to your altimeter, what is the lowest altitude you would expect to have ground contact on the approach to the Ottawa CYOW) airport at 0230Z? (The aerodrome elevation is 375)

a) 300 feet.
b) 1200 feet.
c) 675 feet.
d) 1900 feet.

59. The latest weather reported at London is as follows:

SPECI CYXU 141907Z 29010G15KT 1/2SM R15/3500VP6000FT/D +TSRA OVC015CB 20/ RMK FG6CB2

What is the necessary increase in the opacity of the ground-based obscuring phenomenon for it to constitute a ceiling?

a) 2/8
b) 4/8
c) 6/8
d) None, the weather given already constitutes a ceiling.

60. Referring to the GFA, which of the following statements is true regarding the location of the frontal system at 0200Z if it was to move at forecast?

a) The warm front would be just South of Quebec City (YQB).
b) The cold front would over Ottawa (YOW).
c) The warm front would be just east of Montreal (YUL).
d) The cold front would be over Kingston (YGK).

61. As you approach CYND at 1900Z, FSS provides the following advisory:
Wind 100° at 13; visibility 2 ½ SM in light rain showers and haze; 600' overcast, temperature 08; dewpoint 08; altimeter 29.72; the IFR approach is the RNAV 09; landings and departures on runway 09. Which of the following statements is true?

a) The weather is better than forecast.
b) The light rain and haze were not forecast.
c) The weather is as forecast.
d) The visibility and ceiling are worse than forecast.

62. Which of the following statements is true with reference to the precipitation forecasted at 18Z within 100 nm north of the warm front (reference the GFA)?

a) The solid line encloses an area of continuous precipitation with 2 to 6 miles in light rain.
b) The solid line encloses an area of intermittent or showery precipitation with 2 to 6 miles in patchy rain showers.
c) The solid line enclosing green dots represents an area of fog.
d) The solid line encloses an area of scattered thunderstorms with tops as high as 30,000 feet.

63. Referring to the 0000Z GFA, what icing conditions would you expect to encounter flying YSB to YQB at 15,000 feet?

a) Nil to light to moderate icing in cloud above freezing level during climb cruise and descent above the freezing level.
b) Nil icing in the climb then moderate mixed icing in cruise and nil icing in descent.
c) Light icing in layer type clouds, moderate to severe clear icing in thunderstorms near the cold front.
d) Nil to light icing in cloud above freezing level in the climb and initial cruise, then moderate mixed icing with a possibility of severe clear icing in descent below 5000' ASL.

64. Referring to the GFA, what weather could a flight crew expect on departure from CYQB (Quebec) westbound at 2300Z (planned cruise attitude is 8000 feet)?

a) Visibility 2 to better than 6 SM in light rain showers, broken clouds between 3000 and 20,000 feet with occasional thunderstorms topped at 36,000 feet reducing visibility to 1SM. Moderate mechanical turbulence until climbing above 3000' AGL and moderate mixed icing between 10,000 and 20,0000 feet.
b) On initial departure visibility better than 6 SM with overcast cloud based at 800' AGL, temporarily 2 SM in light rain showers with overcast cloud at 400' AGL. Moderate mechanical turbulence until climbing above 3000' AGL and moderate mixed icing between 10,000 and 20,0000 feet.
c) Broken cloud between 3000 and 20,000' ASL, intermittent 3 to 6 SM in light rain, mist and extensive ceilings between 400 and 1000' AGL. Moderate mechanical turbulence until climbing above 3000' AGL and moderate mixed icing between 10,000 and 20,0000 feet.
d) 2 to better than 6 SM in light rain and mist, overcast cloud between 3000 and 20,000 feet. Occasionally 1 SM in heavy rain showers and mist, ceilings 800' AGL. Isolated CBs topped at 26,000 feet reducing visibility to ¾ SM in thundershowers.

65. With a planned cruise altitude of FL250, what flight conditions could a flight crew expect to encounter on departure eastbound from CYOW (Ottawa) at 2300Z (refer to GFA and YOW TAF)?

a) Light rain and overcast cloud based at 3000 feet on departure, layer clouds with scattered thunderstorms topped at 36,000 feet, and 5 miles in light rain and overcast cloud based at 3000 feet.
b) On initial departure visibility better than 6 SM with overcast cloud based at 800 feet AGL, temporarily 2 SM in light rain showers with overcast cloud at 400 feet AGL. Moderate mechanical turbulence until climbing above 3000 feet AGL and moderate mixed icing between 12,000 and 20,0000 feet.
c) On initial departure, 6 SM in light rain showers with overcast cloud at 800 feet AGL, temporarily 2 SM in moderate rain showers with overcast cloud at 400 feet AGL. Broken clouds between 3000 and 20,000 feet with 40 percent chance of thunderstorms topped at 36,000 feet reducing visibility to 1 SM. Moderate mechanical turbulence until climbing above 3000 feet AGL and moderate mixed icing between 12,000 and 20,0000 feet.
d) On initial departure 6 SM in mist with broken cloud at 1500' AGL, temporarily 5 SM in light rain showers with broken cloud at 800' AGL and the possibility of ¾ SM in mist overcast 300' AGL. Moderate mechanical turbulence until climbing above 3000' AGL and moderate mixed icing between 12,000 and 20,0000 feet.

66. Select the correct statement with regards to forecast turbulence between Toronto (YYZ) and Windsor (YQG) at 0000Z?

a) Nil to light turbulence is forecast for the area from YYZ to YQG.
b) Moderate mechanical turbulence and low-level windshear is forecast from the surface to 3000 feet AGL.
c) Moderate mechanical turbulence is forecast from the surface to 3,000 feet ASL. Locally severe turbulence is associated with the low-level jet stream.
d) None of the above.

67. With an ETA of 1800Z for YQT, what flight conditions could a flight crew expect during descent from FL240?

a) Overcast cloud from 20,000 to 3,000' ASL and visibilities 2 to 6 SM in light snow and light snow/rain showers on the surface. Moderate mixed icing between 20,000 and 5,000' ASL with possible severe clear icing below 5,000 feet in freezing precipitation. Occasional ACC top at 22,000 feet giving ¾ SM in light snow showers and ceilings at 800' AGL. Moderate mechanical turbulence and low-level windshear 3000' AGL to the surface with possible severe turbulence in the vicinity of the low level jet stream.
b) Overcast cloud from 20,000 to 3,000' ASL with 2 to 6 SM in light rain showers on the surface. Moderate mixed icing from 20,000' to the freezing level. Occasional ACC top at 22,000 feet giving 1 SM in light rain showers and ceilings at 300' AGL. Moderate mechanical turbulence and low-level windshear 3000' AGL to the surface.
c) Broken cloud from 20,000 to 3,000' AGL with 1 SM in light rain showers on the surface. Moderate mixed icing from 20,000' to the freezing level. Occasional CBs top at 34,000 feet giving ¾ SM in thunder showers and ceilings at 300' AGL. Moderate mechanical turbulence and low-level windshear 3000' AGL to the surface.
d) Overcast cloud from 20,000 to 3,000' AGL with 2 to 6 SM in snow showers on the surface. Moderate mixed icing between 20,000 to 8000' AGL with severe clear below 5,000 feet. Moderate mechanical turbulence and low-level windshear 3000' AGL to the surface.

68. Flight Service Stations (FSS) and Flight Service Centres (FIC) broadcast and provide upon request with which of the following reports to pilots while they are enroute to their destination:

a) GFAs, METARs, TAFs and SIGMETs.
b) SIGMETs and urgent PIREPs.
c) ATIS, SIGMETs and AIRMETs.
d) SIGMETs, AIRMETs, PIREPs, METARs, SPECIs, TAFs, altimeter setting, radar and lightning reports.

69. With reference to SIGMETs, select the correct answer from the following statements.

a) A SIGMET is valid upon receipt until it is updated or cancelled.
b) A SIGMET is only valid for 4 hours and can be issued up to 4 hours before the valid time.
c) When a SIGMET is issued for volcanic ash or tropical storm they are valid for 6 hours and can be issued up to 12 hours before the valid time.
d) All of the above.

70. Which of the statements is true with respect to the following **SIGMET**?

WSCN33 CWUL 121907
SIGMET C4 VALID 121905/122305 CWUL-
CZYZ TORONTO FIR SEV ICG (FZRA) FCST WTN /N4300 W08220/CYZR - /N4229 W08010/45 S CYHM - /N4254 W07916/20 S CYSN - /N4346 W07855/30 E CYYZ - /N4353 W08007/25 NW CYYZ - /N4337 W08201/15 SW CYGD - /N4300 W08220/CYZR SFC/FL030 MOV NE 10KT NC
RMK GFACN33

a) C4 SIGMET will time expire at 05Z December 23.
b) Severe icing was reported between 1905Z and 2305 in the vicinity of CYHM from the surface to 3000 AGL.
c) C4 SIGMET is valid from 1905Z to 2305Z on the 12 of the month.
d) Moderate to severe icing is forecasted between surface and 3000 feet north east of a line from CYZR to CYSN.

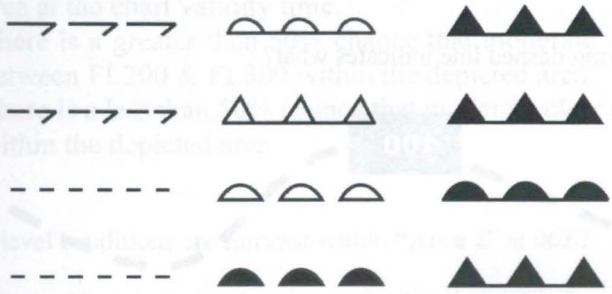
71. **WSCN33 CWUL 011626**
SIGMET G1 VALID 011625/012025 CWUL-
CZYZ TORONTO FIR SEV TURB OBS WTN 45 NM OF LINE W08344/45 SE CYAM – CYSB – CYOW
FL240/340 MOV ENE 20KT NC
RMK GFACN33=

With reference to the above SIGMET which of the following statements is true:

a) Severe turbulence is forecasted between FL240 and FL340 on a line SE CYAM thru CYSB and CYOW.
b) The turbulence is forecast to dissipate by the end of the period.
c) If the turbulence is still active at the end of the period SEGMET H2 will replace G1 and be valid for 4 hours.
d) Severe turbulence has been observed between FL240 and FL340 on a line SE CYAM thru CYSB and CYOW

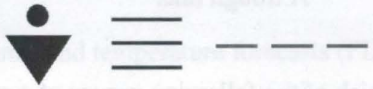
72. Which of the following group of symbols is used on weather maps to indicate a **Trowal, Upper Warm Front,** and **Cold Front**?

a)
b)
c)
d)



73. What do the following symbols on surface weather chart represent:

a) rain, fog, surface trough.
b) Rain showers, mist, surface trough of low pressure.
c) Rain, fog, upper trough.
d) Rain showers, fog, surface trough.



74. On surface weather charts what do the following symbols represent:

a) Freezing drizzle, Thunderstorms.
b) Freezing rain, Thunderstorms.
c) Intermittent drizzle, Showers.
d) Freezing drizzle, Showers.

Questions 75 through 83 are based on the Weather Chart provided on page 3-33.

75. Which of the following statements is true regarding the times of issue and the validity periods of P SIG WX/TMPS 700-400 hPa charts?

a) The charts are issued twice a day at 00Z & 12Z and are valid for 12 hours.
b) The charts are issued four times a day at 00Z, 06Z, 12Z, & 18Z and are valid for 12 hours after the issue time displayed on the chart.
c) The charts are prepared 4 times daily and are issued approximately 12 hours before the validity time displayed on the charts.
d) The charts are issued four times a day based on 00Z, 06Z, 12Z & 18Z data analysis. They are valid for 24 hours after the issuing time displayed on the chart.

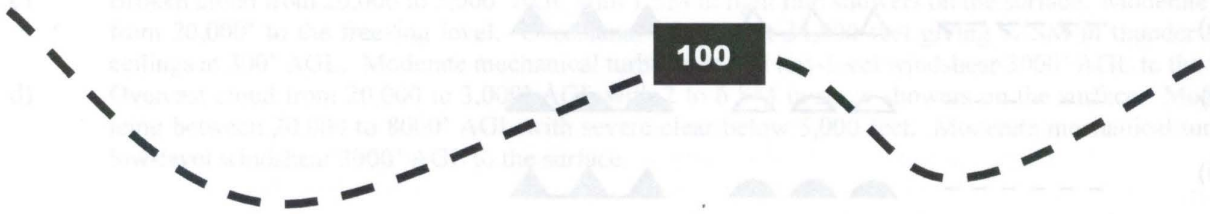
76. Referring to the Sig WX Prog chart legend, which of the following statements is true with reference to time of issued and validity period.

a) The chart is valid from 06Z to 18Z on February 13 and was issued at approximately 0530Z.
b) The chart was issued at approximately 18Z on February 12 and is valid at 06Z on the 13th.
c) The chart is based on 06Z data on February 12 and was issued 2 to 3 hours after 06Z.
d) The chart was issued 06Z on February 13 and is valid at 18Z.

77. The term FRQ CB depicted within a red scalloped border indicates…

a) a line of thunderstorms with little or no separation.
b) frequent embedded thunderstorms with spatial coverage of between 50% and 75% within the scalloped border.
c) embedded thunderstorms with spatial coverage greater than 65% within the scalloped border.
d) an area of thunderstorms with little or no separation with greater than 75% spatial coverage within the scalloped border.

78. On a SIG WX 700 - 400 hPa chart, the following dashed line indicates what?



a) Clear air turbulence at 10,000 feet.
b) Marked mountain waves.
c) The freezing level at 10,000 feet.
d) A trough line.

79. Which of the following groups of symbols indicate severe turbulence, moderate icing, and a trowal?

a)


b)


c)


d)


80. The term CB when forecasted for a particular area automatically implies:

a) severe thunderstorms within the depicted area of cloud.
b) greater than 75% thunderstorm coverage within the depicted area of cloud.
c) significant thunderstorms are not located within the depicted area of cloud.
d) moderate or severe turbulence and icing with no symbols being used.

81. Reviewing the P SIG WX chart in preparation for a flight from Thunder Bay (CYQT) to Ottawa (CYOW) departing at 04Z, what significant weather would you expect to encounter at a cruise altitude of FL210?

a) Broken changing to overcast cloud mid-way through the flight with 50% to 75% chance of alto-cumulus castellanus. Moderate with localized severe clear air turbulence nearing Ottawa.
b) Broken cloud topped at 24,000 feet, moderate icing and a band of moderate to severe clear air turbulence nearing Ottawa.
c) During cruise a 50 to 75% chance of alto-cumulus castellanus with moderate to severe turbulence nearing Ottawa.
d) Overcast cloud with occasional alto-cumulus castellanus topped at 24,000 feet and moderate with localized severe turbulence nearing Ottawa.

82. "**Area 1**" depicted on the P SIG WX/TMPS chart indicates:

a) A greater than 75% chance that moderate clear air turbulence will occur within the depicted area.
b) Moderate clear air turbulence between 20,000 & 30,000 feet is forecast to occur within the depicted area at the chart validity time.
c) There is a greater than 50% chance that moderate with locally severe clear air turbulence will occur between FL200 & FL300 within the depicted area.
d) There is a less than 50% chance that moderate clear air turbulence will occur between FL200 & FL300 within the depicted area

83. What mid-level conditions are forecast within "**Area 2**" at 06Z?

a) No significant weather is forecast for that time period.
b) Broken cloud layers topped at 12,000 feet.
c) Broken cloud topped at 18,000 feet and individual ACC topped at 18,000 feet.
d) Broken cloud between 12,000 and 24,000 feet with embedded ACC up to 24,000.

84. Which of the following statements is true with reference to Upper level winds and temperature forecasts (FD):

a) Forecast wind speeds are in knots, to the nearest 10°T.
b) Forecast wind speeds are in MPH, to the nearest 10°M.
c) Forecast wind speeds are in knots, to the nearest 5°T.
d) Are issued four times a day.

85. The FD wind forecast for FL240 is 740538, it would be decoded as:

a) 050°T at 74KTS temperature ISA+5°C.
b) 240°T at 105 KTS temperature ISA+5°C.
c) 040°T at 5 MPH temperature ISA-8°C.
d) 240°T at 105 KTS temperature ISA-5°C.

86. Decode the following upper level wind report:

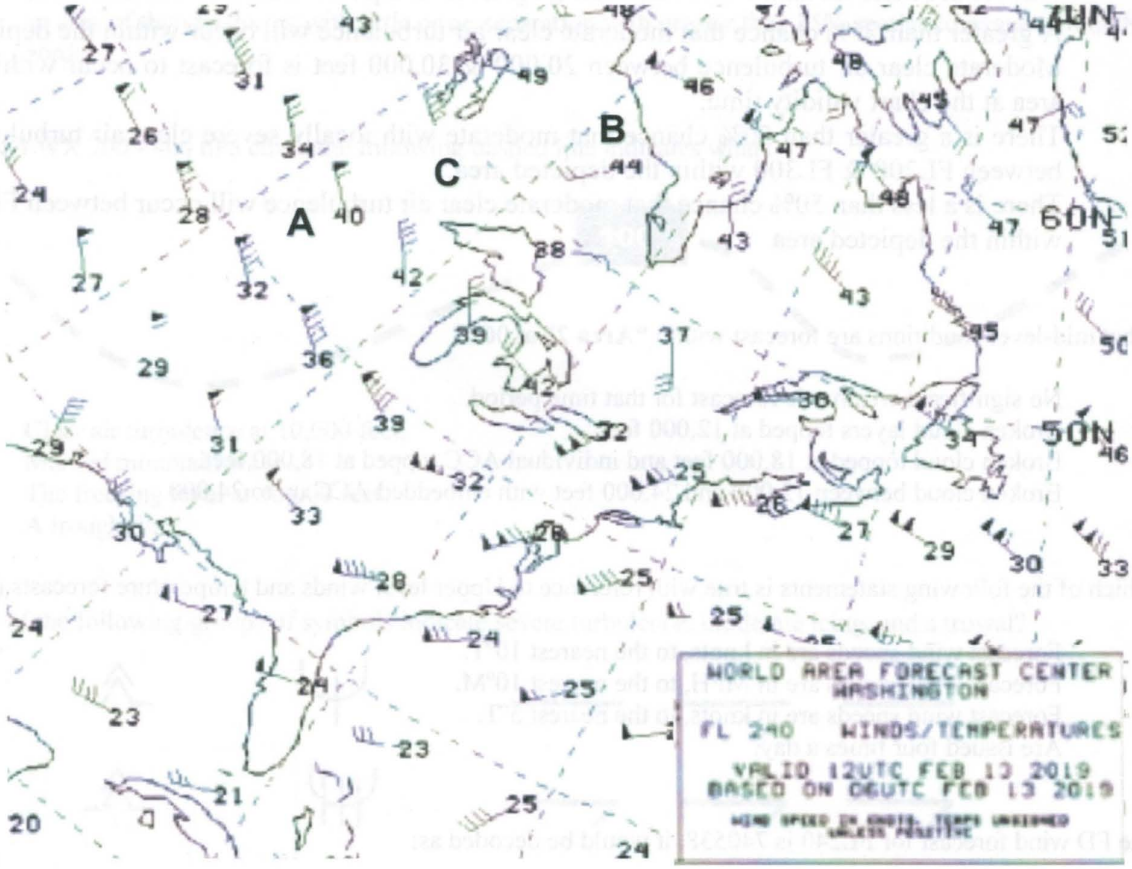
CYYF
39,000
823359

a) 320° magnetic at 133 knots, temperature -59°C.
b) 320° true at 133 knots, temperature -59° C.
c) 330° magnetic at 82 knots, temperature -59°F.
d) 330° true at 82 knots, temperature -59°C.

87. Upper Level Chart - PROGs are prepared for flight levels 240, 340, 390 and 450. What are the issue and validity times for these charts?

a) They are issued twice a day (00Z,12Z) and are valid for six and twelve hours after they are issued.
b) They are issued four times a day (00Z, 06Z, 12Z & 18Z) and are valid for twelve hours after they are issued.
c) They are issued once a day with validity times of 00Z, 06Z, 12Z and 18Z.
d) A 6 hour and 12-hour forecast is produced from each of the upper wind analyses completed at 00Z, 06Z, 12Z & 18Z and is indicated in the header of the chart.

88. With reference to the Prog Chart above you would expect the wind and temperature at point C to be (Hint: reference the underlying grid)?



a) 255°/40 kts ISA+9° C
b) 075°/40 kts ISA-9°C
c) 075°/65 kts ISA-11°C
d) 255°/40 kts ISA-9°C

For questions 89 through 95 refer to the WAFC SIG WX Chart FL250-FL630 on page 3-34

89. Clear air turbulence associated with jet streams occurs most often when;

a) jet stream wind speeds exceed 110 knots at the core.
b) jet streams have a significant curve or bend, especially around a deep pressure trough.
c) a jet stream passes just north of a surface frontal wave.
d) all of the above.

90. A forecast area of turbulence implies a ____ probability of encountering turbulence somewhere within the depicted area.

a) 30%
b) 50%
c) 70%
d) 100%

91. Jet streams are depicted on WAFC SIG WX charts when their core speeds are forecast to attain ____ knots or more.

a) 60
b) 80
c) 100
d) 120

92. Select the correct statement below with reference to jet stream delta depicted on SIGWX FL 250-630 charts.

a) It indicates the lowest, highest and average level of the core height along with the maximum speed of the core.
b) It indicates the flight level above and below the jet stream core height where the wind speed slows to 80 knots.
c) It indicates the highest and lowest level of the tropopause along the jet stream's path.
d) It indicates the flight levels where moderate and severe clear air turbulence is forecast along the jet stream.

93. Which of the following statements is true with reference to the jet stream that is located in the vicinity of the Great Lakes thru northern Quebec and south of Greenland?

a) The core height is FL310; the maximum speed is 160 knots and moderate turbulence is forecast from below the level of the chart to FL350.
b) The average core height is FL310 and varies from FL180 to FL410. The maximum core speed is 160 knots and moderate to severe turbulence is forecast from FL260 to FL400.
c) The core height is FL350 and the vertical depth to the eighty knot isototach varies from 1800 meters to 4100 meters
d) The core height is FL310; the maximum speed is 160 knots and moderate turbulence is forecast from below the level of the chart to FL420 with a smaller area of moderate occasional severe turbulence from FL260 to FL360.

94. With reference to the WAFC SIG WX chart, what does the following symbol represent?

a) Tropical cyclone Fukushima is forecast to be located at 37.2N, 141.0E at the chart valid time.
b) A high altitude weather balloon is being released from 37.2N, 141.0E during the period.
c) Radioactive materials were released into the atmosphere position 37.2N, 141.0E and pose a hazard to aircraft in the area.
d) Fukushima Volcano located 37.2N, 141.0E has erupted; there is a potential of a volcanic ash plume in the depicted area.

95. Select the false statement from the list below relating to the jet stream over Alaska and the Yukon.

a) The winds associated with the jet stream gradually veer from the southwest to the northwest.
b) The jet stream core height is FL290 with a maximum speed of 140 knots.
c) The jet stream 80 knot wind field is from FL190 to FL370.
d) The winds associated with jet stream are initially from the north then gradually veer to the northeast.

For questions 96 to 107 refer to the 250 hPa chart on 3-35

96. At what times is the data collected for the 250 hPa constant pressure analysis charts, and when are the charts disseminated?

a) 00Z, 12Z and they are issued approximately three hours after the observation.
b) 00Z, 06Z, 12Z, 18Z, and they are issued approximately two to three hours after the observation
c) They are observed approximately twelve hours before the issue times of 00Z, 06Z, 12Z, 18Z.
d) 00Z, 12Z, and they are issued approximately 30 minutes after the observed times.

97. What is the height and maximum wind speed of the jet stream core depicted east of Nova Scotia (Area C)?

a) 10,200 metres and 179 kts.
b) 1020 metres and 179 kts.
c) 1044 decametres and 179 kts.
d) 10,200 feet and 179 kts.

98. On a constant pressure upper air chart, contour lines represent:

a) The height of the pressure surface in decametres.
b) The slope of the pressure surface.
c) The change in pressure along the contours.
d) The pressure rate of change measured at right angles to the contours.

99. On an upper level analytical chart, the spacing between the contour lines represents the:

a) Height of the pressure surface in decametres.
b) Slope of the pressure surface.
c) Change in pressure along the contours.
d) Pressure rate of change measured at right angles to the contours.

100. If the___kt. isotachs are spaced closer together than ___NM on the 250 hPa upper air chart, you can expect sufficient horizontal shear for the occurrence of Clear Air Turbulence (CAT).

a) 20, 60
b) 30, 90
c) 40, 100
d) 50, 120

101. Which of the following areas have a high probability for CAT?

a) Area A
b) Area B
c) Area C
d) Areas A and C

102. Contours on upper air charts usually form wavy patterns which are referred to as macro scale waves. As a macro scale wave ridge passes over your station, what will happen to the height of the tropopause?

a) It will decrease for a time then increase.
b) It will increase for a time then decrease.
c) It will remain at a constant height.
d) The tropopause will tend to be higher in the summer and lower in the winter.

103. Which of the following areas is a macro scale wave ridge?

a) Area A
b) Area B
c) Area C
d) Areas A and C

104. When considering upper-air contour charts, you should know that:

a) The contour lines show the height of the pressure level and are in terms of "feet".
b) The contour lines connect points having equal MSL pressure.
c) The contour lines have no bearing on the direction or speed of the wind at the corresponding altitude.
d) The wind blows parallel to the contour lines and the wind strength is proportional to its spacing.

105. The data that is used to prepare upper level analytical charts is based upon what?

a) Radiosondes that are recorded four times a day to prepare four charts/day.
b) Radiosondes that are recorded two times a day to prepare four charts/day.
c) Radiosondes that are recorded four times a day to prepare two charts/day.
d) Radiosondes that are recorded two times a day to prepare two charts/day.

106. On upper level analytical charts when the contour lines are spaced close together, it indicates that the contour gradient is _____ and as a result, the wind speeds for that corresponding altitude are _____. Fill in the blanks.

a) Steep, strong.
b) Shallow, strong.
c) Shallow, weak.
d) Contour lines do not relate to wind speed.

107. With respect to interpreting wind direction and speed on upper-air contour charts, which of the following statements is false?

a) The wind blows parallel to the height contours, with lower heights on the left.
b) If the height contours are curved, then centrifugal force acts on the wind.
c) The closer the contours, the stronger the wind.
d) Curvature of the height contours does not affect the speed of the wind if the contour spacing is the same.

Answer Key MET Practical

1. d	31. c	61. c	91. b
2. b	32. d	62. a	92. b
3. a	33. c	63. d	93. d
4. c	34. a	64. d	94. c
5. a	35. b	65. c	95. d
6. c	36. c	66. b	96. a
7. b	37. d	67. a	97. a
8. a	38. c	68. b	98. a
9. b	39. a	69. d	99. b
10. d	40. d	70. c	100. b
11. c	41. a	71. d	101. c
12. c	42. d	72. a	102. b
13. b	43. a	73. d	103. a
14. a	44. c	74. a	104. d
15. d	45. b	75. c	105. d
16. a	46. b	76. b	106. a
17. c	47. c	77. d	107. d
18. b	48. a	78. c	
19. c	49. c	79. d	
20. b	50. b	80. d	
21. c	51. a	81. d	
22. a	52. c	82. c	
23. d	53. b	83. a	
24. d	54. d	84. a	
25. c	55. c	85. d	
26. a	56. d	86. b	
27. c	57. a	87. d	
28. c	58. c	88. d	
29. b	59. a	89. d	
30. d	60. d	90. b	

RADIO AIDS & FLIGHT PLANNING

1. The slaved gyro magnetic compass (gyrosyn) minimizes the oscillation and turning errors associated with P-type magnetic compasses through the utilization of a:

   a) magnetic compensator assembly
   b) stabilized gyro to keep the flux valve in a horizontal position
   c) directional gyro unit slaved to a remote compass transmitter
   d) remote "sensing unit" equipped with a torque levelling actuator

2. Frequency is:

   a) A measure of the wave's strength and decreases with distance from the transmitter.
   b) The number of cycles per second.
   c) The period of time to complete a full wave.
   d) The number of waves per metre.

3. The distance between the transmitting antenna and the point where the sky wave first returns to the surface of the earth is called the _____ .

   a) Skip Zone
   b) Space Wave Distance
   c) Skip Distance
   d) L/F Radio Wave Propagation Distance.

4. Which of the following statements is true with reference to propagation of radio ground waves?

   a) Reception of ground wave signals can only be accomplished at varying distances from the transmitter.
   b) As the frequency increases ground wave attenuation decreases to provide a greater reception distance
   c) As the frequency increases ground wave attenuation increases to provide less reception distance.
   d) The distance from where the ground wave can no longer be received is dependent on the height and distance of the ionosphere, time of day, season and latitude.

5. When navigating by use of the ADF, pilots should be aware that coastal refraction error is most pronounced when the radio beam being received by the aircraft from an inland NDB crosses the shoreline at an angle of:

a) 90 degrees
b) 60 - 90 degrees
c) 30 - 60 degrees
d) less than 30 degrees

6. How can a pilot determine if the ADF is still in reception range of the tuned NDB?

a) Check for the OFF flag, which will appear if the aircraft is out of range.
b) The ADF pointer will always point towards north once it is out of range.
c) Listen to the Morse code ident for the tuned NDB to endure positive tracking.
d) The ADF pointer will begin to spin if it is out of range.

7. A pilot is flying IFR within controlled airspace. The aircraft is equipped with two VOR receivers, two DMEs and one ADF. The ADF malfunctions and is rendered unserviceable. The pilot should:

a) depart controlled airspace
b) advise ATS of the failure immediately
c) request a change of flight plan to VFR
d) squawk 7600 on the transponder

8. How do the operating limitations differ between an NDB and a VOR?

a) Use of a VOR is limited by line of sight, while use of an NDB is limited by signal attenuation.
b) Use of both VORs and NDBs is limited by line of sight.
c) Use of a VOR is limited by signal attenuation, while use of an NDB is limited by line of sight.
d) Use of both VORs and NDBs is limited by signal attenuation

9. Which of the following statements about the VOR is correct?

a) It depends upon a simultaneous comparison of several phased signals.
b) It depends upon a time difference between signals transmitted from the aircraft to a ground station.
c) It depends upon a phase difference between two signals transmitted simultaneously from a ground station.
d) It measures the frequency difference between two signals received from a ground station transmitter.

10. What is the minimum reception distance and height for a VOR signal assuming no terrain interference?

a) 100 nm at 7000 feet
b) 60 nm at 3000 feet
c) 80 nm at 3000 feet
d) 40 nm at 1000 feet

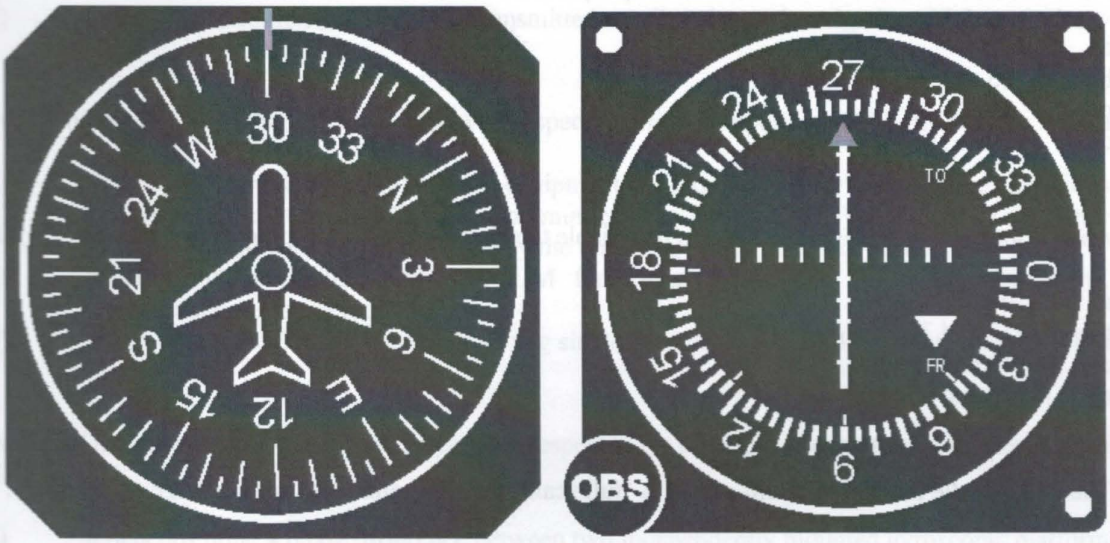
11. When flying an aircraft equipped with **dual** VOR receivers, you may check the accuracy of the sets against each other on the ground or in the air. Which of the following tolerances are correct?

a) ±3° ground, ±4° air
b) ±4° ground, ±4° air
c) ±4° ground, ±6° air
d) ±3° ground, ±6° air

12. You are passing abeam a VOR station and you note that the CDI is fully deflected, and there is no TO/FROM indication. The reason for this indication is:

a) that the TO/FROM indicator is not serviceable
b) that the VOR station is of the Doppler type and does not provide valid TO/FROM indications unless the aircraft is actually established on the radial selected
c) that the aircraft is crossing a radial at 90 degrees to the one selected on the OBS
d) that the aircraft VOR set is receiving erroneous signals that have been reflected from the ground or from a nearby object.

13. With reference to the instruments below, ATC has cleared you to intercept the 320° radial inbound at an intercept angle of 90 degrees. You would fly a heading of ____ and select ____ on the OBS.



a) 030°, 320
b) 050°, 140
c) 360°, 090
d) 230°, 140

14. Which of the following statements is true with reference to a Radio Magnetic Indicator (RMI)?

a) The RMI bearing indicators always points to the navigation facility and therefore can display magnetic bearing to ADF, VOR or Localizer transmitters.
b) The VOR/RMI needle head always displays the radial that the aircraft is tracking.
c) If the RMI compass card fails the ADF/RMI will function as fixed card ADF, but the VOR/RMI will continue to function normally.
d) The RMI is an instrument which can provide heading and magnetic bearing information to LF/MF and VHF omnidirectional range facilities.

15. Identify from the statements which follow, the one that correctly describes the operating principle of Distance Measuring Equipment (DME):

a) the measurement of the time between the transmission of an aircraft interrogating signal and the receipt of a matched pulse reply signal from a ground station (the 2 signals having different frequencies)
b) pulse width measurement of coded signals that are transmitted every 37.5 seconds from a DME station
c) measurement of the time that elapses between aircraft responder signals and successive interrogation signals transmitted from a particular DME station
d) the airborne set measures the exact phase of the DME station's interrogation signal, the value of which undergoes electronic translation into a DME slant range readout

16. An ILS localizer provides valid and reliable signal coverage of____degrees either side of the front course out to a distance of 10nm.

a) 10
b) 25
c) 35
d) 3- 6

17. An ILS localizer signal is considered to be reliable to approximately 10-degree splay between ____ and ____:

a) 0 and 10 nm
b) 17 and 35 nm
c) 10 and 18 nm
d) 10 and 35 nm

18. The CDI Needle indications from centre to "full scale" for VOR and ILS/Localizers are respectively:

a) 12 degrees and 3 degrees
b) 10 degrees and 2.5 degrees
c) 4.0 NM per side and 35 degrees
d) There is no minimum to tolerance

19. What is the total depth of an ILS glide path beam?

a) 0.7 degrees
b) 1.4 degrees
c) 0.5 degrees
d) 2.5 degrees

20. Which of the following statements is true with reference to Single Sideband (SSB) HF radios?

a) SSB radios incorporate a sideband carrier wave circuit which is used to obtain better reception of unmodulated AM carrier wave transmissions.
b) SSB radios having long range, high quality and good propagation qualities, provide HF data link capability.
c) SSB transmitters utilize high frequency ground wave signals which are least affected by attenuation and bending due to diffraction to allow for ranges of several thousand miles.
d) SSB transmitters eliminate one sideband and all or most of the carrier wave in order to increase transmission power; the carrier is reinserted by the receiver to reproduce the original message.

21. Is it possible to increase the reception range on an HF radio by changing frequencies?

a) No, it will have the same range on all frequencies.
b) Yes, by using higher frequencies at night and lower frequencies during the day.
c) Yes, by using lower frequencies at night, and higher frequencies during the day.
d) Yes, higher frequencies have a higher reception range.

22. SELCAL operates with a single selective call consisting of a combination of four preselected audio tones requiring approximately two seconds transmission time. The tones are generated:

a) in the ground station coder and are received by a decoder in the airborne receiver
b) in the airborne transmitter and are received by the ground station decoder
c) in one airborne transmitter and are received by a paired airborne receiver in another aircraft
d) in the ground station coder and are transmitted on all co-located navigation aid frequencies

23. Which of the following statements is false with respect to HF radio operation in North Atlantic Airspace (NAT)?

a) Fully functioning HF communication equipment is a requirement for unrestrictive operations.
b) On first voice contact with Oceanic Communication Centres (OCCs), flight crews are required to request a SELCAL check with the OCCs to verify the operation of the SELCAL equipment.
c) When utilizing CPDLC and SATCOM for routine air/ground ATS communications, HF/SELCAL communications is not required.
d) When tuning a HF radio frequency, a long sidetone tuning cycle could indicate a faulty HF radio.

24. Which of the following statements is correct with respect to the principle of operation of an Inertial Navigation System (INS)?

a) it depends upon a phase difference between two independently mounted gyroscopic platforms.
b) it requires external references in order to determine aircraft position and velocity.
c) it must utilize a radial and DME distance to determine its initial geographical position.
d) it measures acceleration against time to determine speed and position.

25. An INS system is capable of providing:

1. steering information to the autopilot.
2. ground proximity sensing.
3. runway alignment and glideslope information for precision approaches
4. aircraft attitude information for flight instruments.
5. antenna stabilization for airborne weather radar.
6. yaw dampening information to the autopilot.
7. horizontal navigation data.
8. control surface actuation.

a) 1,2,4,7
b) 1,4,5,7
c) 2,4,5,7
d) 2,5,6,8

26. Select the true statement with reference to an Inertial Navigation System (INS).

a) It utilizes highly stable cesium frequency transmissions which are synchronized with up to eight ground stations to provide an accurate position fix.
b) It is a completely self-contained unit which can provide accurate measurement of aircraft position by comparing transmitted and received radio beams utilizing doppler shift measurement.
c) It utilizes accelerometers, in a gimbal assembly, to sense all vertical and horizontal accelerations to provide position and steering information.
d) It calculates the elapsed time between aircraft responder signals and successive interrogation signals transmitted from the INS transmitter to provide a position readout.

27. Inertial Reference Systems…

a) Operate using a strap-down system with ring laser gyros which measure rate of rotation.
b) Use GPS to calculate the aircraft's position.
c) Use a gyro-stabilized platform to ensure that readings from the accelerometers are accurate.
d) Rely on ground-based navigation aids to compute the aircraft's position.

28. Select the correct statement with regards to IRS/FMS Systems:

a) The sensor package and navigation solution are contained in a single unit.
b) INS systems are a more modern version of the IRS/FMS system.
c) The navigation solution is provided by the Flight Management System which is integrated with the IRSs.
d) The sensor package uses 4 gyros and 4 accelerometers on a stable platform to calculate the aircraft's position.

29. Which of the following statements is correct with respect to the operation of GPS?

a) Position triangulation is provided by measuring distances from satellites by precise timing of radio signals.
b) It measures the phase difference between two signals transmitted simultaneously from a satellite.
c) It calculates the elapsed time between aircraft responder signals and successive interrogation signals transmitted from a particular satellite.
d) It computes the exact phase of the satellite radio signal, the value of which undergoes an electronic translation to provide a position readout.

30. Which of the following statements is true with reference to GNSS overlay approaches?

a) GPS overlay approaches may be used for either precision or non-precision type approaches.
b) Ground-based NAVAIDs may be used in conjunction with GPS to establish way points that are not in the GPS data base but depicted on the approach plate.
c) The appropriate NAVAID(s) which define the published approach must be operational. The pilot must revert to traditional means of navigation if there are any discrepancies between GPS and the traditional navaid(s).
d) Pilots are also allowed to fly a GPS overlay approach when the traditional underlying navigation aid is temporarily out of service.

31. A pilot may take credit for a GPS based approach at an alternate airport when which of the following are met?

a) The destination and alternate airports are separated by at least 100NM if both airports only have GNSS approaches.
b) Published LNAV minima are the lowest landing limits for which credit may be taken when determining alternate weather minima requirements.
c) For GPS units that do not have FDE (fault detection & exclusion), the pilot must perform a RAIM prediction at least once before the mid-point of the flight to the destination.
d) All of the above.

32. Without RAIM capability, the pilot of a non-WAAS GPS-equipped aircraft:

a) may still navigate IFR for enroute and terminal operations and even fly GPS approaches if the CDI display sensitivity can be manually changed.
b) can execute a GPS stand-alone approach if a DME source is available for position updating at the destination airport.
c) is permitted to continue using GPS as the primary navigation source for IFR flight as long as a baro-input from the aircraft's altitude encoder is continuously available.
d) will have no assurance of the accuracy of the GPS position.

33. TSO C129(a)-compliant GPS avionics must be capable of automatically increasing the CDI display sensitivity as an aircraft moves closer to the airport during a GPS approach. This 'stepping-up' or 'tightening' of CDI sensitivity provides for the greater tracking accuracy required during the terminal and approach phases. From the following statements regarding GPS avionics operation during an approach, select those which are correct:

1. When the aircraft reaches 30 NM or less from the destination and an approach for that airport has been loaded into the flight plan, the CDI sensitivity automatically changes from ±5 NM to the terminal value of ±1 NM (full scale deflection).
2. Manually setting the CDI display sensitivity automatically changes the RAIM sensitivity on all IFR certified GPS avionics.
3. At a distance of 2 NM inbound to the final approach fix waypoint the CDI display sensitivity begins to transition to the approach value of ±0.3 NM and will have achieved this extra sensitivity by the time the aircraft passes the FAF waypoint.
4. When the aircraft arrives at the missed approach waypoint, waypoint sequencing for the missed approach segment is always automatic and directs the pilot to fly to the missed approach holding waypoint.
5. As the aircraft starts to fly the missed approach segment the CDI display sensitivity reverts to the enroute value of ±5 NM.
6. If RAIM is not available when crossing the final approach fix waypoint, the pilot must execute the missed approach procedure.

a) 2,3,5
b) 3,4,5
c) 1,3,6
d) 4,5,6

34. From the following statements that relate to the RAIM component of a TSO C-129 compliant GPS receiver, select the one which is correct:

a) RAIM is able to predict the scheduled removal of satellites from service as well as being able to predict satellite failure.
b) If RAIM is not available prior to crossing the final approach waypoint during an approach, the GPS receiver will not go into the approach "ACTIVE" mode.
c) RAIM function requires continuous input from ground-based NAVAIDs or facilities.
d) The RAIM alert level will automatically change when a pilot manually sets the CDI scale factor (or sensitivity) on any TSO C-129 receiver.

35. WAAS-corrected GPS signals offer approximately 5 times greater position accuracy than basic or uncorrected GPS signals. Another true statement related to the use of this satellite-based augmentation system would be:

a) The databases of WAAS-enabled GPS receivers are compatible with those of earlier non-WAAS receivers.
b) WAAS-capable GPS receivers use differential correction signals to improve the accuracy of the position solutions but still rely on RAIM function to provide integrity.
c) WAAS geo satellites provide a ranging signal which improves availability.
d) WAAS-capable receivers are able to predict the availability of LPV approaches at destination airports.

36. The statements that follow relate to GPS stand-alone approaches. Identify those that are correct.

1. Stand-alone approach design is usually based on a "T" pattern of waypoints which eliminates the need for a procedure turn.
2. GPS stand-alone approaches are charted as "RNAV (GNSS) RWY XX"
3. Pilot verification of GPS stand-alone approach waypoints is not required if they have been retrieved from a current data base supplied by a Transport Canada approved vendor.
4. GPS stand-alone approaches are charted as "(GNSS)" which appears following the runway identification.
5. Stand-alone approach waypoints retrieved from a current data base and inserted into the active flight plan may be deleted and replaced by manually entering the new coordinates for pilot-defined waypoints that facilitate direct routings to the FAF.
6. General aviation pilots do not require a special licence endorsement to qualify them to conduct GPS stand-alone approaches.

a) 1,2,6
b) 3,4,5
c) 2,3,6
d) 1,3,4

37. Prior to commencing a GPS-based approach, pilots using TSO C129/129(a) avionics should:

a) Ensure that ATC approval has been received to descend to the equivalent of Category 1 ILS minima.
b) Determine that the avionics will present all of the approach waypoints as Fly-over waypoints.
c) Ensure that the CDI sensitivity is operating in the terminal mode if conducting an overlay approach.
d) Use the RAIM prediction feature to ensure that approach-level RAIM will be supported for the ETA (±15min).

38. When using a WAAS-certified GPS (TSO C146a) and planning a GPS approach at the alternate, is the pilot required to manually perform a RAIM check in flight?

a) Yes, as well as prior to flight.
b) Yes, periodically during the flight and at least once prior to the mid-point of the flight to destination.
c) No, a WAAS-certified GPS will complete a RAIM check and self-test automatically.
d) No, unless there is a WAAS NOTAM predicting a satellite outage at the destination.

39. A WAAS NOTAM predicts that approach-level RAIM will not be available at your destination. Upon arrival at the aerodrome during the period covered by the NOTAM, you note that approach-level RAIM is available. What are your options for the approach?

a) You may not use any GPS-based approaches as a result of the published NOTAM.
b) You may fly a GPS-based approach at the airport, but only to LNAV minima.
c) You are safely able to use a GPS-based approach.
d) You may only proceed with available GPS overlay approaches and must monitor the underlying NAVAID.

40. What requirement must be met if a GNSS approach is planned at both the destination and the alternate aerodrome?

a) The destination and alternate aerodromes must be separated by a minimum of 100 NM.
b) The pilot must use the alternate minima requirements for "No IFR Approach Available".
c) A GNSS approach cannot be planned at both the destination and the alternate – one aerodrome must have an approach based on traditional NAVAIDs.
d) An additional RAIM check must be completed prior to beginning the descent for the destination.

41. Do cold temperatures have any effect on a Constant Descent Angle style of non-precision approach?

a) Yes, the approach is steeper in cold temperatures due to a smaller altimeter error over the FAF than at the MDA/DA.
b) No, as long as the appropriate cold temperature corrections are made, there will be no effect on the descent angle.
c) Yes, the approach is shallower in cold temperatures due to a larger altimeter error over the FAF than at the MDA/DA.
d) No, cold temperature corrections are not required when using this descent method because the descent angle does not vary with temperature.

42. Pick the correct statements with reference to 406 MHz ELTs:

1. 406 MHz ELTs provide position information accurate within a radius of about 2-5 km.
2. 406 MHz is an exclusive, dedicated frequency that cannot be activated by any other type of equipment.
3. 406 MHz ELTs can be tested for a maximum of 5 seconds within the first 5 minutes of every hour just like 121.5 MHz ELTs.
4. One drawback of 406 MHz ELTs is that there are a higher number of false alerts.
5. Users of 406 MHz ELTs should listen on 406 MHz prior to flight to ensure that the ELT is not transmitting.
6. An alert will be sent to the Joint Rescue Coordination Centre only after the switch on the 406 MHz ELT has been selected to the "ON" position for more than 50 seconds.

a) 1, 3, 6
b) 1, 2, 6
c) 2, 3, 5
d) 2, 4, 6

43. With regards to Primary (PSR) and Secondary (SSR) Surveillance Radar, which statement is true?

a) PSR requires the aircraft be equipped with a transponder and is capable of detecting weather.
b) SSR requires the aircraft be equipped with a transponder and is capable of detecting weather.
c) PSR does not require a transponder and is capable of detecting weather.
d) SSR does not require a transponder and is incapable of detecting weather.

44. A pilot forgets to set 29.92 from 30.22 climbing through FL180 to FL220. After levelling at his assigned altitude, the pilot realizes the problem and then sets 29.92 on the altimeter subscale. What indication will be seen by the ATS controller monitoring the aircraft's altitude read-out?

a) an immediate indication of 300 feet altitude loss
b) nothing because the subscale is not geared to the encoding altitude read-out
c) an immediate indication of 300 feet altitude gain
d) no noticeable indication provided the subscale is moved very slowly

45. Which of the following is true with respect to airborne weather radar?

a) drop size determines radar echo intensity to a much greater extent than does drop number.
b) cloud that is visible to the naked eye will always be displayed on the indicator
c) drops of frozen precipitation provide stronger radar returns than do drops of liquid precipitation
d) the intensity of radar echoes depends solely upon the number of drops of frozen precipitation present per unit volume of storm cell cloud

46. Two characteristic weather radar scope patterns known as "hooks" and "fingers" identify areas of:

a) lightning and heavy static discharge
b) moderate to heavy icing in cloud
c) convergent air flow and ice crystal formation
d) hail and turbulence

47. Which of the following statements is true with respect to airborne weather radar?

a) A thunderstorm echo displayed at 90 nm on your aircraft indicator will decrease in intensity as distance is decreased from the antenna.
b) The intensity of a thunderstorm echo displayed at 90 nm on your aircraft indicator would decrease as the distance from the echo increased.
c) As the gain control is adjusted, the radar beam width changes to give greater penetration of target storm cells.
d) A thunderstorm echo will display the same intensity at various distances from the antenna.

48. A thunderstorm contouring red on your airborne weather radar set that is estimated to have a radar top over 30,000 feet and displaying a steep gradient should be avoided by at least _____ .

a) 5 nm
b) 10 nm
c) 20 nm
d) 30 nm

49. When a thunderstorm contours on an airborne weather radar indicator, it should be avoided by at least:

a) 5 nm when the aircraft is flying above the freezing level
b) 5 nm when the aircraft is flying below the freezing level
c) 10 nm when the aircraft is flying below the freezing level
d) 10 nm when the aircraft is flying near the tropopause

50. An airborne weather radar system is susceptible to a significant reduction in storm cell detection capability known as ATTENUATION. This loss of effectiveness is caused by:

a) antenna side lobe energy reflecting back from ground to aircraft.
b) overcompensation by the sensitivity time control circuit when intense storm cells move to within 20 nm of the aircraft.
c) an uneven deposition of rime ice on the radome.
d) the presence of moderate to heavy rainfall areas in the antenna near field range.

51. When flying in moderate rain and attempting to locate embedded CBs, the pilot should:

a) use the tilt control "up" to assess the weather above the rain.
b) do nothing because rain attenuates the radar returns.
c) use different range scales.
d) use various methods such as reducing the gain for brief periods to identify the most intense areas of precipitation. Selection of the REACT or Contour functions on the radar control unit may also be useful.

52. Use of the tilt function on airborne weather radar to provide an indication of a thunderstorm threat can be best accomplished by tilting the antenna beam to scan:

a) the middle/lower area of a CB first.
b) the top 5% of a CB.
c) upper region of a cell
d) the lower 5% of the CB.

53. A true statement regarding the main advantage of a Lightning Detection System would be:

a) in addition to detecting lightning, it is able to detect intense precipitation.
b) it provides accurate bearing and distances to lightning strikes.
c) it is able to detect electrical activity associated with a thunderstorm that is located behind a mountain range.
d) turbulence detection is enhanced when compared to normal airborne weather radar equipment.

54. ACARS (Aircraft Communications, Addressing and Reporting System) is…

a) A Transport Canada program for reporting communication issues between aircraft and ATC.
b) A digital datalink system used to transmit short, text-based messages between aircraft and ground stations.
c) A VHF communications system for voice transmissions between aircraft and company.
d) A NavCanada system used to broadcast weather information to pilots within certain high traffic areas.

55. Select the correct statements with reference to ACARS:

1. It can be used to obtain text-based station and enroute weather.
2. It can be used to obtain graphic weather.
3. It can be used to send and receive messages to and from company.
4. It can be used to obtain an IFR clearance.
5. ACARS can automatically detect and transmit OUT, OFF, ON and IN times.
6. An onboard printer is required for ACARS use.

a) 1, 3, 5, 6
b) 1, 2, 4, 5
c) 1, 2, 5, 6
d) 1, 3, 4, 5

56. SATCOM is…

a) Standard Abbreviated Text Communications – aircraft to aircraft text communications system.
b) Satellite Communications - voice and data communications via satellite.
c) Satellite Company Operations Monitoring – company flight watch and tracking via satellite-based position.
d) Satellite Command - satellite-commanded updates to FMS position.

57. Aircraft equipped with ADS-B IN capability…

a) No longer require a Mode C or S transponder.
b) Can receive traffic information and upload text and graphic weather.
c) Can use this function to fly WAAS-based approaches.
d) Are not required to make position reports in non-radar airspace, unless specifically requested by ATC.

58. Which of the following can ADS-B provide?

1. Position determination using satellite navigation (GPS) for use by ATC as well as other aircraft.
2. Terrain avoidance warnings.
3. The ability to upload text and graphic weather.
4. Aircraft tracking in areas without radar coverage.
5. Communications between aircraft.
6. Windshear avoidance warnings.

a) 2, 3, 6
b) 1, 4, 5
c) 1, 2, 4
d) 1, 3, 4

59. Which of the following is NOT true with regards to ADS-B OUT capability?

a) Aircraft data is transmitted once per second.
b) Position information is determined using satellite navigation.
c) It is integrated with TCAS for traffic avoidance.
d) It can serve as an alerting device for downed aircraft.

60. ADS-C is defined as:

a) A method of automatically providing position reports to ATC via datalink based on FMS position.
b) A collision avoidance system that gives flight crews awareness of surrounding traffic and resolution advisories in the case of a predicted collision.
c) An aircraft tracking system using satellite-based position, which can even be used in non-radar environments.
d) A ground tracking system that determines aircraft position via transponder interrogation.

61. Which of the following statements are correct with regards to Multilateration (MLAT)?

1. MLAT uses a system of strategically placed ground stations to send interrogations and receive replies from transponders.
2. MLAT is limited to monitoring ground movements of aircraft and vehicles.
3. MLAT functions on a principle known as Time Difference of Arrival.
4. MLAT cannot receive replies from Mode A transponders.
5. MLAT calculates the difference in transponder response time at multiple ground receivers and compares the results to determine a position.
6. MLAT can be used to transmit messages from ATC to aircraft and vehicles.

a) 1, 2, 6
b) 2, 4, 5
c) 1, 3, 5
d) 1, 4, 6

62. What does TCAS provide?

a) A view of the terrain ahead of the aircraft, and warnings of imminent collision with terrain.
b) A method of navigating directly between waypoints, rather than following airways.
c) A system independent from ATC that notifies the pilot of proximate traffic, and, if properly equipped, instructions to avoid traffic.
d) A method of viewing aircraft systems and malfunctions from a screen in the flight deck.

63. How are ACAS/TCAS I and II different?

a) ACAS/TCAS I provide RAs in the vertical plane, while ACAS/TCAS II provides RAs in both the horizontal and vertical planes.
b) Both provide TAs and RAs but ACAS/TCAS II has a wider range.
c) ACAS/TCAS I only provide pilots with TAs, while ACAS/TCAS II provides both TAs and RAs.
d) ACAS/TCAS I and II both provide TAs and RAs, but ACAS/TCAS II is integrated with the autopilot so that RAs are followed without any manual maneuvering required.

64. What does ACAS/TCAS III provide?

a) RAs in the vertical plane only.
b) RAs in both the horizontal and vertical planes.
c) RAs in the horizontal plane only.
d) TAs only, no resolution guidance is provided.

65. Which of the following statements is true with reference to TCAS collision avoidance systems?

a) TCAS I processors are able to issue visual and audio advisories for appropriate vertical avoidance manoeuvres, should a possible collision hazard exist.
b) TCAS II processors are able to issue visual and audio advisories for appropriate vertical and horizontal avoidance manoeuvres, should a possible collision hazard exist.
c) TCAS is able to detect any intruding aircraft with or without an operating transponder.
d) TCAS is unable to detect any intruding aircraft that does not have an operating transponder.

66. When a TCAS II unit computes data from a Mode C transponder without altitude encoding, the TCAS cockpit indicator will display the intruder's....

a) range only.
b) range and bearing.
c) range, bearing and relative altitude.
d) range, bearing, relative altitude and intercept track.

67. TCAS II or ACAS II (Airborne Collision Avoidance System) operational features are correctly described by which of the following statements?

a) Can provide traffic advisories but cannot generate resolution advisories.
b) Is able to provide both horizontal and vertical plane resolution advisories.
c) Consists of a computer unit, a Mode S transponder, cockpit displays and controls and provides both traffic advisories and resolution advisories in the vertical plane only.
d) Utilizes a sophisticated absolute altimeter when computing the vertical flight paths of intruder aircraft.

68. What does the following symbol denote for a TCAS II system:

a) A Traffic Advisory has been issued for an intruder 200 feet above you and climbing.
b) A Resolution Advisory has been issued for an intruder 200 feet below you and descending.
c) A Traffic Advisory has been issued for an intruder 2000 feet above you and climbing.
d) A Resolution Advisory has been issued for an intruder 200 feet below you and descending.

69. With regards to Pilot/Controller actions in response to a TCAS Resolution Advisory (RA), which of the following is correct?

a) Pilots should only manoeuvre their aircraft in response to a TCAS resolution advisory.
b) Pilots shall notify ATC as soon as possible of any deviation from an ATC instruction or clearance in response to a TCAS RA.
c) Pilots who deviate from an ATC instruction or clearance in response to a TCAS RA shall promptly return to the terms of that instruction or clearance when the conflict is resolved.
d) All of the above.

70. Which system would be affected if the Radio Altimeter in an aircraft was unserviceable?

a) TCAS
b) GPWS
c) FMS
d) IRS

71. The purpose of the Ground Proximity Warning System (GPWS) is to alert flight crews to the existence of unsafe conditions due to terrain proximity. Which of the following is not one of the hazardous conditions identified by a GPWS system during flight?

a) Excessive closure rate with respect to rising terrain.
b) Excessive altitude loss during climb-out (take-off or go-around).
c) Insufficient terrain clearance when not in landing configuration.
d) Excessive nose up in the take-off configuration.

72. For a typical GPWS installation, which of the following aural message and visual indication mode is capable of being inhibited while the aircraft is airborne?

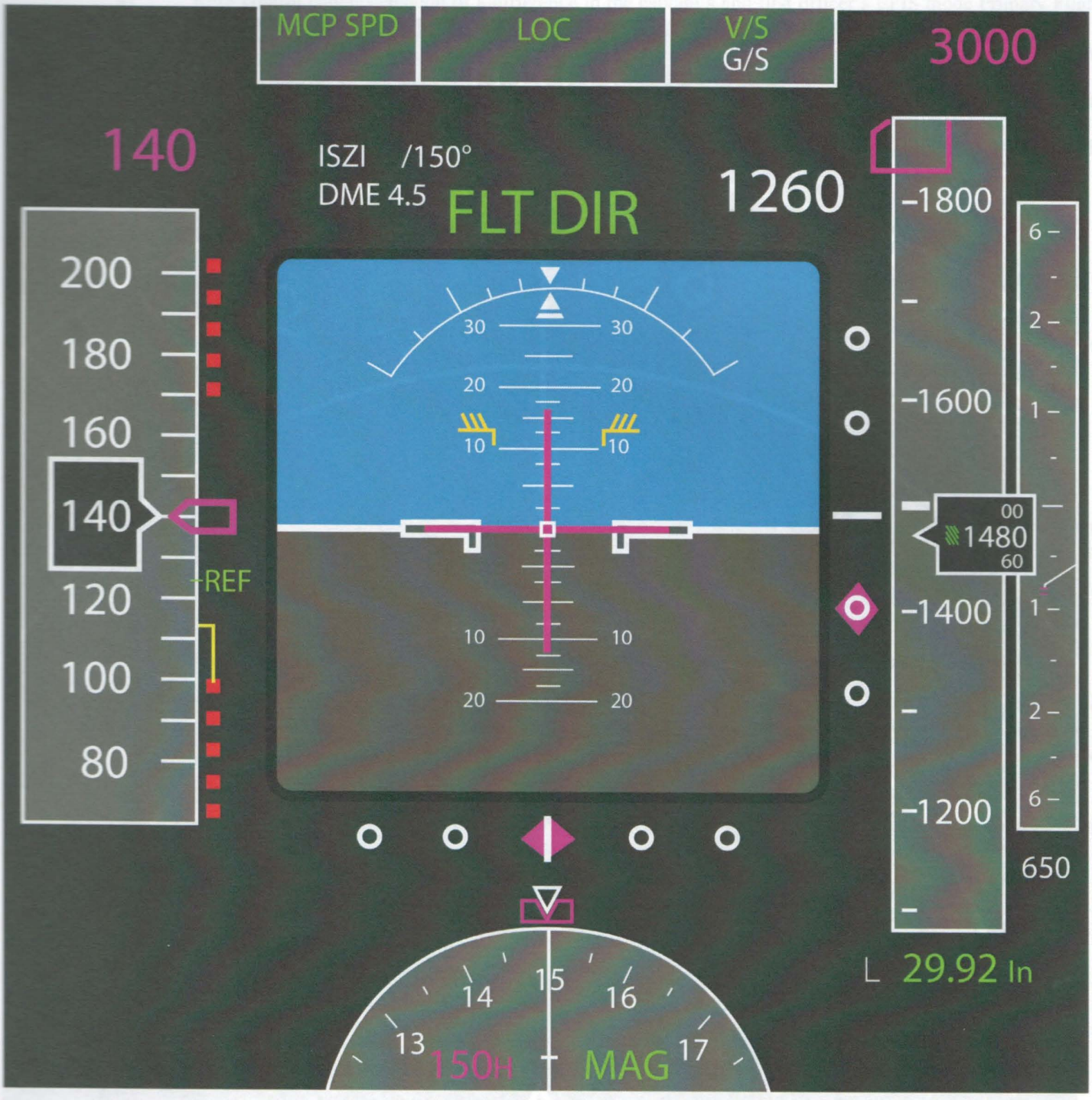
a) Excessive descent rate.
b) Excessive speed with respect to rising terrain.
c) Insufficient terrain clearance when not in landing configuration.
d) Excessive deviation below the glide slope in landing configuration.

73. A complex Air Data Computer is a unit which senses, evaluates and outputs:

a) quantities associated with altitude, IAS/Mach number, vertical speed, and cabin pressurization.
b) warnings for wrong aircraft configurations.
c) cautions and warnings for aircraft system and subsystem failures.
d) video signals which are sent to EFIS systems CRTs.

74. An Electronic Flight Instrument System (EFIS) utilizes cathode ray tubes (CRTs) to electronically display flight information. _____ receive inputs from various aircraft systems, respond to these inputs and changes the data into video signals which are sent to the respective CRTs for display.

a) Attitude heading and reference systems (AHRS)
b) Symbol generator units (SGUs)
c) Digital air data computers
d) EFIS control panels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LOC
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3000
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DME 4.5
FLT DIR
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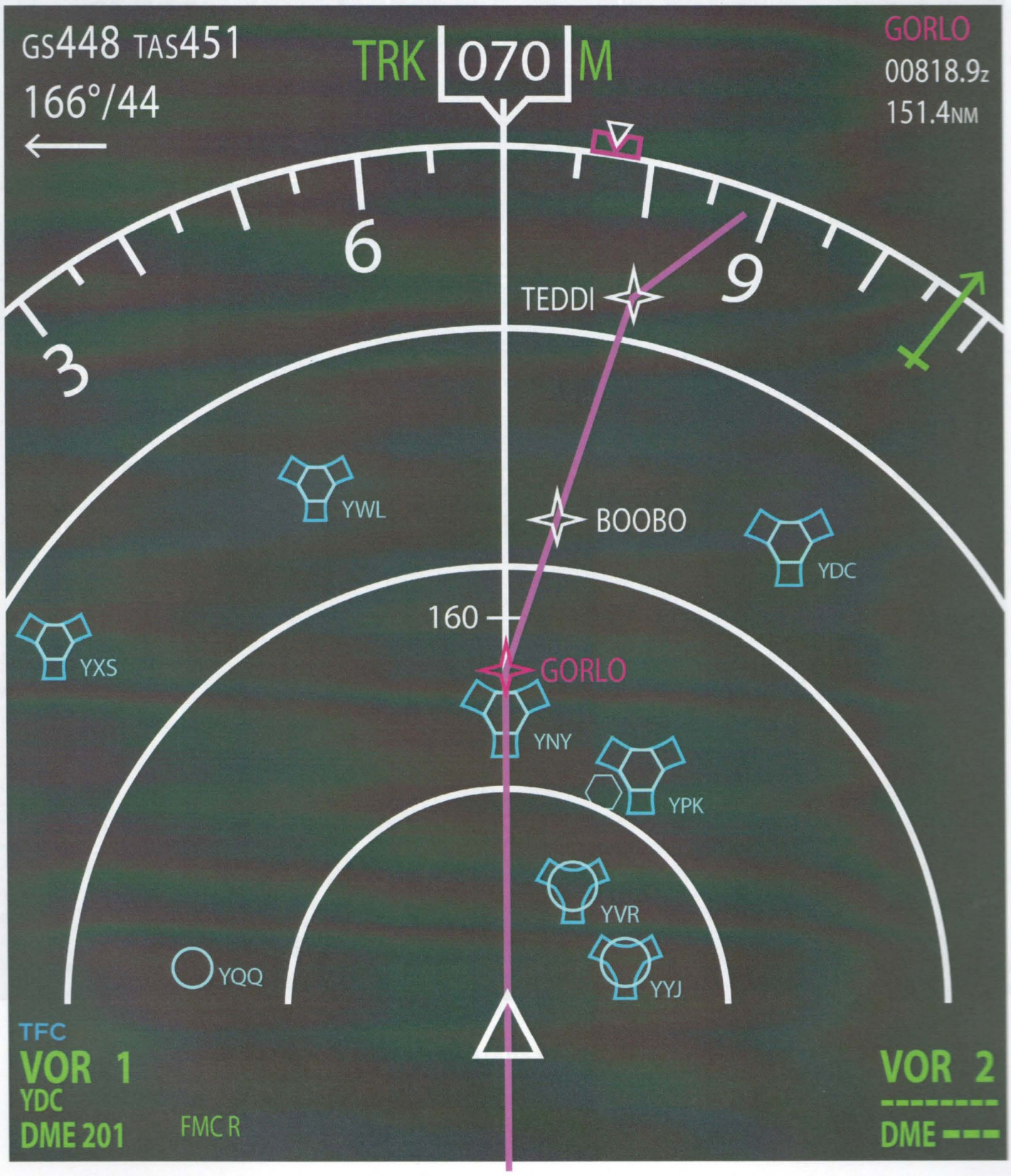
GS448 TAS451
166°/44
TRK 070 M
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TEDDI
YWL
BOOBO
YDC
160
YXS
GORLO
YNY
YPK
YVR
YQQ
YYJ
TFC
VOR 1
YDC
DME 201
FMC R
VOR 2
DME

75. An EFIS comparison fault refers to the:

a) EFIS control panels detection of a difference in the captain's and first officer's EFIS mode Primary Flight Display (PFD) or Navigation Display (ND).
b) digital air data computers detection of a disagreement between the captain's and first officer's EFIS systems of attitude, air or navigation data.
c) symbol generators detection of a disagreement between the captain's and first officer's EFIS systems in attitude, air or navigation data.
d) attitude heading and reference systems (AHRS) detection of a deviation from the aircraft desired flight path.

76. In many aircraft such as the Dash 8, EFIS composite mode display refers to the:

a) selection of the EHSI or ND heading display on an ARC showing 45° either side of actual Heading.
b) selection of the standby source for attitude, air or navigation data.
c) selection of the rising runway to aircraft symbol display.
d) combining of EHSI and EADI information onto the remaining CRT following the failure of one of the CRTs.

77. Choose the correct statement with reference to the PFD on page 4-15:

a) The aircraft is currently climbing to a selected altitude of 3000 feet, on a heading of 150°.
b) The aircraft has captured the ILS glideslope and is on a heading of 150° to intercept the localizer.
c) The aircraft auto-pilot is tracking the localizer but is above the glideslope descending at a V/S of 1000 fpm.
d) The aircraft flight director system has captured the localizer, is above the glideslope, descending at a V/S of 650 fpm, on a heading of 150°.

78. Choose the correct statement with reference to the PFD on page 4-15:

a) With the autopilot engaged, the aircraft is slowing to the selected airspeed and is approximately 220 feet above minimums.
b) The current airspeed matches the selected airspeed, and the aircraft is approximately 220 feet above minimums.
c) The aircraft is 15 knots above the Vref target airspeed and is approximately 120 feet above minimums.
d) The current airspeed matches the selected airspeed, the aircraft is approximately 320 feet above minimums and the pilot is hand flying the aircraft.

79. Choose the correct statement with reference to the MFD on page 4-16:

a) The MFD is using TRACK UP display, showing winds from the SSE and a current heading of 077°.
b) The MFD is using HEADING UP display, showing winds from the east, and a current heading of 070°.
c) The MFD is using TRACK UP display, showing winds from the NNW, and a current heading of 070°.
d) The MFD uses a HEADING UP display, showing winds from the east, and a current heading of 077°.

80. Choose the correct statement with reference to the MFD on page 4-16:

a) The aircraft is tracking to YDC VOR, 201 NM away and the terrain function is selected.
b) The aircraft is tracking to GORLO on a heading of 077° to maintain a track of 070°M.
c) The aircraft is tracking to YNY VORTAC, heading is 070°M to maintain a track of 077°M.
d) The aircraft is in heading mode maintaining a heading of 077°M and TCAS is selected on..

81. What is a Flight Management System used for?

a) To manage the weather radar.
b) To plot the navigation route.
c) To see other traffic and manage TCAS alerts.
d) To view the status of aircraft systems.

82. Which of the following components are NOT part of a Flight Management System?

1. Flight Management Computer
2. Control Display Unit
3. Radar Altimeter
4. Navigation Sensors (IRS, VOR, ILS etc)
5. Primary Flight Display and Multi Function Display
6. Weather Radar

a) 5, 6
b) 3, 4
c) 2, 5
d) 3, 6

83. On Boeing aircraft LNAV and VNAV provide:

a) Lateral and vertical navigation for both precision and non-precision approaches.
b) Localizer-based navigation and vertical navigation along the glideslope.
c) Lateral navigation along the flight route in the FMC and vertical navigation along a FMC-computed vertical path.
d) Localizer-based navigation and VOR-based navigation.

NAVIGATION & FLIGHT PLANNING

84. Which of the following types of projection is used in the preparation of World Aeronautical charts?

a) Transverse Mercator
b) Polar Stereographic
c) Lambert Conformal Conic
d) Mercator

85. Considering Lambert Conformal Conic, Mercator and Transverse Mercator map projections, any great circle track is or approximates, a straight line on:

a) all projections except the Mercator
b) all projections.
c) the Mercator and Transverse Mercator projections only
d) all projections except the Lambert Conformal Conic

86. When considering rhumb line tracks and great circle tracks, you should know that:

a) In the polar regions, a rhumb line track is always the shortest distance between two points.
b) A great circle track has the property of " constant direction"
c) A rhumb line track cuts each meridian at a different angle.
d) The equator is both a great circle and a rhumb line.

87. What is distance between the following geographic reference points?

N47 54.82 W74 22.6
N46 54.82 W74 22.6

a) 60 NM
b) 90 NM
c) 120 NM
d) It depends on how far north or south any location is from the equator.

88. When completing a flight plan form how would you indicate a medium sized aircraft is equipped with TCAS?

a) List the appropriate prefixes in the Type of aircraft box.
b) List TCAS in the other information box.
c) List the appropriate suffix in the equipment box.
d) It is not required to list any equipment.

89. A commercial IFR flight is planned with three intermediate stops in controlled airspace. How would this proposed flight be filed.

a) Stopovers may be indicated in the route section provided the stops are not in uncontrolled airspace.
b) An IFR flight plan is required for each flight leg.
c) Only one flight plan is required provided the total flight time including the total time of all the stops is included in the remarks box.
d) Only one flight plan is required provided the each intermediate stop is indicated in the route section.

90. Which of the following statements about flight planning in Canada is correct?

a) stopovers may not be indicated on a single flight plan
b) when proceeding VFR to a military airfield, a flight plan is not required
c) only IFR flight plans may be filed whenever operating into or within the CADIZ or DEWIZ
d) flights to the USA are not considered international and do not require an ICAO flight plan

91. What type of flight plan is required for an IFR flight between Canada and Mexico?

a) ICAO for all aircraft.
b) ICAO for aircraft in commercial air service.
c) A normal domestic IFR flight plan.
d) A normal domestic IFR flight plan for privately registered aircraft.

92. What is the minimum fuel required for a large turbo prop aircraft on a night commercial VFR trip, if the flight time is estimated at 4 hours and 15 minutes of which 25 minutes will be at climb power? (Add 200 lbs. for contingencies)

Fuel Burns:	585 lb/hr for climb	470 lb/hr for cruise	370 lb/hr for holding

a) 1845 lbs.
b) 2245 lbs.
c) 2600 lbs.
d) 2790 lbs.

93. A large turbojet aircraft in commercial air service on a 2 hour and 30 minute VFR flight burns 2500 lb/hour for cruise and hold, and 3600 lb/hour in the climb. What is the minimum day VFR fuel requirement if the aircraft took 20 minutes to climb to flight planned altitude.

a) 7850 lbs.
b) 8465 lbs.
c) 10,800 lbs.
d) 12,150 lbs.

The following data is related to a flight from Halifax to Santa Maria and is to be used for questions 94 & 95.

Rhumb Line Track	104° T	Four-engined	TAS 470 kts
Rhumb Line Distance	2,080 nm	Three-engined	TAS 390 kts
Forecast Winds	240°T/60 kts	Safe Fuel	7 Hours

94. The distance to the Critical Point (CP) from Halifax is:

a) 864 nm
b) 925 nm
c) 988 nm
d) 1077 nm

95. The time to the Critical Point (CP) from Halifax is:

a) 1 hour and 48 minutes
b) 2 hours and 03 minutes
c) 2 hours and 52 minutes
d) 3 hours and 18 minutes

96. What effect will an increase in tail wind component have on the CP while enroute to Santa Maria?

a) The increased tailwind will have no effect on the distance or time to CP.
b) The distance to the CP will move further from Halifax and the time to CP will increase.
c) The distance to the CP will move closer to Halifax and the time to CP will be less.
d) The distance to the CP will move closer to Halifax but the time to CP will remain the same.

The following data is related to a flight from Vancouver to Honolulu and is to be used for questions 97 & 98.

Rhumb Line Track	224° T	Four-engined TAS	460 kts
Rhumb Line Distance	2,350 nm	Three-engined TAS	380 kts
Forecast Winds	260° T/65 Kts	Safe Fuel	6.5 Hours

97. The distance to the Critical Point (CP) from Vancouver is:

a) 1024 nm
b) 1261 nm
c) 1339 nm
d) 1456 nm

98. The time to the Critical Point (CP) from Vancouver is:

a) 1 hours and 47 minutes
b) 2 hours and 03 minutes
c) 2 hours and 52 minutes
d) 3 hours and 18 minutes

99. The vertical dimensions of the Northern Control Area (NCA), the Arctic Control Area (ACA) and the northern part of the Southern Control Area (SCA) which has been designated CMNPS airspace in which special procedures apply is that airspace from:

a) FL290 To FL350
b) FL180 To FL600
c) FL330 To FL410
d) FL310 To FL450

100. Except as required over designated compulsory reporting points or requested by ATC, flights operated in the CMNPS airspace whose tracks are predominantly north or south shall report over fixed reporting lines coincident with each:

a) 15° of latitude
b) 10° of latitude
c) 5° of latitude
d) 3° of latitude

101. North Atlantic Minimum Navigation Performance Specification Airspace (NAT MNPSA) exists over the North Atlantic between:

a) FL180 and FL410.
b) FL275 and FL410.
c) FL230 and FL430.
d) FL285 and FL420.

102. Select the statement that is correct with reference to the daily publishing of the North Atlantic (NAT) Organized Track System (OTS).

a) Westbound daytime tracks are designated by letters starting at the top of the alphabet (ie. A, B, C, D, E, F, G) and are valid from 1130–1900Z .
b) Westbound daytime tracks are designated by letters starting at the bottom of the alphabet (ie T, U, V, W. X, Y, Z) and are valid from 1130–1900Z .
c) Eastbound nighttime tracks are designated by letters starting at the top of the alphabet (ie. A, B, C, D, E, F, G) and are valid from 0100–0800Z .
d) None of the above

103. Aircraft with which of the following combinations of Navaids would likely gain state approval for operation within the NAT MNPS airspace?

a) Two Inertial Reference Systems / Flight Management Systems (IRS/FMS).
b) Two Global Navigation Satellite Systems certified under TSO C129.
c) One FMS with IRS input.
d) One VOR DME and one IRS/FMS.

104. Which of the following is not correct with respect to North Atlantic High Level Airspace flight planning procedures:

a) south of 70°N for flights on predominately east-west directions, planned tracks shall be defined at each half or whole degrees of latitude and each 10° of longitude.
b) north of 70°N for flights on predominately east-west directions, planned tracks shall be defined at each half or whole degrees of latitude and each 20° of longitude.
c) for flights on predominately north-south directions, planned tracks shall be defined at each whole degrees of longitude and each 5° of latitude.
d) for flights on predominately north-south directions, planned tracks shall be defined at each whole degrees of longitude and each 10° of latitude.

105. MACH Number Technique (MNT) is utilized extensively in NAT airspace where by flight crews are cleared by ATC to maintain a Mach Number (i.e. M.82) for enroute phases of flight. Which of the following statements about MNT is correct?

a) MNT is to used to improve the utilization of airspace along the NAT OTS.
b) The monitoring of longitudinal separation between aircraft are dependent upon flight crews providing accurate times in position reports.
c) When two or more aircraft are utilizing MNT along the same route and at the same flight level, the time interval between the aircraft is likely to remain more constant than when using other methods.
d) All of the above.

106. Pilots are encouraged to employ Strategic Lateral Offset Procedures (SLOP) in the North Atlantic Oceanic region to:

a) reduce the risk of collision and wake turbulence encounters.
b) avoid convective activity when crews are unable to contact ATC for a clearance
c) allow aircraft to climb or descend on the oceanic tracks
d) assist ATC identify aircraft when within radar range.

107. With regards to SLOP, which of the following is true?

a) Offsets may be applied after oceanic entry points and must be removed to before oceanic exit points.
b) SLOP is designed to increase safety margins should another aircraft deviate from its assigned altitude or track.
c) There is no requirement to obtain an ATC clearance when using SLOP and ATC does not need to be advise when returning to the centreline.
d) All of the above.

108. Which of the following statements about Strategic Lateral Offset Procedures (SLOP) is correct:

a) Crews operating aircraft capable of automatic offsets may fly the centreline or offset 1 or 2 NM to the left or right of centreline.
b) Crews operating aircraft capable of automatic offsets may fly the centreline or offset up to 5 NM to the right of centreline
c) Crews operating aircraft capable of automatic offsets may fly the centreline or offset 1 or 2 NM to the right of centreline.
d) None of the above.

109. In the North Atlantic NAT region, transponder operation is as follows:

a) Flight crews must squawk code 2000 once entering oceanic airspace.
b) Flight crews must maintain last assigned code for 30 minutes after entering oceanic airspace then squawk code 2000 unless otherwise advise by ATC.
c) Flight crews must maintain last assigned domestic code unless otherwise advise by ATC.
d) Flight crews must maintain last assigned code until the first waypoint after entering oceanic airspace then squawk code 2000 unless otherwise advise by ATC.

110. Any Canadian Air Operator who intends to conduct flights using twin-engine, turbine-powered aeroplanes outside of the Canadian Domestic Airspace and along routes which traverse large bodies of water or over sparsely populated areas must be familiar with the ETOPS (Extended-range Twin-engine Operations) regulatory requirements. ETOPS authorization is required as an Operations Specification for an Air Operator who wishes to dispatch a flight along a route containing a point that is farther than what maximum distance or time from an adequate aerodrome (based on engine-out cruise speed)?

a) that distance flown in 60 minutes.
b) 60 nm.
c) 150 nm.
d) that distance flown in 90 minutes.

111. What information does a VOLMET include:

a) Forecasts, actual weather and notams transmitted on selected FSS frequencies.
b) GFAs , TAFs, and SIGMETs transmitted on selected FSS VHF frequencies.
c) GFAs, TAFs, and METARs transmitted on Oceanic Control frequencies.
d) TAFs, METARs and SIGMETs transmitted on frequencies found in the CFS.

OPERATIONAL FLIGHT PLAN (OFP)

For questions 112 to 116 refer to the OFP on pages 4-25 & 4-26.

112. What is the planned alternate, alternate fuel and TAS?

a) CYEG, 880 lbs, 227 kts
b) CYEG, 1209 lbs, 213 kts
c) CYEG, 880 lbs, 250 kts
d) CYEG, 1209 lbs, 227 kts

113. How much fuel must be on board to release the brakes for takeoff and how much fuel is estimated to be on board on landing at CYQU?

a) 4301 lbs, 3362 lbs
b) 4401 lbs, 2089 lbs
c) 1738 lbs, 3362 lbs
d) 5200 lbs, 2089 lbs

114. What is the maximum takeoff weight for this flight?

a) 39500 pounds
b) 41800 pounds
c) 41500 pounds
d) 41600 pounds

115. In cruise over OBNAP, the fuel gauges indicate 3915 lbs. remaining in the tanks. What would this indicate to the flight crew?

a) There is 700 lbs. above planned fuel on board over OBNAP.
b) There is 500 lbs above planned fuel on board and 700 lbs. above minimum fuel on board.
c) There is 500 lbs. below planned fuel on board and 700lbs. above minimum fuel on board.
d) There is 500 lbs below minimum fuel on board indicating the aircraft does not have enough fuel to continue to CYQU.

116. What is the time and distance remaining to CYQU at IGSOD?

a) 34 mins and 53 NM
b) 44 mins and 189 NM
c) 34 mins and 189 NM
d) 44 mins and 53 NM

```
JAZZ AIR        8475  YYC - YQU  26JAN18 DHC8-311        305  CFMDW
RELEASE GENERATED  26JAN18 1207Z/UNIQUE ID-1Q099903
-------------------------------------------------------------------
 EMPLOYEE   SEAT    FIRST              LAST
   0008      CA
   0007      FO
   0007      PU
CAPTAINS SIGNATURE:
                  ------------------------------------------------
DISPATCHER/XXXX                DESK/DI  PHONE 866-000-0000 AGRIS/000
REMARKS/
TAKEOFF ANALYSIS REMARKS - FLIGHT 8475  YYC
FLUIDS TYPE II OR IV
COMPACTED SNOW

ICAO ATS PLAN

(FPL-JZA475-IS
-DH8C/M-SDFGRZ/S
-CYYC1345
-N0273F240 DCT AGMAK DCT TAMVU DCT VOKIM DCT OBNAP DCT IGSOD DCT
 ONDET ONDET3
-CYQU0118 CYEG
-PBN/D2 NAV/RNVD1E2A1 DAT/V REG/CFMDW
 OPR/JAZZ AVIATION LP)

T/O ALTN/    /        ALTN/YEG /CYEG         VIA/    /

==================== COMPUTER FLIGHT PLAN ============================
WAYPOINT    AWY    TTIME DIST  IAS  MCH   MC   ALT  WIND  SEGBO EO/RO
FREQ               TTREM DTGO  TAS  G/S  HDG  IOAT   SHR  ACCBO CRZFF
LAT/LONG           POINT-NAME           TC                 PFOB  MFOB
CYYC               ----- ----  ---  ---  ---  ---  TAXI   0100
                   01.18  308  ---  ---  ---  ---
-------------------------------------------------------------------
AGMAK       DCT    00.08   22  CLB  ---  269  --- 315 17    262
                   01.10  286  ---  ---  273  ---     01    262
N51 13.0 W114 34.7                      285T               4838  3565
-------------------------------------------------------------------
TAMVU       DCT    00.11    8  CLB  ---  285  --- 298 21     79
                   01.07  278  ---  ---  285  ---     02    341
N51 17.0 W114 45.7                      300T               4759  3486
-------------------------------------------------------------------
VOKIM       DCT    00.17   17  CLB  ---  311  --- 294 14    149
                   01.01  261  ---  ---  309  ---     02    490
N51 30.9 W115 01.0                      326T               4610  3337
-------------------------------------------------------------------
--- TOC --- DCT    00.19    8  CLB  ---  310  240 270 16     69
                   00.59  253  ---  ---  307  M48     01    559
N51 37.6 W115 08.3                      325T               4541  3268
-------------------------------------------------------------------
OBNAP       DCT    00.21   10  195  .47  310  240 269 16     53
                   00.57  243  273  263  308  M48     01    612  1380
N51 45.9 W115 17.7                      325T               4488  3215
-------------------------------------------------------------------
IGSOD       DCT    00.34   53  196  .47  310  240 277 12    278
                   00.44  189  273  265  309  M48     01    890  1378
N52 29.5 W116 07.7                      325T               4210  2937
-------------------------------------------------------------------
--- TOD --- DCT    01.02  132  196  .47  313  240 170  7    646
                   00.16   57  274  281  313  M48     01   1537  1375
N54 21.6 W118 03.6                      328T               3563  2290
-------------------------------------------------------------------
ONDET       DCT    01.06   15  DSC  ---  313  --- 283 13     37
                   00.12   42  ---  ---  312  ---     01   1574
N54 34.5 W118 17.8                      328T               3526  2253
-------------------------------------------------------------------
CYQU               01.18  308  DSC  ---  ---  ---           164
                                ---  ---  ---  ---          1738
                                                           3362  2089
===================================================================
```

```
-------------------------------------------------------------------
OPERATION MODES                    AVG WND   AVG TMP     FUEL
COST INDEX: 014                      CMP       DEV      ADJUST
  CLIMB     T2-900                   M 15      M13       P005
  CRUISE    MCR-900                  P  1      M15       P005
  DESCENT   II-900                   M 11      M13       P005
  RESERVE FL015 AT LRC-900
  ALTERNATE CRUISE SCHEDULE: LRC-900   OR          IF BELOW FL000
  ENRT RESERVE IS 005 PCT OF BURN OR A MIN OF    112 LBS
  BURN INCLUDES   63 LBS IAF AT DEST
  ALTN BURN INCLUDES    39 LBS MAF AT DEST AND   63 LBS IAF AT ALTN
-------------------------------------------------------------------
ALTERNATE          TTIME DIST  IAS  MCH  MC   ALT   WIND  BURN   SHR
  LAT - LONG       TTREM DTGO  TAS  G/S  HDG  IOAT        MFOB
      YEG          01.04  227  159  ---  ---  250  140 16 1209     04
N53 18.6 W113 34.8 ----- ----  227  213  ---  ---          880
                                                OVER-  CYEG
FL250 CYQU DCT ESKIE ESKIE2 CYEG

-------------------------------------------------------------------
                          FLIGHT PLAN SUMMARY
FLT 8475  A/C 305 /CFMDW          DHC8-311  /PW123
YYC  ETD 1345Z

FMS ROUTE  YYCYQUFPH

            LB FUEL   TIME          LB WEIGHTS  STRUCT     BOOKED PAX
TAXI            100 00.14    OEW      026717   LIMIT       29  OF 050
BURN/YQU       1738 01.18    PYLD     006709   012783      300   CARGO
ENRT RESERVE    112 00.05    ZFW      033426   039500
ALTN/YEG       1209 01.04    FOB      005200   005670
RESERVE         880 00.45    TXWT     038626   041800   PERF LIMITS
CONTINGENCY     362 00.20    T/O      038526   041600   041600   T/O
ETP BUILDUP       0          LDG      036788   041500   041500   LDG
MIN RAMP FUEL  4401          INDEX   -12.8              041600/1 METW
MIN BR FUEL    4301          CONFIG
TANKER EXTRA    799
PLANNED RAMP   5200      ETE 0118
PLANNED ARRIV  3362      STE 0122
-------------------------------------------------------------------
          ---------- FLIGHT TIMES SUMMARY -----------
      SCHEDULED      ACTUAL          SCHEDULED        ACTUAL

OUT     1345Z      ..........    ON     1521Z       ..........
TAXI    14                       TAXI    4
OFF     1359Z      ..........    IN     1525Z       ..........
ETE                   0118

ETA                ..........

FOB                ..........    FOA                ..........

UPLIFT             ..........G/L

WIND AND COMPONENT SUMMARY    WX PROG DAY/HOUR 26/06
POINT    FL100    2  FL LOWER  1  FL LOWER  1  FL HIGHER
TOC   29023M019 20 28015M011 22 28015M010 26 28015M011
OBNAP 29023M019 20 28015M011 22 28015M010 26 28015M011
IGSOD 29016M013 20 28014M010 22 28013M010 26 28008M005
TOD   30013M011 20 23009P001 22 18010P009 26 15021P021

DESCENT WIND SUMMARY
       FL070      FL130      FL210      FL290
      307/008    282/015    189/012    178/018

AIRCRAFT TURNS TO FLT  8476  TO YYC   DEPT AT 1545Z.
AIRCRAFT TURNS FR FLT  8482  FR YQU   ARRL AT 0638Z.
--------------------ENROUTE DRIFTDOWN----------------------


YYC
PTOW  38526
METW 1  41600
MLDW 041500       PLDW  36788
```

ANSWER KEY
RADIO AIDS & FLIGHT PLANNING

1. c	31. d	61. c	91. a
2. b	32. d	62. c	92. c
3. c	33. c	63. c	93. b
4. c	34. b	64. b	94. b
5. d	35. c	65. d	95. a
6. c	36. a	66. b	96. c
7. b	37. d	67. c	97. c
8. a	38. c	68. a	98. d
9. c	39. c	69. d	99. c
10. d	40. a	70. b	100. c
11. b	41. c	71. d	101. d
12. c	42. b	72. d	102. a
13. b	43. c	73. a	103. a
14. d	44. b	74. b	104. d
15. a	45. a	75. c	105. d
16. c	46. d	76. d	106. a
17. c	47. b	77. d	107. d
18. b	48. c	78. b	108. c
19. b	49. b	79. a	109. b
20. d	50. d	80. b	110. a
21. c	51. d	81. b	111. d
22. a	52. a	82. d	112. d
23. c	53. c	83. c	113. a
24. d	54. b	84. c	114. d
25. b	55. d	85. a	115. c
26. c	56. b	86. d	116. b
27. a	57. b	87. a	
28. c	58. d	88. c	
29. a	59. c	89. b	
30. d	60. a	90. d	

PERFORMANCE and WEIGHT & BALANCE

1. V_1 is the speed at which it must be possible:

   a) to stop an aeroplane on the remaining runway plus clearway
   b) to take-off and attain the V_2 climb speed at 35 feet above the runway surface
   c) to apply full braking and whatever lift dump devices, bring the aeroplane to a full stop on the runway plus stopway or continue and be at V_2 at 400 feet AGL
   d) to abort the take-off and bring the aeroplane to a stop on the runway plus stopway or continue and be at V_2 at 35 feet above the departure end of the runway

2. Which of the following would cause V1 speed to increase?

   a) An increase in gross take-off weight
   b) Reverse thrust capability
   c) Snow or slush on the runway
   d) An increase in tailwind component

3. The symbol "V_{SI}" represents:

   a) the stall speed or the minimum steady flight speed at which the aircraft is controllable
   b) that speed above which shock-induced buffet will cause airflow separation to occur
   c) the stall speed or the minimum steady flight speed in the landing configuration
   d) the stall speed or the minimum steady flight speed in a specified configuration

4. The definitions for V_r, V_3, V_b would be respectively:

   a) rotation speed, flap retraction speed and maximum gust intensity speed
   b) rotation speed, gear retraction speed and rough air speed
   c) rough air speed, critical engine failure speed and manoeuvring speed
   d) rotation speed, gear retraction speed and maximum gust intensity speed

5. In the blank space at the right of each item in Column B, write the letter of the "V" speed from Column A that is defined by that item.

Column A	Column B	
a) Va	1) Computed approach speed	1)
b) Vso	2) Maximum operating limit speed	2)
c) V2	3) Critical engine failure speed	3)
d) Vmca	4) Manoeuvring speed	4)
e) Vra	5) Stall speed in the landing configuration	5)
f) V1	6) Take-off safety speed	6)
g) Vref	7) Turbulence Penetration Speed	7)
h) Vmo	8) Speed for maximum gust intensity	8)
i) Vb.	9) Airborne minimum control speed	9)

6. Which of the following "V" speeds represents the maximum speed at which full deflection of the primary flight controls will not cause overstressing of the aircraft?

a) V_R
b) V_A
c) V_{REF}
d) V_{MC}

7. Vmca Air Minimum Control Speed is defined as the lowest calibrated airspeed at which control of an aircraft can be maintained following the failure of the critical engine with the remaining engine(s) operating at take off power. Vmca is determined at gross weight with the C of G at the aft limit, the flaps in take-off position, the _____ and the .

a) landing gear extended, propeller windmilling if no auto feathering system is installed.
b) landing gear extended, propeller feathered if an auto feathering system is installed.
c) landing gear retracted, propeller windmilling if no auto feathering system is installed
d) landing gear retracted, aircraft banked a maximum of 5° towards the inoperative engine.

8. Which of the following symbols represents the take-off safety speed of a multi-engine aeroplane?

a) Vx
b) V2
c) Vs
d) V1

9. A referenced airspeed obtained after the airplane lifts off and at which the required one-engine-inoperative climb performance can be achieved is designated as:

a) V_{ENR}
b) V_{MCA}
c) V_2
d) V_{REF}

10. Which of the following take-off and landing distances published in the **Canada Air Pilot** aerodrome charts includes the length of the clearway?

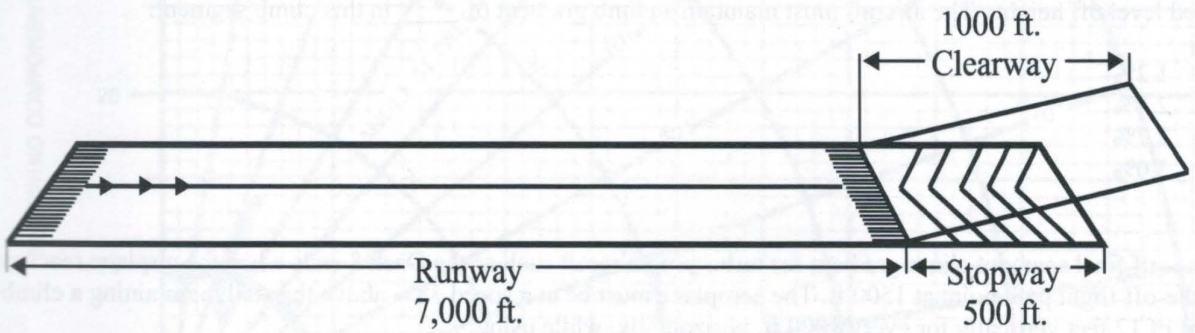
a) LDA (Landing Distance Available)
b) TORA (Take-off Run Available)
c) ASDA (Accelerate-Stop Distance Available)
d) TODA (Take-off Distance Available)

11. A runway is 8800 ft in length. It has a published clearway of 1000 ft and also includes a stopway of 1500 ft. Therefore TORA and TODA would be respectively;

a) 8800 ft and 9,800 ft
b) 8800 ft and 10,800 ft
c) 10,300 ft and 9,800 ft
d) 10,300 ft and 10,800 ft

12. When departing the runway illustrated below in the direction indicated, a turbo-jet aeroplane operated by an air carrier must be able to accelerate to V1: thereafter, lose its most critical engine and continue to a height of 35 feet within a total distance of:

a) 7,000 feet
b) 8,500 feet
c) 8,000 feet
d) 9,000 feet



13. The computed landing approach speed is:

a) V_{ENR}
b) V_{LO}
c) V_{RA}
d) V_{REF}

14. A **Critical Field Length** or **Balanced Field Length** means the length of runway:

a) Required to accommodate the take-off of a heavy aircraft when the runway maximum weight-bearing capacity is reached.
b) Required for an aircraft to accelerate to computed rotation speed (Vr), experience an engine failure and to come to a complete stop on the runway remaining.
c) Required for an aircraft to accelerate to critical engine failure speed, experience an engine failure and to either continue the take-off or reject it.
d) Required to stop an aircraft following the failure of its critical engine at its take-off safety speed.

15. The 3 takeoff distances that must be calculated prior to departure are:

a) 115% All Engines Takeoff, Accelerate Stop and 1 Engine Out Takeoff distances
b) 115% All Engines Takeoff, Accelerate Stop and Accelerate Go distances
c) 3 takeoff distances are only required if the Accelerate Go distance exceeds runway length
d) 115% All Engines Takeoff, Accelerate Go and 1 Engine Out climb distances

16. A slush covered runway will have what effect on V1 and VR speeds?

a) V1 will increase while VR will decrease, however VR must never be below V1
b) V1 will decrease and VR will decrease
c) V1 will decrease and VR will remain the same
d) V1 will decrease and VR will increase

17. An upslope runway will have what effect of V1 and VR speeds?

a) V1 will increase and VR will remain the same, however V1 must never exceed VR
b) V1 will decrease and VR will decrease
c) V1 will increase and VR will remain the same
d) V1 will decrease and VR will increase

18. The take-off second segment climb gradient for a large two-engine turbine-powered aircraft starts at the time the landing gear is fully retracted and continues until the airplane reaches an altitude, above the runway, of at least 400 ft. or a specified level off height. The aircraft must maintain a climb gradient of ____ in this climb segment.

a) 1.2%
b) 2.4%
c) 2.7%
d) 3.0%

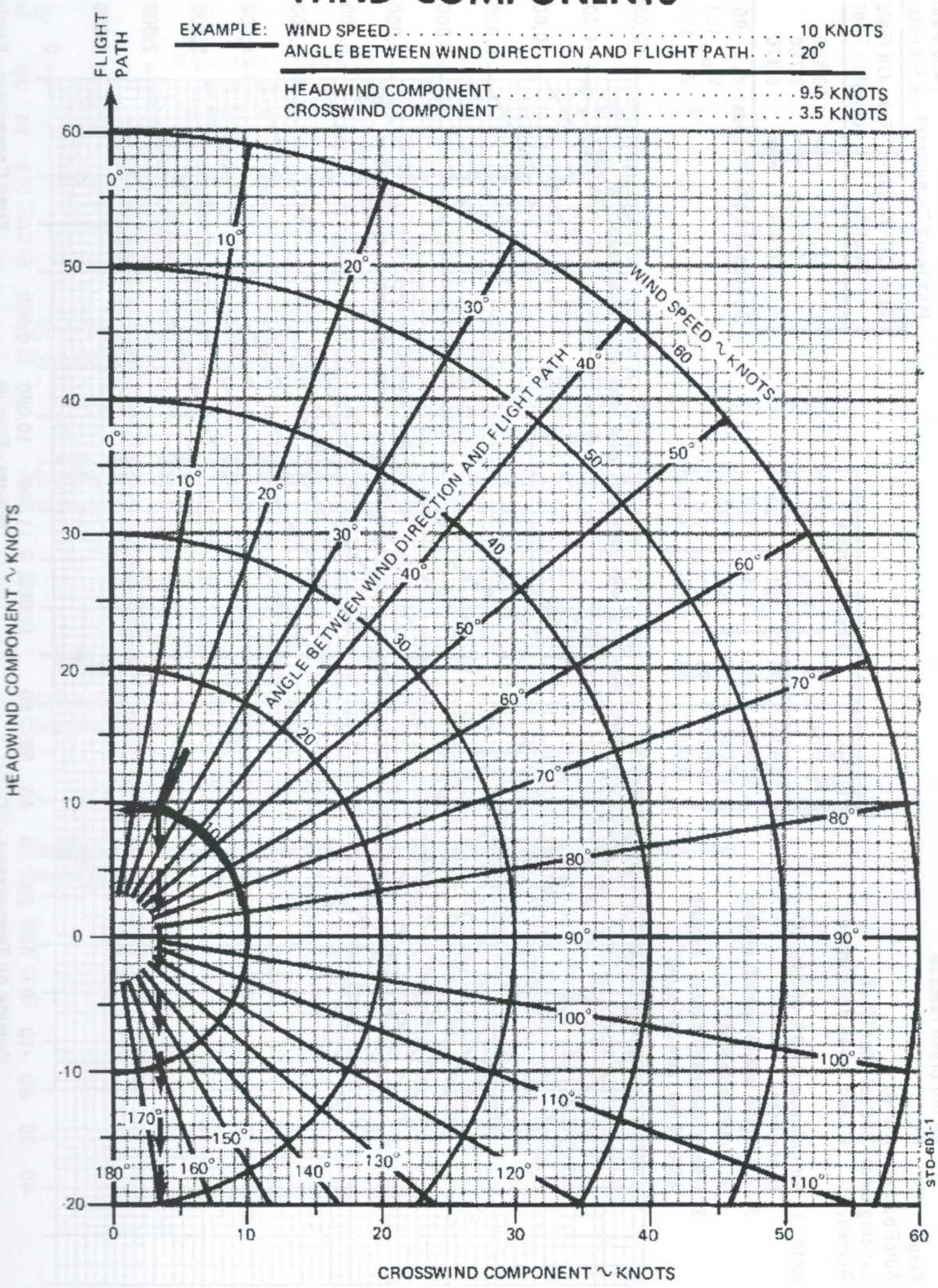
19. The take-off final segment climb gradient for turbo-prop aircraft such as the Dash 8 ends when the airplane reaches the final take-off flight path point at 1500 ft. The aeroplane must be at a speed 38% above the stall maintaining a climb gradient of 12 feet vertically for every 1000 ft. horizontally, while using:

a) max continuous power, with the gear up and flaps retracted.
b) max continuous power or take-off power, with the gear up and flaps at take-off setting.
c) take-power, with the gear up and flaps retracted.
d) take-off power, with the gear down and flaps at take-off setting.

20. In determining whether an aeroplane can be dispatched or a take-off conducted, not more than ____% of the reported headwind component or not less than____% of the reported tailwind component, has to be taken into account.

a) 60, 70
b) 30, 40
c) 50, 100
d) 50, 150

WIND COMPONENTS



Accelerate-Go - Flaps 0%

Associated Conditions:

Power	Take-Off power set before brake release.
Flaps	0%
AutoFeather	Armed
Landing Gear	Retract after lift-off
Runway	Paved, level, dry surface

Note:
1. Air distance is 50% of take-off field length.
2. V_1 (engine failure speed) equals V_R (rotation speed).
3. Usable clearway cannot exceed 25% of the runway length.

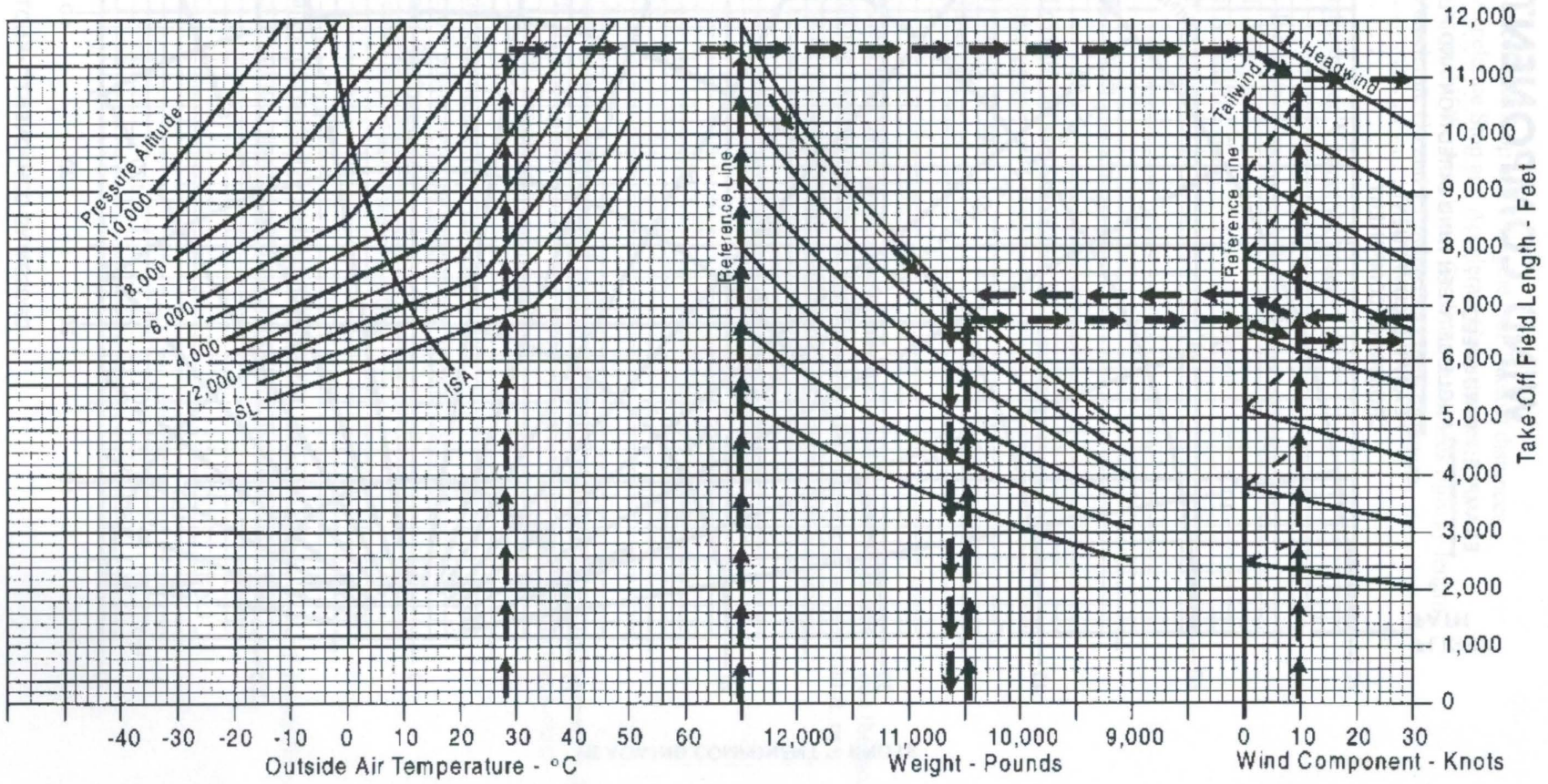
Weight - Pounds	Speed - Knots		
	V_R	V_{LOF}	V_2
12,500	95	101	121
12,000	95	101	119
11,000	95	101	115
10,000	95	101	111
9,000	95	101	108

Example:

OAT	28°C
Pressure Altitude	5430 Feet
Headwind Component	9.5 Knots

Take-Off Weight - Pounds	Take-Off Field Length - Feet
12,500 →	10,950
10,650 ←	6,786
10,470 →	6,370

Speeds (10,470 Pounds) V_R 95 Kt.
V_{LOF} 101 Kt.
V_2 113 Kt.



21. ACCELERATE/GO - 0° FLAPS
Given the following data, determine the maximum allowable take-off weight for the Super King Air: (See pages 5-5 and 5-6)

Wind - 090° M/10 KTS.
Temperature 20°C
Take-Off Runway is RWY 07 (1,700 ft ASL); 6,000 Ft. Long
Altimeter - 29.62"

a) 12,250 lbs.
b) 11,980 lbs.
c) 11,780 lbs.
d) 11,400 lbs.

22. ACCELERATE/GO - 0° FLAPS
Given the following information: Wind = 290° M/30 kts
Temperature 26°C
Take-Off RWY 26 (2,800 ft ASL); 4,600 ft. Long
Altimeter Setting = 29.72"

What is the maximum allowable Take -off gross weight under the above conditions?
(See pages 5-13 and 5-14)

a) 10,550 lbs
b) 11,450 lbs
c) 11,900 lbs
d) 12,200 lbs

23. ACCELERATE/GO - 0°FLAPS
Given the following information: Wind = 090° M/18 kts
Temperature 16°C
Take-Off RWY 20 (1,400 ft ASL); 6,200 ft. Long
Altimeter Setting = 30.32"

What is the maximum allowable Take -off gross weight under the above conditions?
(See pages 5-13 and 5-14)

a) 11,450 lbs
b) 11,700 lbs
c) 12,050 lbs
d) 12,400 lbs

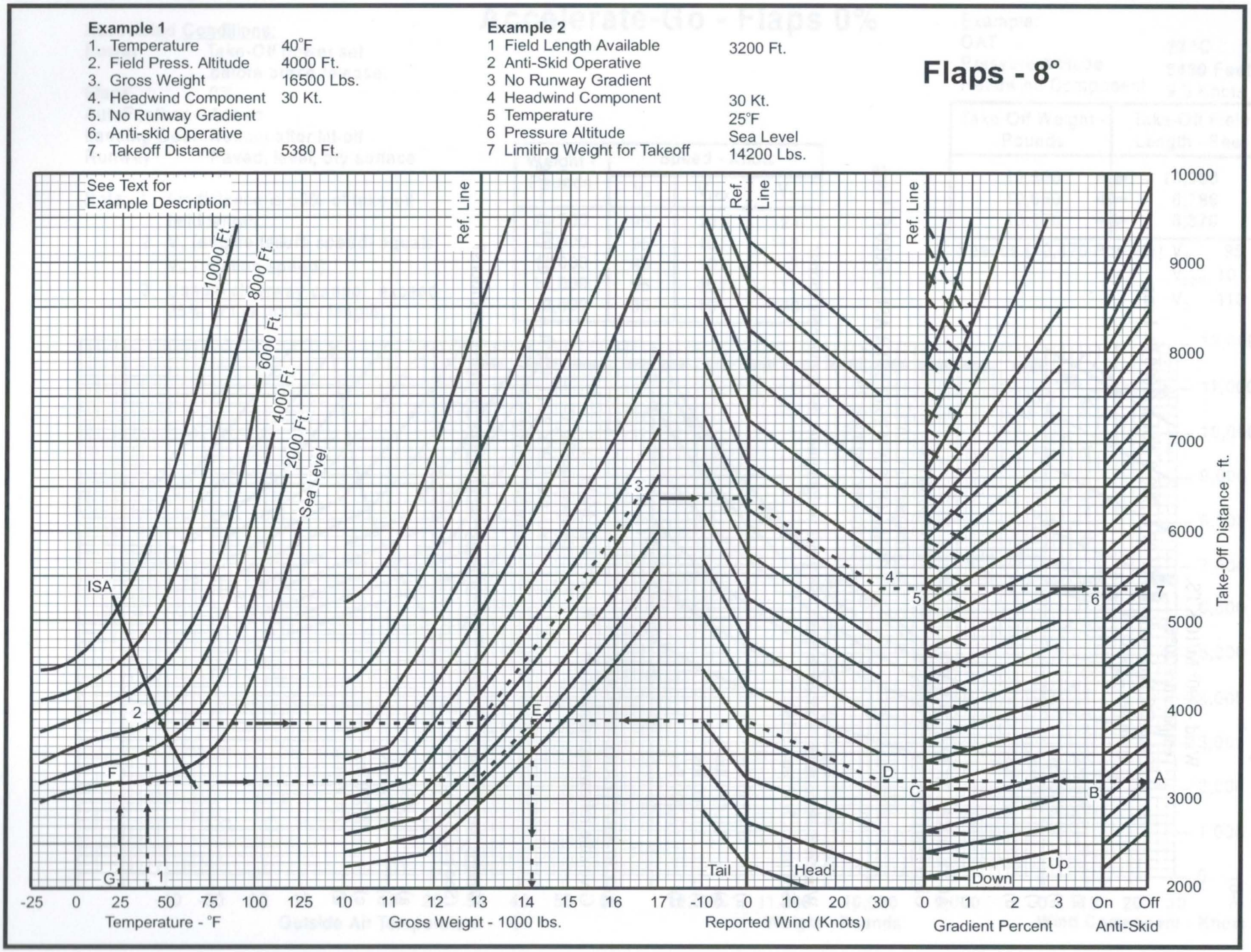
TAKE-OFF DISTANCE GRAPH

Example 1

1. Temperature	40°F
2. Field Press. Altitude	4000 Ft.
3. Gross Weight	16500 Lbs.
4. Headwind Component	30 Kt.
5. No Runway Gradient	
6. Anti-skid Operative	
7. Takeoff Distance	5380 Ft.

Example 2

1 Field Length Available	3200 Ft.
2 Anti-Skid Operative	
3 No Runway Gradient	
4 Headwind Component	30 Kt.
5 Temperature	25°F
6 Pressure Altitude	Sea Level
7 Limiting Weight for Takeoff	14200 Lbs.



24. Determine the Limited Weight for the take-off of a business jet using the following data:
(See pages 5-5 and 5-8)

Field Length Available - 5400 feet
Anti-Skid - Operative
Runway Gradient - Nil
Active Runway -Rwy. 26
Tower Reported Wind - 290 degrees M at 20kts.
Runway Elevation - 2600 feet A.S.L.
altimeter Setting - 29.52 (inches Hg.).
Temperature 75 degrees Fahrenheit

a) 15,100 lbs
b) 13,600 lbs
c) 14,800 lbs
d) 13,950 lbs

25. Determine the Limited Weight for the take-off of a business jet using the following data:
(See pages 5-13 and 5-16)

Field Length Available - 6400 feet
Anti-Skid - Operative
Runway Gradient - Nil
Active Runway -Rwy. 27
Tower Reported Wind - 140 degrees M at 13kts.
Runway Elevation - 4400 feet A.S.L.
altimeter Setting - 30.32 (inches Hg.).
Temperature 85 degrees Fahrenheit

a) 15,100 lbs
b) 14,250 lbs
c) 13,430 lbs
d) 12,880 lbs

Takeoff Performance Flap 15
Dash 8 100

RUNWAY LENGTH SLOPE			15 5300 -0.10	33 5300 0.10
TEMP °C	TORQUE (LIMIT)	CLIMB LIMIT		
-18	92.0	34500	34370	34500
-16	92.0	34500	34370	34500
-14	92.0	34500	34370	34500
-12	92.0	34500	34370	34500
-10	92.0	34500	34370	34500
-8	92.0	34500	34370	34500
-6	92.0	34500	34350	34500
-4	92.0	34500	34270	34500
-2	92.0	34500	34190	34500
0	92.0	34500	34120	34500
2	92.0	34500	34040	34500
4	92.0	34500	39900	34500
6	92.0	34500	33930	34500
8	92.0	34500	33840	34500
10	92.0	34500	33750	34500
12	92.0	34500	33650	34500
14	92.0	34500	33580	34500
16	92.0	34500	33490	34500
18	92.0	34500	33420	34500
20	92.0	34500	33330	34500
22	92.0	34500	33230	34500
24	91.8	34500	33140	34500
26	89.7	34500	32860	34500
28	88.2	34500	32320	34500
30	86.3	34160	31780	34200
32	84.1	33520	30840	33700
34	83.3	33040	30790	33160
36	81.8	32440	30690	32460
38	80.0	31780	30370	31820
40	78.6	31300	29900	31330
42	77.2	30760	29370	30990
44	75.8	30200	28850	30470

Headwind ADD LBS/Knot	25	55
Tailwind SUB LBS/Knot	140	75
Acceleration Height	640	400

QNH Less than 29.92 SUB 50 LBS per .02 in Hg
QNH greater than 29.92 no correction
Maximum tailwind 10 kts.

FOR TRAINING PURPOSES ONLY

26. Given the following data determine the maximum allowable take weight for a Dash 8-100 regional turbo-prop aircraft. (Refer 5-5 & 5-10).

Flap 15 Wind 180/15 kts QNH 29.98" Temp. 24° C

a) 33,140 lbs.
b) 32,815 lbs
c) 33,465 lbs.
d) 34,500 lbs.

27. Given the following data determine the maximum allowable take weight for a Dash 8-100 regional turbo-prop aircraft. (Refer 5-5 & 5-10).

Flap 15 Wind 100/09 kts QNH 29.98" Temp. 30° C

a) 31,930 lbs.
b) 33,750 lbs.
c) 34,160 lbs
d) 34,200 lbs.

28. Determine the maximum take-off weight for a large turbo-prop if the altimeter setting is 30.02" and the temperature is 32°C with a headwind component of 8 knots favoring runway 33. (Refer 5-18).

a) 33,520 lbs.
b) 33,700 lbs
c) 34,100 lbs.
d) 34,500 lbs.

29. Given the following data determine the maximum allowable take weight for a Dash 8-100 regional turbo-prop aircraft. (Refer 5-13 & 5-18).

Flap 15 Winds150/12 kts. QNH 29.76" Temp. 27° C

a) 33,500 lbs.
b) 33,220 lbs
c) 32,890 lbs.
d) 32,490 lbs.

WEIGHT ALTITUDE TEMPERATURE (WAT) LIMIT CHART

(SAMPLE NOT FOR OPERATIONAL USE)

TAKEOFF WEIGHT LIMITATIONS

CYYC
Calgary Intl
Calgary, Alberta
Elev. 3557 FT ASL
Max Temp. 48° C

B767-300/PW4080
MTOW in 1000s of Kgs.
Packs On

		RUNWAY LIMIT WEIGHTS								CLIMB LIMIT WEIGHTS	
Runway #		10 8000 FT		28 8000 FT		16 12675 FT		34 12675 FT			
EPR	°C	5 FLAP	20 FLAP	5 FLAP	20 FLAP	5 FLAP	20 FLAP	5 FLAP	20 FLAP	5 FLAP	20 FLAP
1.60	-15	160.3	153.9	160.1	157.9	175.6	162.3	176.8	163.5	172.2	159.0
1.60	-10	159.2	153.8	159.0	157.9	175.1	161.8	176.3	162.9	172.2	159.0
1.60	-5	158.1	153.6	157.9	157.8	174.6	161.3	175.8	162.3	172.2	159.0
1.60	0	157.0	153.4	156.9	157.8	174.0	161.4	175.2	161.7	172.2	159.0
1.60	4	156.2	153.3	156.1	157.6	173.5	160.9	174.6	161.0	172.2	159.0
1.58	8	155.4	153.1	155.3	157.4	173.0	160.3	174.0	160.4	172.2	159.0
1.56	12	154.6	152.9	154.4	157.1	172.5	159.7	173.4	159.8	172.2	159.0
1.54	16	153.7	152.7	153.5	156.8	172.0	159.1	172.8	159.1	172.2	159.0
1.52	20	152.9	152.5	152.7	156.4	171.5	158.5	172.2	158.4	172.1	158.8
1.50	23	152.2	152.3	152.0	155.9	169.9	156.9	169.9	156.8	169.9	157.2
1.48	26	150.9	151.8	151.2	154.8	167.4	155.3	167.5	155.1	167.7	155.6
1.46	29	149.8	151.3	149.7	153.6	165.2	153.7	165.2	153.6	165.5	154.1
1.44	30	148.8	149.5	148.7	152.9	162.7	152.1	163.0	151.1	163.3	152.5
1.42	32	147.7	148.8	147.6	151.3	160.5	150.5	160.6	149.6	161.1	150.9
1.40	34	146.0	146.1	146.0	149.7	158.1	148.9	158.4	148.0	158.9	149.3
1.38	36	144.7	144.4	144.5	147.5	155.9	147.3	156.1	146.1	156.7	147.7
1.36	38	142.9	141.6	142.2	145.6	153.5	145.6	153.9	144.6	154.5	146.1
1.34	40	141.0	139.0	140.9	143.0	151.3	144.0	151.6	143.2	152.3	144.5
1.32	42	138.8	136.4	138.8	140.4	149.1	142.4	149.4	141.8	150.1	143.0
1.30	44	136.8	133.2	136.7	136.3	146.7	140.7	148.7	140.5	147.9	141.4
1.28	46	134.5	130.9	134.4	133.8	144.5	139.0	145.0	139.1	145.7	139.8
1.25	48	131.0	128.1	131.0	130.6	142.3	137.4	142.8	137.8	143.4	138.2
H/W Corr /5 KT		+1.6	+0.8	+1.6	+1.1	+0.8	+0.6	+1.1	+0.8		
T/W Corr /5 KT		-5.9	-3.0	-5.8	-4.7	-2.3	-1.4	-2.3	-1.7		
Packs Off		+1.1	+1.6	+1.0	+1.3	+3.2	+1.9	+3.2	+1.9		
ENG Anti-Ice		-0.4	-0.4	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3		
Wing & ENG Anti-ice		-1.6	-1.7	-1.8	-1.8	-1.9	-1.8	-1.9	-1.8		
PRESS CORR PER 0.1 INCH BELOW 29.92 -0.8 kgs.											
PRESS CORR PER 0.1 INCH ABOVE 29.92 +0.5 kgs.											

CAUTION RUNWAY LIMIT WEIGHT MAY BE GREATER THAN CLIMB LIMIT WEIGHT

30. Given the following information, determine the maximum allowable take weight and EPR for a heavy jet transport aircraft departing Calgary (CYYC). (Refer to 5-12).

Active Runway 16 Wind 160/10 kts QNH 30.12" Temp. 20° C Packs On

a) 158.8 Kgs, 1.52 EPR.
b) 159.7 Kgs, 1.52 EPR
c) 172.1 Kgs, 1.52 EPR.
d) 173.1 Kgs, 1.52 EPR.

31. Determine the maximum take-off weight and EPR for a B767 if the altimeter setting is 29.82" and the temperature is 32°C with a headwind component of 7 knots favoring runway 10. (Refer 5-12).

a) 149.6 Kgs, 1.42 EPR. Flap 5
b) 161.1 Kgs, 1.42 EPR. Flap 5
c) 150.4 Kgs, 1.42 EPR. Flap 20
d) 150.9 Kgs, 1.42 EPR. Flap 20

32. Determine the maximum allowable take weight for a heavy jet transport aircraft under the following conditions. (Refer 5-13 & 5-18).

Active Runway 16 Winds 340/04 kts. QNH 29.43" Temp. 0° C Light Snow

a) 170.6 Kgs, 1.60 EPR.
b) 171.4 Kgs, 1.60 EPR.
c) 172.2 Kgs, 1.60 EPR.
d) 172.9 Kgs, 1.60 EPR.

Heavy JET Takeoff Speeds

V1, VR, V2 for Max Takeoff Thrust

WEIGHT (1000 KG)	FLAP 5			FLAP 15			FLAP 20		
	V1	VR	V2	V1	VR	V2	V1	VR	V2
190	166	170	175	161	163	168	159	159	165
180	161	165	171	156	158	164	159	159	165
170	155	160	166	150	153	154	153	154	160
160	149	154	161	144	147	154	147	148	154
150	143	148	156	138	142	149	141	142	149
140	136	142	151	132	136	144	135	137	144
130	129	136	145	125	132	139	129	131	140
120	122	129	140	119	124	134	122	125	135
110	115	122	134	112	117	128	116	119	129
100	108	115	127	106	110	122	109	113	124
90	101	108	121	99	102	116	102	106	118

V1, VR, V2 Adjustments

TEMP		V1						VR						V2					
		PRESS ALT (1000 FT)						PRESS ALT (1000 FT)						PRESS ALT (1000 FT)					
°C	°F	-2	0	2	4	6	8	-2	0	2	4	6	8	-2	0	2	4	6	8
60	**140**	5	6	7	8			3	4	5	6			-2	-3	-3	-4		
50	**120**	3	4	5	6	7	9	2	3	4	5	6	7	-2	-2	-3	-3	-4	-5
40	**105**	1	2	3	4	5	7	1	1	2	4	5	6	-1	-1	-2	-2	-3	-4
30	**85**	0	0	1	3	4	6	0	0	1	3	4	5	0	0	-1	-2	-2	-3
20	**67**	0	0	1	3	4	6	0	0	1	3	4	5	0	0	-1	-1	-2	-3
10 or below	**50**	0	0	1	3	4	6	0	0	1	3	4	5	0	0	-1	-1	-2	-3

Slope & Wind Adjustment for V1

WEIGHT 1000 KG	SLOPE %					WIND KTS							
	DN			UP		TAIL							HEAD
	-2	-1	0	1	2	-15	-10	-5	0	10	20	30	40
190	-3	-2	0	2	2	-2	-1	0	0	0	0	0	1
170	-3	-1	0	2	2	-2	-1	0	0	0	1	1	1
150	-2	-1	0	2	3	-3	-2	-1	0	0	1	1	1
130	-2	-1	0	2	3	-3	-2	-1	0	0	1	1	2
110	-1	0	0	1	3	-4	-3	-1	0	0	1	1	2
90	0	0	0	1	2	-4	-3	-1	0	0	1	2	3

Max Take off Thrust

TEMP		PRESSURE ALTITUDE FEET						
°C	°F	-1000	0	2000	4000	6000	8000	9000
55	131	99	97	93				
50	122	103	100	96	93			
45	113	106	103	99	95	92		
40	104	109	106	102	98	94	90	89
35	95	110	109	104	99	96	92	90
30	86	111	110	106	100	98	94	92
25	77	111	110	106	102	99	95	93
20	68	111	110	106	103	100	96	94
15	59	111	110	106	103	100	96	95
-50	-58	111	110	107	103	100	97	95

33. Given the following information, determine V1, VR, V2 and the takeoff power setting for a large jet aircraft. (Refer to 5-14).

TOW 170,000 Kgs. Flap 5 Runway 28, Elevation 3557' Runway Slope 1 DN

QNH 29.52" Temp. 30° C Wind 280/09 kts,

a) V1 155, VR 160, V2 166 and N1 100%
b) V1 157, VR 163, V2 164 and N1 100%
c) V1 157, VR 160, V2 166 and N1 106%
d) V1 156, VR 162, V2 165 and N1 99%

34. Determine V1, VR, V2 and the N1 power setting for a heavy jet aircraft given the following data. (Refer 5-14).

TOW 150,000 Kgs. Flap 20 Runway 08, Elevation 2557' Runway Slope 0
QNH 30.42" Temp. 20° C Tailwind 7 kts,

a) V1 142, VR 149, V2 155 and N1 106%
b) V1 141, VR 142, V2 149 and N1 103%
c) V1 139, VR 143, V2 151 and N1 103%
d) V1 140, VR 143, V2 148 and N1 106%

TAKEOFF EPR

0 TO 60 KTS

A/C ON

EPR BLEED CORRECTIONS	Δ EPR
AIR CONDITIONING OFF	+.03
ENGINE ANTI-ICE	ZERO

OAT																					
°F	-65	-49	-40	-31	-22	-13	-4	5	14	23	32	41	50	59	68	77	86	95	104	120
°C	-54	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	49
TEMP LIMIT EPR	2.31	2.31	2.31	2.29	2.27	2.24	2.22	2.19	2.17	2.14	2.11	2.07	2.04	2.01	2.01	2.01	2.00	1.95	1.91	1.82
PRESS EPR	2.31						2.22		2.16	2.11		2.06				2.01	1.96			
PRESS ALT	5860 AND ABOVE						4000		3000	2000		1000				S.L.	-1000			

① FIND TEMP LIMIT EPR
② FIND PRESS LIMIT EPR
③ USE THE SMALLER OF THE TWO LIMITS

V_1, V_R, V_2

ANTI-SKID ON

PRESSURE ALTITUDE 1000 FT		OAT					
9 to 10	F°			-65 to -19	-18 to 18	19 to 45	46 to 86
	C°			-54 to -28	-27 to -8	-7 to 7	8 to 30
7 to 9	F°		-65 to -21	-20 to 10	11 to 39	40 to 87	88 to 101
	C°		-54 to -29	-28 to -23	-22 to 4	5 to 31	32 to 38
5 to 7	F°	-65 to -15	-14 to 15	16 to 40	41 to 87	88 to 105	106 to 109
	C°	-54 to -26	-27 to -9	-8 to 4	5 to 31	32 to 40	41 to 43
3 to 5	F°	-65 to 20	21 to 42	43 to 88	89 to 103	104 to 116	
	C°	-54 to -8	-7 to 6	7 to 31	32 to 39	40 to 46	
1 to 3	F°	-65 to 46	47 to 89	90 to 104	105 to 120		
	C°	-54 to 8	9 to 32	33 to 40	41 to 49		
-1 to 1	F°	-65 to 91	92 to 105	106 to 120			
	C°	-54 to 33	34 to 40	41 to 49			

STAB. TRIM SETTING
-UNITS AIRPLANE NOSE UP

CG	FLAPS ALL
6	8
8	7-3/4
10	7-1/2
12	7
14	6-3/4
16	6-1/4
18	5-3/4
20	5-1/2
22	5
24	4-1/2
26	4
28	3-1/2
30	3
32	2-1/2

FLAPS	GROSS WT -1000 LB	V_1 V_R V_2	V_1 V_R V_2	V_1 V_R V_2	V_1 V_R V_2	V_1 V_R V_2	V_1 V_R V_2
1	120	159 161 164	160 162 164				
	110	150 152 155	151 153 155	152 154 155			
	100	141 143 147	142 143 147	142 144 147	143 145 147	144 146 147	
	90	131 133 138	132 134 138	133 135 138	133 136 138	134 136 138	135 137 138
	80	122 124 130	122 125 130	123 126 130	124 126 130	125 127 130	125 128 130
	70	112 116 123	113 117 123	113 117 122	114 118 122	115 119 122	116 119 122
5	120	153 155 158	154 156 158				
	110	144 146 150	145 147 150				
	100	135 137 142	136 138 142	137 139 142	138 140 142		
	90	126 128 133	127 129 133	128 130 133	129 131 133	130 132 133	
	80	116 118 125	117 119 125	118 121 125	119 122 125	120 123 125	121 124 125
	70	106 109 118	107 110 118	108 111 117	109 112 117	110 113 117	112 114 117
15	100	130 130 135	131 131 135	132 132 135			
	90	120 121 128	121 122 128	123 123 128	124 124 128	125 125 128	126 126 128
	80	111 112 119	112 113 119	113 114 119	114 115 119	115 116 119	117 117 119
	70	105 105 112	101 103 112	102 105 112	103 106 112	105 107 112	106 108 112
25	100	124 126 132	126 127 132				
	90	115 117 124	116 118 124	117 119 124	118 120 124		
	80	105 108 116	107 109 116	108 110 116	109 111 116	110 112 116	111 113 116
	70	105 105 108	104 104 108	101 101 108	99 102 108	100 103 108	101 104 108

SPEEDS NOT VALID WHEN WEIGHTS ARE PREDICTED ON USE OF CLEARWAY, STOPWAY, IMPROVED CLIMB OR ARE LIMITED BY BRAKE ENERGY

V_1 ADJUSTMENTS*

WIND	SLOPE
ADD 1 KT PER 20 KTS HEADWIND	ADD 1 KT PER 1% UP SLOPE
SUBTRACT 1 KT PER 5 KTS TAILWIND	SUBTRACT 1 KT PER 1% DOWN SLOPE

*V_1 MUST NOT EXCEED V_R

The following information relates to the takeoff performance of a 2 engine turbofan aircraft: (See chart on page 5-16)

Gross Weight 110 000 lbs	Temperature 11°C
Center of Gravity 18%	Flaps 5°
Airport Elevation 990 ft ASL	Headwind 18 knots
Altimeter 29.82″	Runway Slope 0%

35. Referring to the above information. Determine takeoff EPR settings for the engines: (See page 5-16)

a) 2.06 EPR, Pressure Limited
b) 2.01 EPR, Pressure Limited
c) 2.01 EPR, Temperature Limited
d) 2.06 EPR, Temperature Limited

36. Referring to the above information. Calculate the V speeds for takeoff: (See page 5-16)

a) V1 144, VR 146, V2 150
b) V1 145, VR 147, V2 150
c) V1 145, VR 146, V2 150
d) V1 146, VR 147, V2 150

37. Referring to the above information. What will be the takeoff trim setting? (See page 5-16)

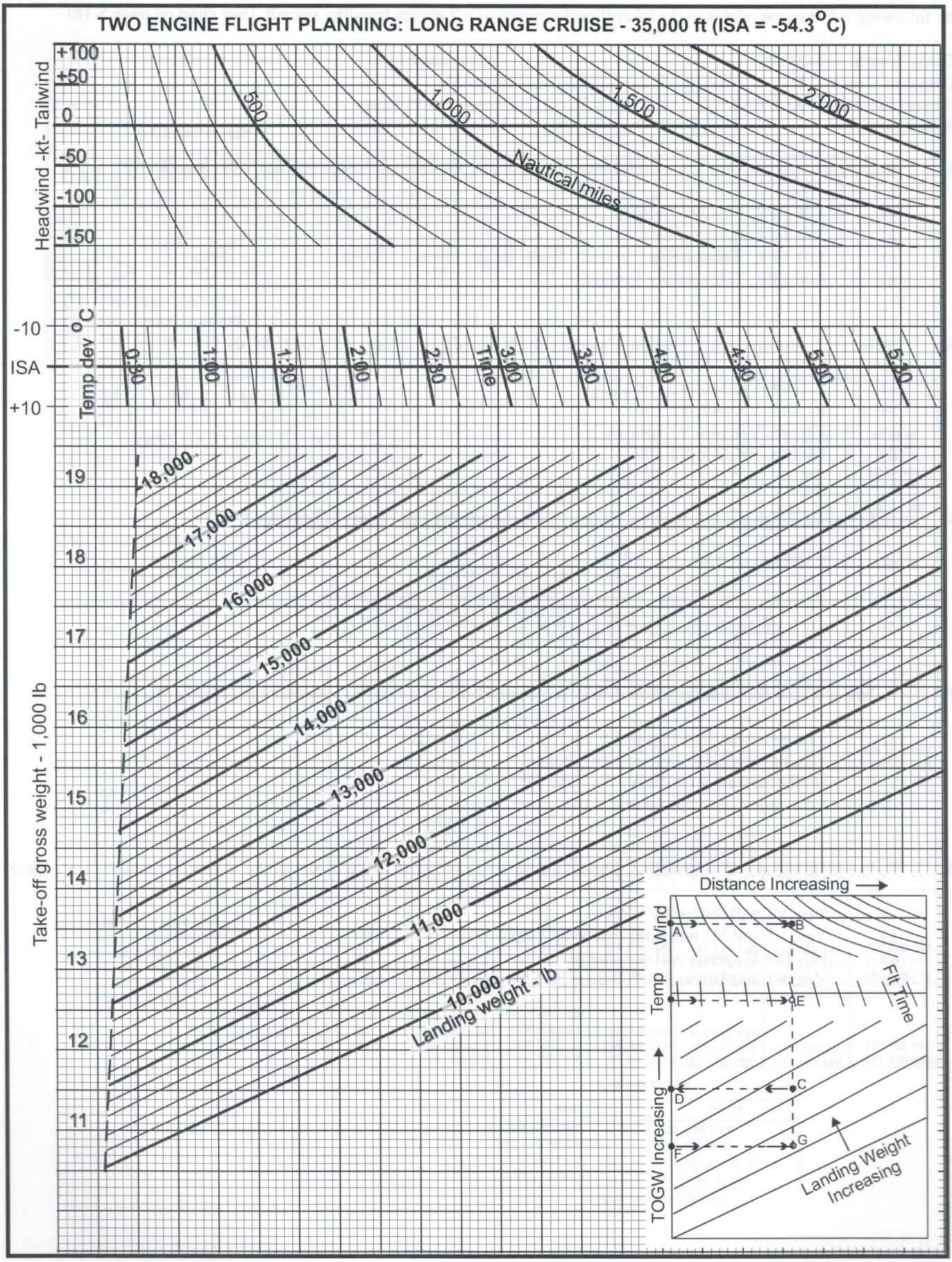
a) 5.75 Degrees Up
b) 5.75 Units Nose Up
c) 6.0 Degrees Up
d) 6.0 Units Nose Up

38. Referring to the above information. Under these conditions, is a flaps 15° departure possible? (See page 5-16)

a) Yes, however the EPRs and V speeds will both change
b) Yes, however the V speeds will change
c) No the aircraft is too heavy for flaps 15°
d) Yes, only if air conditioning is off

39. Referring to the above information. Should the air pressure rise 0.10″, will any of the V speeds change? (See page 5-16)

a) Yes ,V1 will reduce by 1 knot
b) Yes, V1 and V2 will both reduce by 1 knot
c) No, The V speeds will not change
d) Yes, V1 and VR will both reduce by 1 knot


TWO ENGINE FLIGHT PLANNING: LONG RANGE CRUISE - 35,000 ft (ISA = -54.3°C)
Headwind -kt- Tailwind
+100
+50
0
-50
-100
-150
500
1,000
1,500
2,000
Nautical miles
Temp dev °C
-10
ISA
+10
0:30
1:00
1:30
2:00
2:30
Time
3:00
3:30
4:00
4:30
5:00
5:30
Take-off gross weight - 1,000 lb
19
18
17
16
15
14
13
12
11
18,000
17,000
16,000
15,000
14,000
13,000
12,000
11,000
10,000
Landing weight - lb
Distance Increasing
Wind
Temp
Flt Time
TOGW Increasing
A
B
C
D
E
G
Landing Weight Increasing

40. Given the following information, determine the time enroute and the landing weight for a business jet flying at .75 Indicated Mach cruise: (See page 5-18)

Cruising Altitude 35,000 feet A.S.L.
Headwind Component 50 kts.
Distance to be flown 1000 N.M.
Temperature at Flight Altitude ISA +10° C
Take-Off Weight 18,500 lbs.

a) 2 hrs. 50 mins., 13,400 lbs.
b) 3 hrs. 00 mins., 14,300 lbs.
c) 3 hrs. 30 mins., 13,550 lbs.
d) 3 hrs. 04 mins., 14,950 lbs.

41. Given the following information, determine the time enroute and the fuel required for a business jet flying at .75 Mach cruise: (See page 5-18)

Cruising Altitude 35,000 feet A.S.L.
Tailwind Component 50 kts.
Distance to be flown 1400 N.M.
Temperature at Flight Altitude ISA -10° C
Take-Off Weight 18,700 lbs.

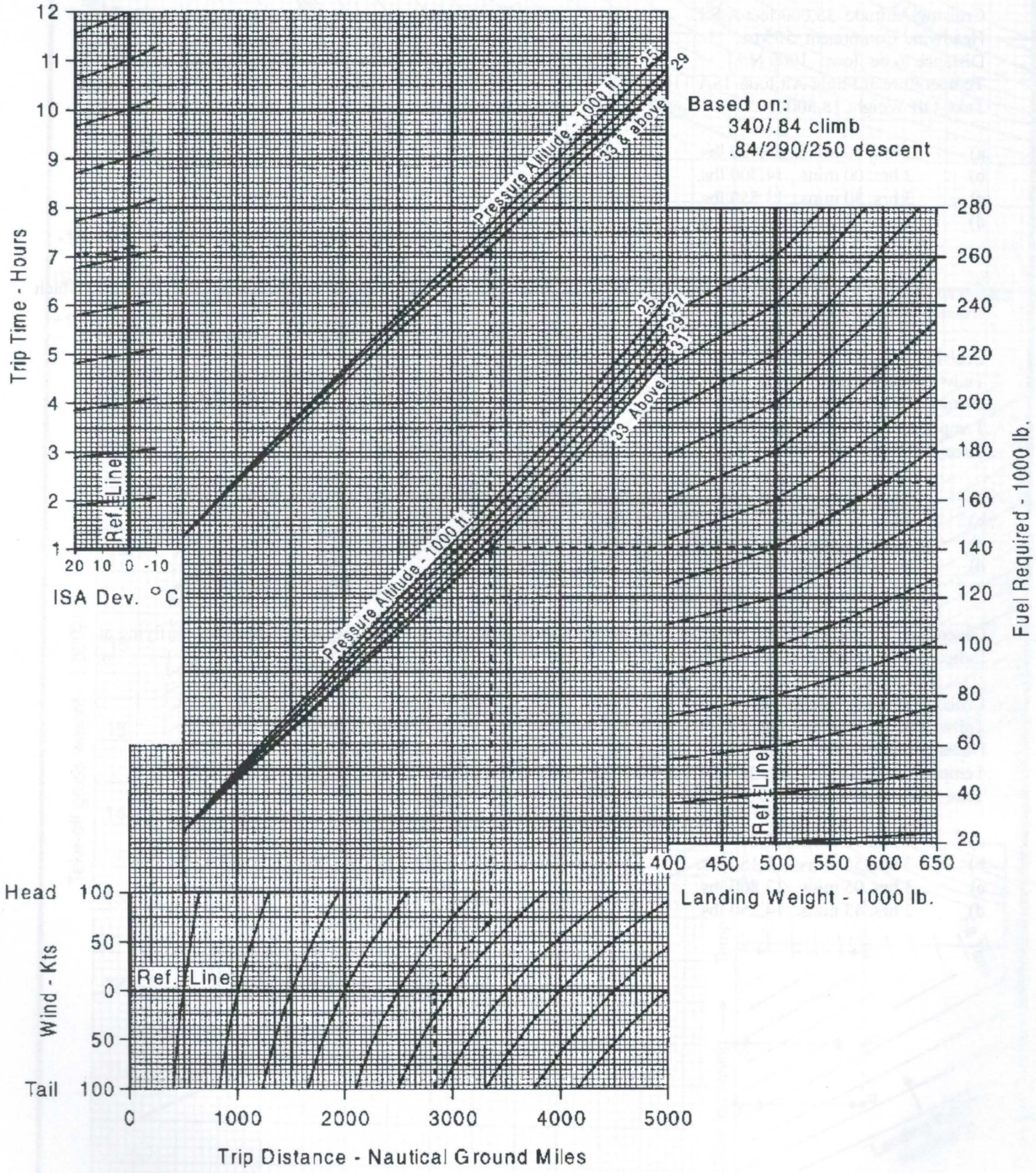
a) 4 hrs. 22 mins., 4750 lbs.
b) 3 hrs. 50 mins., 4600 lbs.
c) 3 hrs. 25 mins., 3850 lbs.
d) 3 hrs. 18 mins., 3800 lbs.

42. Given the following information, determine the time enroute and the landing weight for a business jet flying at .75 Indicated Mach cruise: (See page 5-18)

Cruising Altitude 35,000 feet A.S.L.
Tailwind Component 70 kts.
Distance to be flown 1200 N.M.
Temperature at Flight Altitude ISA +10° C
Take-off Weight 17,400 lbs.

a) 4 hrs. 08 mins., 12,840 lbs.
b) 3 hrs. 55 mins., 13,150 lbs.
c) 3 hrs. 05 mins., 13,860 lbs.
d) 2 hrs. 43 mins., 14,250 lbs.

LONG RANGE CRUISE



43. Given the following information, determine the time enroute and the fuel required for a heavy jet transport aircraft flying at .84 Indicated Mach: (See page 5-20)

Cruising Altitude 37,000 feet A.S.L.
Headwind Component 50 kts.
Distance to be flown 2400 N.M.
Temperature at Flight Altitude ISA +10 degrees C
Landing Weight 550,000 LBS.

a) 4 hrs. 30 mins., 97,000 lbs.
b) 4 hrs. 50 mins., 97,000 lbs.
c) 5 hrs. 45 mins., 124,000 lbs.
d) 6 hrs. 00 mins., 124,000 lbs.

44. Given the following information, determine the time enroute and the fuel required for a heavy jet transport aircraft flying at .84 Indicated Mach: (See page 5-20)

Cruising Altitude 29,000 feet A.S.L.
Tailwind Component 50 kts.
Distance to be flown 3200 N.M.
Temperature at Flight Altitude ISA -10 degrees C
Landing Weight 600,000 LBS.

a) 8 hrs. 12 mins., 196,000 lbs.
b) 6 hrs. 38 mins., 156,000 lbs.
c) 5 hrs. 47 mins., 124,000 lbs.
d) 5 hrs. 00 mins., 118,000 lbs.

45. Given the following information, determine the time enroute and the fuel required for a heavy jet transport aircraft flying at .84 Indicated Mach: (See page 5-20)

Cruising Altitude 37,000 feet A.S.L.
Headwind Component 50 kts.
Distance to be flown 3500 N.M.
Temperature at Flight Altitude ISA -10 degrees C
Landing Weight 600,000 LBS.

a) 6 hrs. 30 mins., 160,000 lbs.
b) 7 hrs. 00 mins., 160,000 lbs.
c) 8 hrs. 20 mins., 198,000 lbs.
d) 8 hrs. 30 mins., 198,000 lbs.

LONG RANGE CRUISE CONTROL

LONG RANGE CRUISE CONTROL

(SAMPLE CHART NOT FOR OPERATIONAL USE)

WEIGHT (1000 KG)		PRESSURE ALTITUDE (1000 FT)								
		41	39	37	35	33	31	29	27	25
180	EPR				1.44	1.36	1.28	1.21	1.17	1.13
	MACH				.810	.805	.802	.799	.794	.782
	KIAS				275	284	298	310	321	329
	FF/ENG				3095	3029	2984	3006	3061	3115
170	EPR				1.40	1.31	1.23	1.19	1.15	1.11
	MACH				.797	.802	.801	.796	.787	.771
	KIAS				271	285	298	309	318	324
	FF/ENG				2897	2823	2823	2867	2918	2962
160	EPR			1.50	1.33	1.26	1.20	1.16	1.13	1.10
	MACH			.794	.801	.802	.798	.791	.777	.758
	KIAS			258	272	385	296	307	314	318
	FF/ENG			2798	2665	2647	2674	2729	2773	2807
150	EPR			1.40	1.29	1.22	1.17	1.14	1.11	1.08
	MACH			.799	802	.799	.794	.781	.763	.743
	KIAS			259	273	284	295	303	308	312
	FF/ENG			2532	2477	2490	2541	2585	2619	2650
140	EPR		1.44	1.32	1.24	1.19	1.15	1.12	1.09	1.07
	MACH		.798	.802	.801	.796	.785	.767	.747	.725
	KIAS		247	260	272	283	291	297	301	303
	FF/ENG		2416	2326	2317	2354	2401	2432	2465	2482
130	EPR		1.35	1.26	1.20	1.16	1.12	1.10	1.07	1.05
	MACH		.802	.801	.797	.788	.771	.751	.728	.704
	KIAS		249	260	271	280	286	290	293	294
	FF/ENG		2193	2159	2173	2218	2251	2282	2301	2308
120	EPR	1.37	1.28	1.21	1.17	1.13	1.10	1.08	1.06	1.04
	MACH	.801	.802	.798	.790	.774	.753	.731	.707	.683
	KIAS	237	249	259	268	274	278	281	283	285
	FF/ENG	2050	2016	2012	2044	2074	2101	2122	2126	2142
110	EPR	1.29	1.22	1.18	1.14	1.11	1.08	1.06	1.04	1.03
	MACH	.802	.798	.791	.775	.755	.732	.707	.683	.659
	KIAS	226	236	245	251	267	270	272	273	274
	FF/ENG	1706	1720	1740	1736	1925	1945	1949	1968	1986
	EPR INC				.08	.07	.06	.05	.05	.04

1. If engine anti-icing on, reduce EPR by -.05
2. When operating left of heavy vertical line set engines to charted EPR
3. When operating right of heavy vertical line increase EPR by value indicated at the bottom of pressure altitude column.

46. A heavy four-engine transport category jet, flying long-range cruise at FL330 weighs of 170,000 Kgs. To maintain long-range, the crew would have to set the EPRs to____in_____. (Refer 5-22).

a) Set the EPR to 1.23in 1 hour & 38 minutes.
b) Set the EPR to 1.26 in 53 minutes.
c) Set the EPR to 1.33 in 1 hour & 46 minutes.
d) Maintain current power setting.

47. In order to maintain long-range cruise, determine the time that the new EPR setting should be set for a large twin-engine jet flying at FL310, weighing 160,000 Kgs. Current time is 2015 UTC. (Refer 5-22).

a) Set the EPR to 1.23 at 2207 UTC.
b) Set the EPR to 1.26 at 2213 UTC.
c) Set the EPR to 1.17 at 2207 UTC.
d) None of the above.

48. In order to maintain long-range cruise, the flight crew of a large four-engine jet aircraft leveling off at FL310, would have to set the EPRs to _____ if the aircraft weighed 160,000 kgs. with engine anti-ice on. In order to continue to maintain long-range, the crew would have to set the EPRs to _____in _____. (Refer 5-22).

a) Set the EPR to 1.31in 2 hours.
b) When leveling off set the EPR to 1.25, then to 1.21 in 58 minutes.
c) When leveling off set the EPR to 1.15, then to 1.18 in 56 minutes.
d) None of the above.

LOAD AND TRIM SHEET

DRY OPERATING WEIGHT		
WEIGHT DEVIATION	±	
CORRECTED DRY OPER. WEIGHT	=	
TOTAL CARGO	+	
TOTAL PASSENGER	+	
ACTUAL ZERO FUEL WEIGHT	=	
TAKE OFF FUEL	+	
ACTUAL TAKE OFF WEIGHT	=	
TRIP FUEL	-	
ACTUAL LANDING WEIGHT	=	

PASSENGER WEIGHT (Lb)		
M		
F		+
CH		+
		+
TOTAL WEIGHT		

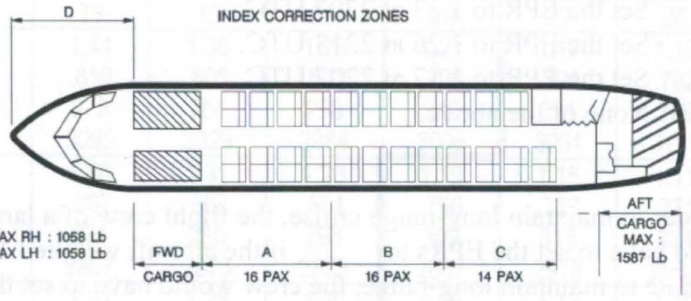
CARGO WEIGHT (Lb)		
FWD LH		
FWD RH		+
AFT		+
TOTAL WEIGHT		+

MTOW (37258 Lb)

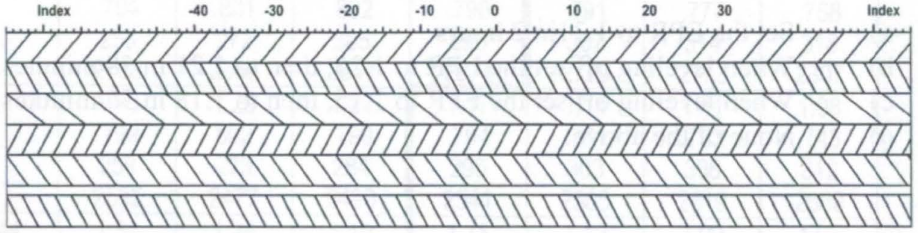
MLW (36155 Lb)

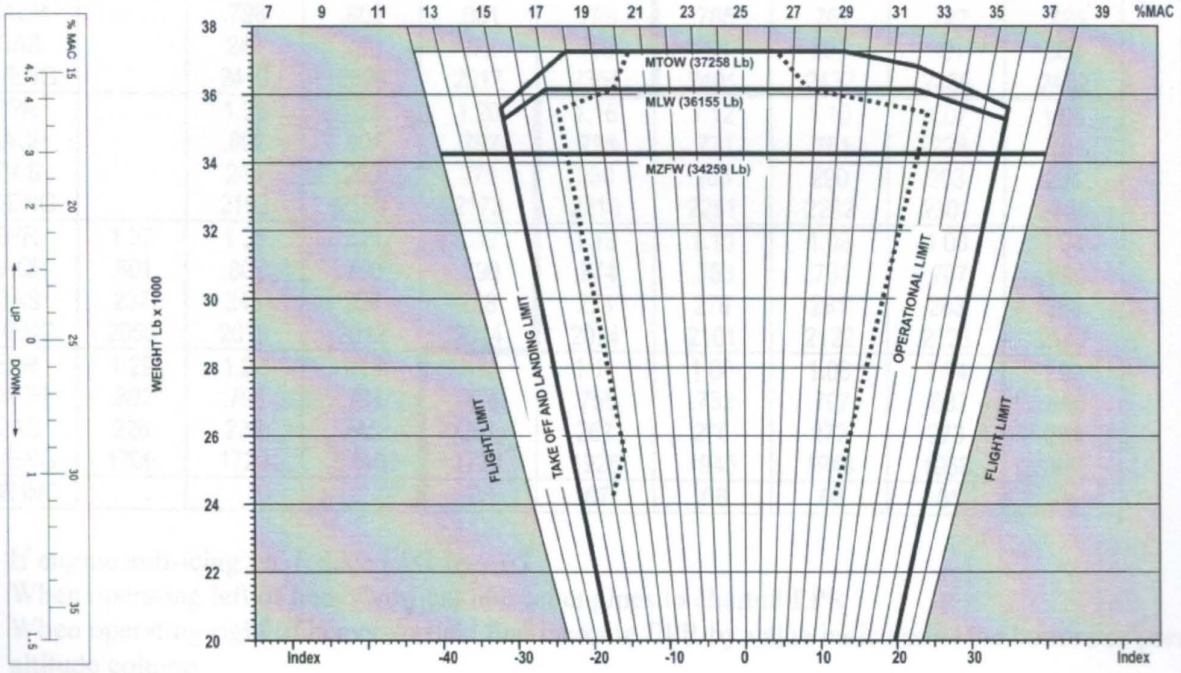
MZFW (34259 Lb)

DRY OPER. WEIGHT CONDITIONS	
WEIGHT (Lb)	
DRY OPER. WT INDEX	



ZONES	NP	WEIGHT Lb	
Zone A			2pax
Zone B			4pax
Zone C			2pax
FWD CARGO			100Lb
AFT CARGO			100Lb
FUEL			2000Lb





The following information relates to the weight & balance computation of an ATR 42:

Basic Operating Weight 22375 lbs	20 Males
Index -16.50	20 Females
Max Fuel 9920 lbs	6 Children
Onboard Fuel 5500 lbs	0 Infants
Trip Fuel 4150 lbs	Forward Cargo 1000 lbs
2 Pilots + 1 Flight Attendant	Aft Cargo 150 lbs

Standard Passenger Weights: Male: 90.7 kg (200lbs) Female: 74.8 kg (165 lbs) Children: 34 kg (75 lbs)

49. Referring to the above information. What is the Takeoff Weight, Zero-fuel Weight and Planned Landing Weight of the ATR42? (See 5-24)

a) Takeoff Weight: 32 548 lbs, Zero-fuel Weight 34259 lbs and Landing Weight: 28 398 lbs
b) Takeoff Weight: 36 775 lbs, Zero-fuel Weight 31 275 lbs and Landing Weight: 32 625 lbs
c) Takeoff Weight: 32 625 lbs, Zero-fuel Weight 34, 775 lbs and Landing Weight: 31 275 lbs
d) Takeoff Weight: 32 548 lbs, Zero-fuel Weight 31857 lbs and Landing Weight: 27 048 lbs

50. Referring to the above information. What is the Takeoff % MAC and Trim Setting? (See 5-24)

a) 22.5% MAC, 1.0 Units Nose UP
b) 26..5% MAC, 0.4 Units Nose UP
c) 30.5% MAC, 1.2. Units Nose DOWN
d) 24.6% MAC, 0.2 Units Nose DOWN

Basic Operating Weight 21750 lbs	18 Males
Index -11.00	14 Females
Max Fuel 9920 lbs	4 Children
Onboard Fuel 4500 lbs	Forward Cargo 1000 lbs
Trip Fuel 3250 lbs	Aft Cargo 600 lbs
2 Pilots + 1 Flight Attendant	

Standard Passenger Weights: Male: 90.7 kg (200lbs) Female: 74.8 kg (165 lbs) Children: 34 kg (75 lbs)

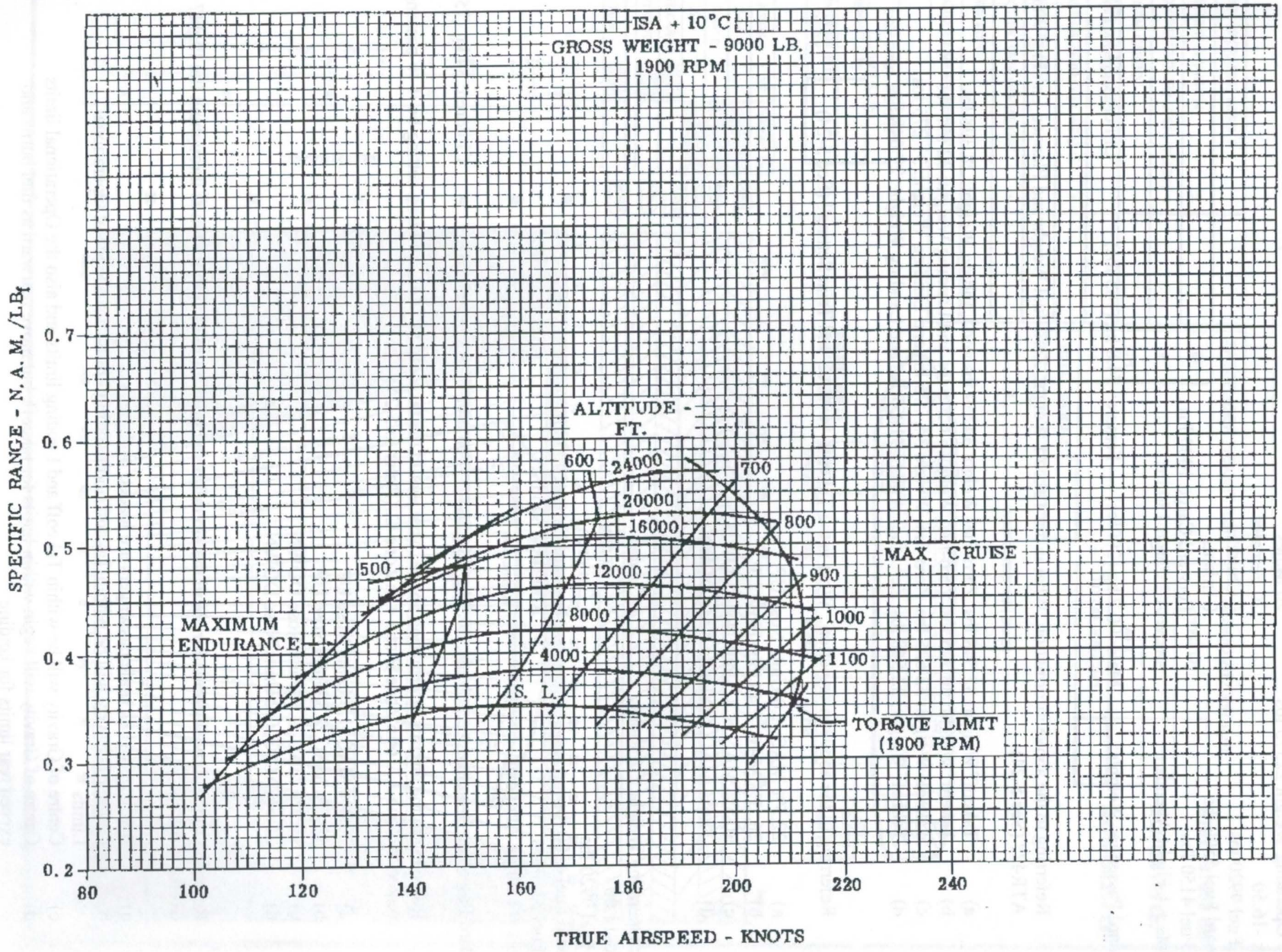
51. Referring to the aircraft information above, what would the take-off % MAC and trim setting be if 16 passengers were seated in Zone A, 16 in Zone B and 4 in Zone C. (Refer to 5-24)

a) 22.3% MAC, 1.0 Units Nose UP
b) 19.7% MAC, 2.3 Units Nose UP
c) 19.7% MAC, 2.3 Units Nose DOWN
d) 25.6% MAC, 0.2 Units Nose DOWN

52. Referring to the above information. Will the aircraft be within Centre of Gravity limits throughout the flight? (Refer to 5-24)

a) It will only if all male passengers are loaded in Zone A
b) Centre of Gravity will be within Takeoff and Landing limits, but outside of Operational Limits
c) Centre of Gravity will be within Takeoff and Landing limits and also the Operational limits
d) Centre of Gravity will begin within limits for takeoff, but move rearward as fuel burns and exceed rear limits for landing

SPECIFIC RANGE



53. What would be the fuel flow for the Beech A-90 when flying under the following conditions? (See page 5-26)

TAS - 200 Kts.
Altitude - 8,000 ft. ASL
Temperature - ISA + 10° C
A/C Gross Weight - 9,000 lbs.

a) 365 lbs./hr.
b) 382 lbs./hr.
c) 435 lbs./hr.
d) 488 lbs./hr.

54. The following data is provided for the pilot of a small turbojet aircraft who is planning a westbound flight and wishes to set up for maximum range cruise:

	FL310	**FL350**
TAS	330 kts.	310 kts.
W/V	270/30	270/60
Fuel Flow	1,100 lbs./hr.	950 lbs./hr.

From the information, determine the best flight level for cruise.

a) FL350 --- SAR (Specific Air Range) is .32 nm/lb. of fuel
b) FL350 --- SGR (Specific Ground Range) is .26 nm/lb. of fuel
c) FL310 --- SAR is .30 nm/lb. of fuel
d) FL310 --- SGR is .27 nm/lb. of fuel

55. The following data is provided for the pilot of a small turbojet aircraft who is planning a westbound flight and wishes to set up for maximum range cruise:

	FL310	FL350
TAS	440	430
Wind	270/60	270/90
Fuel Flow	1450	1250

From the information, determine the best flight level for cruise?

a) FL350 SAR is .284 nm/lb.
b) FL350 SGR is .272 nm/lb.
c) FL310 SAR is .294 nm/lb.
d) FL310 SGR is .262 nm/lb.

CRUISE ENGINE FAILURE

Driftdown Speed/Level Off Altitude

WEIGHT (1000 KG)		OPTIMUM DRIFTDOWN SPEED (KIAS)	LEVEL OFF ALTITUDE (FT)		
START DRIFT DOWN	LEVEL OFF		ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
190	183	276	18400	17400	15600
180	174	269	20000	19100	17700
170	165	262	21200	20600	19700
160	155	254	22600	21900	21000
150	145	247	24000	23200	22300
140	135	238	25500	24700	23700
130	126	230	27200	26700	25500
120	116	221	29100	28900	28100
110	106	212	30900	30900	30500
100	97	202	32900	32800	32600

Driftdown Cruise Range Capability

GROUND TO AIR MILES CONVERSTION

AIR DISTANCE (NM) HEADWIND COMPONENT (KTS)					GROUND DISTANCE (NM)	AIR DISTANCE (NM) TAILWIND COMPONENT (KTS)				
100	80	60	40	20		20	40	60	80	100
274	255	239	224	211	200	190	180	172	164	157
547	510	477	448	423	400	380	361	344	329	315
819	763	715	672	634	600	570	542	517	494	473
1090	1016	952	895	845	800	760	723	690	660	632
1361	1269	1189	1119	1056	1000	950	904	863	825	790
1632	1522	1426	1342	1267	1200	1140	1085	1036	990	949
1902	1775	1664	1565	1478	1400	1330	1266	1208	1156	1107
2174	2029	1901	1789	1689	1600	1520	1447	1381	1321	1266
2447	2283	2139	2013	1900	1800	1710	1628	1554	1486	1424

Driftdown/Cruise Fuel and Time

AIR DIST (NM)	FUEL REQUIRED (1000 KG) WEIGHT AT START OF DRIFTDOWN (1000 KG)										TIME (HR:MIN)
	100	110	120	130	140	150	160	170	180	190	
200	1.5	1.7	1.8	1.9	2.1	2.1	2.3	2.4	2.5	2.6	0:33
400	3.4	3.7	4.0	4.3	4.6	4.9	5.2	5.4	5.8	6.0	1:05
600	5.2	5.7	6.1	6.6	7.0	7.5	7.9	8.3	8.8	9.3	1:36
800	6.9	7.5	8.1	8.8	9.4	10.0	10.6	11.2	11.8	12.4	2:08
1000	8.6	9.4	10.1	10.9	11.7	12.4	13.2	13.9	14.7	15.5	2:39
1200	10.2	11.2	12.1	13.1	14.0	14.9	15.8	16.7	17.6	18.5	3:10
1400	11.9	13.0	14.0	15.2	16.3	17.3	18.4	19.4	20.5	21.5	3:42
1600	13.5	14.8	16.0	17.2	18.5	19.6	20.9	22.0	23.3	24.5	4:14
1800	15.1	16.5	17.8	19.2	20.6	22.0	23.3	24.6	26.0	27.4	4:45

56. Determine the single engine driftdown speed and level off altitude for a 2 engine aircraft weighing 180 000 kg flying at FL320 with an OAT of ISA-15ºC. (See 5-28)

a) 269 KIAS and 20 000 ft
b) 174 KIAS and 20 000 ft
c) 269 KIAS and 19 100 ft
d) 174 KIAS and 19 100 ft

57. Given the air distance to the nearest airport is 500nm and OAT is ISA+15ºC. Determine the engine inoperative speed, altitude, time and fuel required for an aircraft weighing 160 000 kg flying at FL350. (See 5-28)

a) 254 KIAS, 22 600 ft, 1:21 hrs and 6 550 kg
b) 254 KIAS, 21 900 ft, 1:05 hrs and 5 200 kg
c) 254 KIAS, 21 900 ft, 1:21 hrs and 6 550 kg
d) 254 KIAS, 21 900 ft, 1:36 hrs and 7 900 kg

58. Given the distance to the nearest airport is 800nm with an 80 knot headwind and OAT of -20ºC. Determine the engine inoperative level off speed, altitude, time and fuel required for an aircraft weighing 170 000 kg at FL300. (See 5-28)

a) 262 KIAS, 21 200 ft, 2:39 hrs and 13 900 kg
b) 262 KIAS, 21 200 ft, 2:08 hrs and 11 200 kg
c) 262 KIAS, 19 700 ft, 2:08 hrs and 11 200 kg
d) 262 KIAS, 19 700 ft, 2:39 hrs and 13 900 kg

59. Given the following information, determine the minimum landing distance for a heavy jet transport aircraft with good braking conditions reported: (see table below & if required, other graphs/tables from this section)

Landing Weight – 145,000 KG.
Active Runway – Runway 23
Runway Elevation – 3540 feet A.S.L.
Temperature – (+ 28° C)
Approach Speed – VREF plus 10
Brake Configuration – MED
Tower Reported Wind – 290 degrees M at 20 kts.
Altimeter Setting – 29.72 (inches Hg.).
Runway Slope – Nil
Reverse Thrust – Normal

a) 6540
b) 7300
c) 7760
d) 8680

60. Given the following information, determine the minimum landing distance for a heavy jet transport aircraft with poor braking conditions reported: (see table below & if required, other graphs/tables from this section)

Landing Weight – 135,000 KG.
Active Runway – Runway 35
Runway Elevation – 1870 feet A.S.L.
Temperature – (+ 01° C)
Approach Speed – VREF plus 10
Brake Configuration – MAX Manual
Tower Reported Wind – 230 degrees M at 20 kts.
Altimeter Setting – 29.72 (inches Hg.).
Runway Slope – 1% down
Reverse Thrust – One Inoperative

a) 7650
b) 8100
c) 10020
d) 11860

Normal Configuration Landing Distance Flap 25 – Dry Runway

Good Reported Braking Action

LANDING DISTANCE AND ADJUSTMENT (FT)												
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ PER 10 KTS		SLOPE ADJ PER 1%		TEMP ADJ PER 10°C		VREF ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	150000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 150000 KG	PER 1000 FT ABOVE SEA LEVEL	HEAD WIND	TAIL WIND	DOWN HILL	UP HILL	ABV ISA	BLW ISA	PER 10 KTS ABOVE VREF25	ONE REV	NO REV
MAX MANUAL	3200	110/-60	80	-130	440	50	-40	80	-70	250	80	170
MED	6370	160/-160	190	-300	1040	0	-20	190	-190	710	0	0
LOW	7740	220/-220	250	-390	1360	170	-220	250	-230	580	480	620

Medium Reported Braking Action

MAX MANUAL	6030	170/-160	190	-330	1190	300	-230	180	-170	440	690	1660
MED	6670	180/-170	200	-350	1260	160	-100	200	-200	710	350	1100

Poor Reported Braking Action

MAX MANUAL	7790	240/-230	260	-480	1830	660	-440	250	-220	520	1450	3870
MED	7870	240/-220	260	-480	1840	610	-360	250	-230	660	1330	3760

61. CRFI (Canadian Runway Friction Index) readings are included in runway surface condition reports when runways are contaminated with...

a) rain, ice, slush or wet snow
b) ice and snow, slush or wet snow
c) rain, ice, packed snow or slush.
d) mist, rain, ice, slush or packed snow.

62. The following CRFI report was issued at 1400 GMT for the Lethbridge Airport:
CRFI YQL RWY 05/23 -5 .28 1400Z
Calculate the maximum recommended crosswind component that the pilot of a jet aircraft should accept for a landing on Runway 05. (See pages 5-32)

a) 13 kts.
b) 11 kts.
c) 8 kts.
d) 4 kts.

63. The CRFI reading at the Moncton Airport is given as .35 and the wind is blowing from 250 degrees (M). What would be the maximum wind speed that an aircraft should accept for landing on Runway 29 in this situation? (Refer to page 5-32)

a) 20 kts.
b) 16 kts.
c) 13 kts.
d) 11 kts.

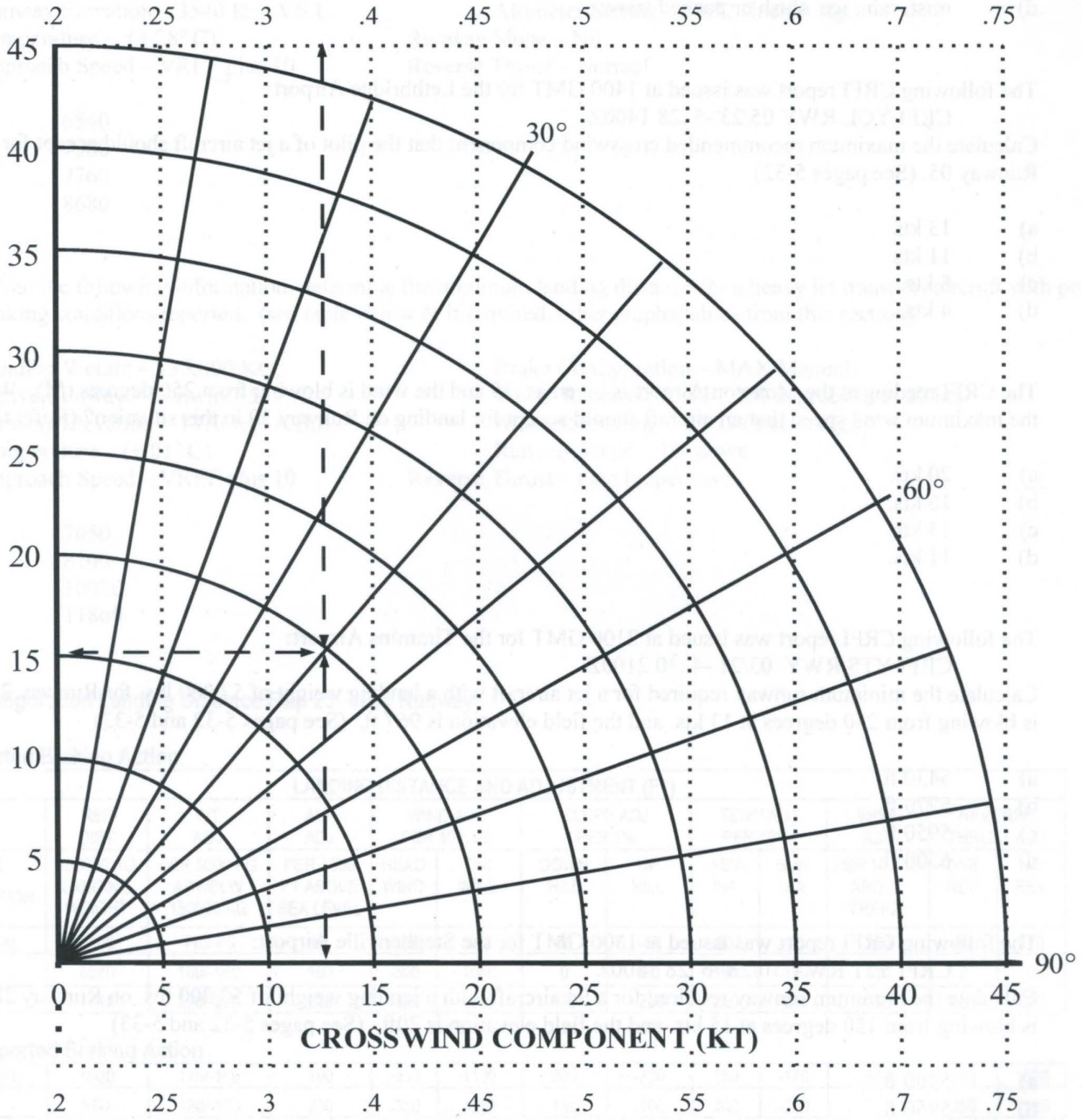
64. The following CRFI report was issued at 2100 GMT for the Timmins Airport:
CRFI YTS RWY 03/21 -4 .30 2100Z
Calculate the minimum runway required for a jet aircraft with a landing weight of 57,000 lbs. for Runway 21, if the wind is blowing from 250 degrees at 13 kts. and the field elevation is 967 ft. (See pages 5-32 and 5-33)

a) 5430 ft.
b) 5770 ft.
c) 5950 ft.
d) 6500 ft.

65. The following CRFI report was issued at 1800 GMT for the Stephenville Airport:
CRFI YJT RWY 10/28 -6 .28 1800Z
Calculate the minimum runway required for a jet aircraft with a landing weight of 50,000 lbs. on Runway 28, if the wind is blowing from 150 degrees at 15 kts. and the field elevation is 20ft. (See pages 5-32 and 5-33)

a) 5500 ft.
b) 5950 ft.
c) 6380 ft.
d) 6950 ft.

CROSSWIND LIMITS FOR CRFI



Canadian Runway Friction Index (CRFI) — Recommended Landing Distances

Reported Canadian Runway Friction Index (CRFI)														
Landing Distance Bare and Dry **Unfactored**	0.6	0.55	0.5	0.45	0.4	0.35	0.3	0.28	0.25	0.22	0.2	0.18	Landing Field Length Bare and Dry	
	Recommended Landing Distances (Dispatch Factors Removed) **95% Confidence Level**												**Dispatch Factors**	
													60%	**70%**
1800	3150	3260	3390	3550	3750	4000	4330	4490	4780	5150	5450	5820	3000	2571
2000	3540	3660	3810	3990	4210	4480	4840	5020	5320	5700	6000	6360	3333	2857
2200	3910	4050	4210	4410	4650	4940	5320	5500	5820	6200	6500	6860	3667	3143
2400	4260	4420	4590	4800	5060	5370	5770	5950	6280	6670	6970	7320	4000	3429
2600	4600	4770	4960	5180	5450	5780	6180	6380	6710	7100	7400	7740	4333	3714
2800	4920	5100	5300	5540	5820	6160	6580	6770	7110	7500	7800	8140	4667	4000
3000	5230	5420	5630	5870	6170	6520	6950	7150	7480	7870	8170	8510	5000	4286
3200	5530	5720	5940	6200	6500	6860	7300	7500	7840	8230	8520	8860	5333	4571
3400	5810	6010	6240	6500	6810	7180	7630	7830	8170	8560	8860	9180	5667	4857
3600	6080	6290	6530	6800	7120	7490	7940	8150	8490	8880	9170	9490	6000	5143
3800	6340	6560	6800	7080	7400	7790	8240	8450	8790	9180	9470	9790	6333	5429
4000	6600	6820	7070	7350	7680	8070	8520	8730	9080	9460	9750	10070	6667	5714

JET 60% Factored Landing Distance Required Flap 25

FPWT	ALTITUDE				
	SEA LEVEL	1000 FT	2000 FT	3000 FT	4000 FT
59 000	4150	4240	4350	4460	4570
58 000	4090	4190	4290	4400	4510
57 000	4030	4130	4230	4340	4440
56 000	3980	4070	4170	4280	4380
55 000	3920	4020	4110	4210	4320
54 000	3860	3960	4050	4150	4250
53 000	3800	3900	3990	4090	4190
52 000	3750	3840	3930	4020	4120
51 000	3690	3780	3870	3960	4060
50 000	3640	3720	3810	3900	4000
49 000	3580	3660	3740	3840	3930
48 000	3520	3600	3680	3780	3860
47 000	3460	3540	3620	3720	3800
46 000	3400	3480	3560	3660	3740
45 000	3350	3420	3500	3590	3670

CONDITIONS: ZERO WIND ZERO SLOPE

Increase landing distance by 150' for 1 degree downslope
Increase landing distance by 700' for 10 knot tail wind
Decrease landing distance by 150' for 10 knot head wind

66. The following information relates to a weight and balance computation for a business jet.

Aircraft Loading:	Weight (LB)	Arm (in)	Moment /1000
Basic Operating Weight	11,596	277.0	3,213
Passengers: Seats No. 1,2&3	510	____	
Seats No. 4&5	315	____	
Seats No. 6&7	350	____	
Seat No.	140	____	
Baggage:8 bags at 25 lbs. per	200	361.5	
Fuel: Wing and Fuselage Tanks -	_____	____	
Wing Tip Tanks -	_____	____	

If the fuselage and wing tanks only were full at the time of engine start-up and 21 IMP. gallons of fuel were consumed during taxi operation, the location of the C of G at take-off would be: (See pages 5-35 to 5-37)

a) 23.78% MAC
b) 25.42% MAC
c) 26.91% MAC
d) 28.98% MAC

67. The following weights are given for a typical business jet:

Empty Operating Weight - 11,640 lbs Crew (2 pilots) 360 lbs

You are field length limited to 18,700 lbs max. for take-off. 500 gallons of fuel are in the tanks. What would be the maximum payload under these conditions? (See pages 5-35 to 5-37)

a) 2,440 lbs
b) 2,500 lbs
c) 2,800 lbs
d) 3,160 lbs

68. The following weights are given for a typical business jet:

Empty Operating Weight - 11,380 lbs Crew (2 pilots) 360 lbs

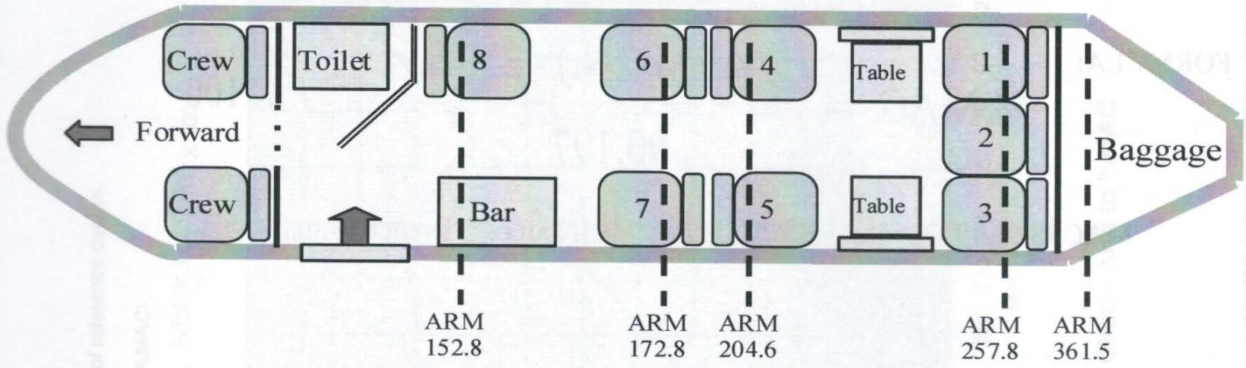
You are field length limited to 19,500 lbs maximum for take-off. 750 gallons of fuel are in the tanks. What would be the maximum payload under these conditions? (See pages 5-35 to 5-37)

a) 1,905 lbs
b) 2,760 lbs
c) 3,600 lbs
d) 7,760 lbs

69. If the aircraft's CG was 179" AFT of Datum and the Mean Aerodynamic Chord (MAC) is from 160" to 240" AFT of Datum, what would be the CG in terms of % MAC?

a) 17%
b) 24%
c) 27%
d) 31%

SMALL JET SEATING CHART



FUEL LOADING CHART
FUEL TAKEN AS 7.807 LB PER IMP. GALLON / MOMENTS ARE IN IN ./LB

FUSELAGE AND WING TANKS			FUSELAGE AND WING TANKS (cont'd)			FUSELAGE AND WING TANKS (cont'd)		
IMP. GAL	Wt. (LB)	MOM./1000	IMP. GAL.	Wt. (LB)	MOM./1000	IMP. GAL.	Wt. (LB)	MOM./1000
10	78	23	340	2,654	771	670	5231	1504
20	156	46	350	2,732	793	680	5309	1526
30	234	68	360	2,810	815	690	5387	1548
40	312	91	370	2,885	837	700	5465	1571
50	390	115	380	2,967	860	710	5513	1593
60	468	137	390	3,045	882	720	5621	1615
70	546	160	400	3,123	904	730	5699	1637
80	625	183	410	3,201	926	740	5777	1660
90	703	205	420	3,279	949	750	5855	1681
100	781	229	430	3,357	970	760	5933	1704
110	859	252	440	3,435	993	770	6011	1726
120	937	275	450	3,513	1015	780	6089	1749
130	1,015	298	460	3,591	1038	790	6168	1770
140	1,093	321	470	3,669	1059	800	6246	1793
150	1,171	343	480	3,747	1082	810	6324	1815
160	1,249	366	490	3,825	1104	820	6402	1838
170	1,327	389	500	3,904	1125	830	6480	1859
180	1,405	412	510	3,982	1148	840	6558	1882
190	1,483	435	520	4,060	1171	850	6636	1904
200	1,561	458	530	4,138	1193	860	6714	1926
210	1,639	480	540	4,216	1215	870	6792	1948
220	1,718	503	550	4,294	1237	880	6870	1971
230	1,796	525	560	4,372	1260	891	6956	2000
240	1,874	548	570	4,450	1281			
250	1,952	570	580	4,528	1304			
260	2,030	593	590	4,606	1326	**WING TIP TANKS**		
270	2,108	615	600	4684	1349			
280	2,186	638	610	4762	1370	50	390	110
290	2,264	659	620	4840	1393	100	781	221
300	2,342	682	630	4918	1415	150	1,171	331
310	2,420	704	640	4996	1438	192	1,499	423
320	2,498	727	650	5075	1459			
330	2,576	748	660	5153	1482			

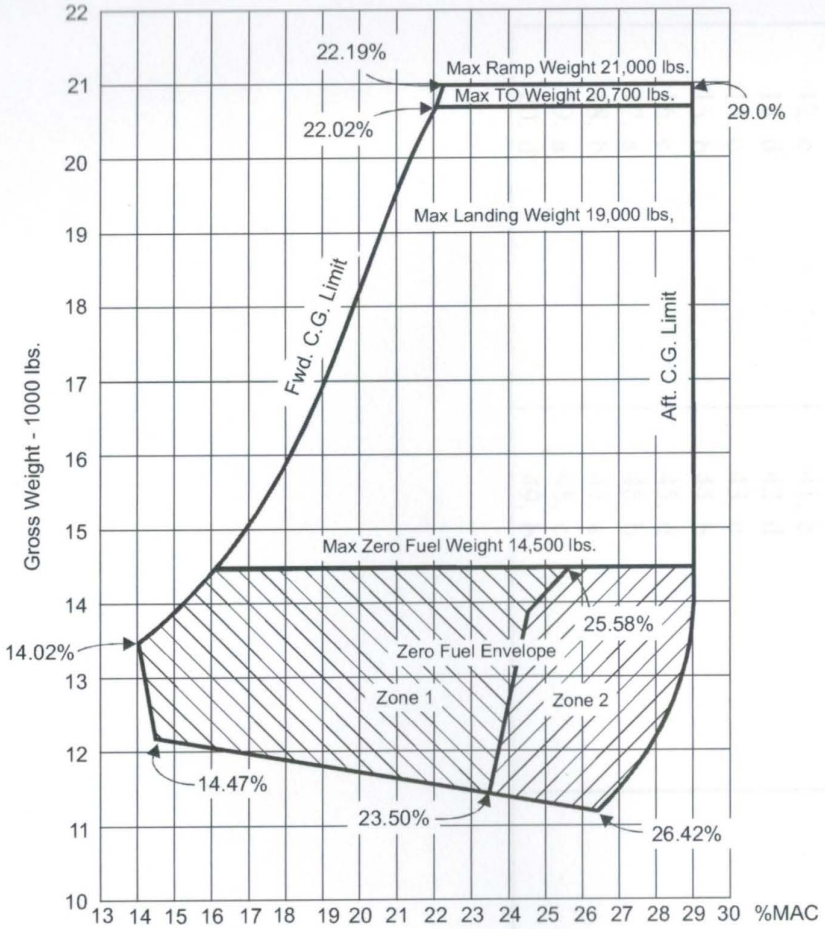
Conversion: Arm to %MAC:

FORMULA:

$$\%\,MAC = \frac{ARM\,(IN.) - 253.964}{90.197} \times 100$$

MAC IS 90.19 IN. LEMAC is 253.964 IN aft of reference datum.

Centre Of Gravity Envelope



Zone 1 If the Zero Fuel Weight falls within this zone - fuel can be loaded up to Max Ramp Wt. without exceeding C.G. Limits.

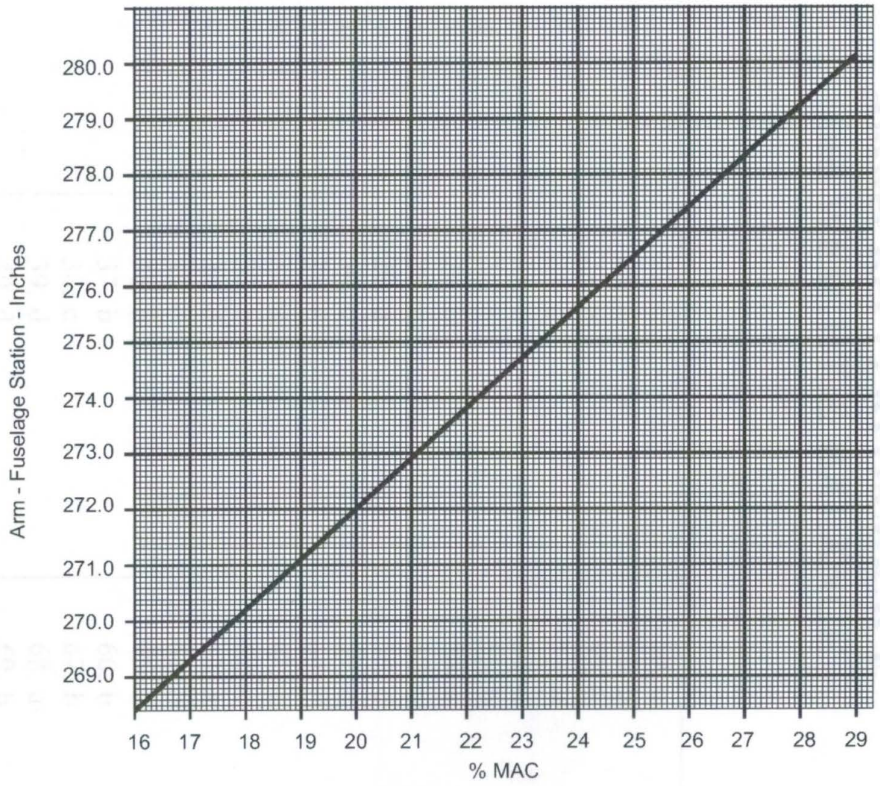
Zone 2 If the Zero Fuel Weight falls within this zone - the fuel quantity that may be added must be restricted such that at take-off the aft C.G. Limit is not exceeded.

MAC is 90.197 inches

L.E. of MAC is 253.964 in. aft of reference daturm.

Conversion Formula - Arm to %MAC:

$$\%MAC = \frac{ARM\ (in.) - 253.964}{90.197} \times 100$$



Conversion Chart - Arm to %MAC

Answer Key PERFORMANCE and WEIGHT & BALANCE

1. d
2. a
3. d
4. a
5.
   1) g
   2) h
   3) f
   4) a
   5) b
   6) c
   7) e
   8) i
   9) d
6. b
7. c
8. b
9. c
10. d
11. a
12. c
13. d
14. c
15. b
16. c
17. a
18. b
19. a
20. d
21. c
22. a
23. b
24. a
25. c
26. c
27. b
28. a
29. d
30. c
31. c
32. a
33. b
34. d
35. c
36. b
37. b
38. c
39. d
40. d
41. c
42. d
43. c
44. b
45. d
46. b
47. a
48. c
49. b
50. a
51. b
52. c
53. d
54. d
55. b
56. a
57. c
58. d
59. c
60. d
61. b
62. c
63. a
64. b
65. c
66. b
67. b
68. a
69. b

FLIGHT OPERATIONS & HUMAN FACTORS

1. One of the main advantages of the axial flow compressor type of gas turbine engine as compared to the centrifugal type is:

   a) comparatively small frontal area of the compressor
   b) lower weight
   c) increased efficiency over a wider RPM range
   d) ease of manufacture

2. That section of a turbine engine which extracts energy from the expanding high velocity combustion gases to drive the compressor section(s) and fan (or propeller) is the:

   a) diffuser section.
   b) turbine section.
   c) booster fan section.
   d) accessory drive section.

3. That component of a gas turbine engine which is located at the outlet side of a centrifugal compressor and whose function is to convert high velocity airflow into high pressure airflow for delivery to the combustion section is known as the:

   a) booster fan section.
   b) convergent delivery duct.
   c) planetary drive section.
   d) diffuser section.

4. The majority of the energy produced in the burner section of a turbojet engine is used for?

   a) Engine Thrust
   b) Hot Bleed Air
   c) Running the engine compressor
   d) Engine noise

5. In a turbo-fan engine, why is bypassed air more efficient at creating engine thrust?

a) Cooler bypassed air is more dense than hot exhaust air, therefore containing more energy
b) The burned fuel mixed with the core air does not produce usable thrust
c) It is not more efficient, the benefit to bypassed air is a reduction in noise
d) Since bypassed air is not used to rotate the compressor section of the engine it can produce more forward thrust

6. Engine N_1 and N_2 gauges are an indication of what?

a) The rotation rate of the compressor and turbine sections respectively, expressed as a percentage
b) Alternative ways of displaying Engine Pressure Ratio (EPR) on digital EFIS displays
c) Percentage of thrust the engine is producing (N_1) as compared to what it should be producing (N_2)
d) The rotation rate of the low and high pressure compressors respectively, expressed as a percentage

7. When starting a gas turbine engine the two primary gauges to observe are:

a) the low pressure compressor and the exhaust gas temperature.
b) the propeller RPM and the exhaust gas temperature.
c) the high pressure compressor and internal turbine temperature
d) the compressor turbine and the free turbine.

8. The relationship between the mass flow of cold air through the fan to the mass flow of the hot air through the turbine is known as the:

a) recovery ratio.
b) bypass ratio.
c) power extraction ratio.
d) engine pressure ratio.

9. What provides the rotational energy for an axial flow compressor in a turbojet engine?

a) The low pressure compressor obtains energy from the high pressure compressor which has a higher rotation rate
b) Electrical energy produced from a generator attached to the constant speed drive
c) The engine turbine using bleed air transferred through high stage bleed ducts
d) The engine turbine using energy from hot exhaust gases exiting the engine's burner section

10. What occurs in the burner section of a gas turbine?

a) Fuel is mixed with compressed air then ignited to create the energy needed to run the engine
b) The fuel/air mixture which enters the burner is ignited to create the energy needed to run the engine
c) Excess fuel not used to produce thrust is collected here and ignited in order to run the engine's compressor
d) Fuel is mixed with air and ignited before moving through the engine compressor and turbine

11. EPR (Engine Pressure Ratio) is correctly defined as:

a) the ratio of turbine discharge total pressure to the total pressure at the compressor inlet
b) the ratio of engine compressor discharge pressure to the engine inlet total pressure
c) the ratio of turbine inlet pressure to turbine discharge pressure
d) the ratio of fan section airflow to basic engine airflow

12. Compressor Stall is caused by:

a) the fuel control unit scheduling an inadequate fuel flow to the primary fuel nozzles
b) below normal internal temperatures at the power turbine section
c) excessive angle of attack on the compressor blades
d) stator blade warping when the engine is operating at a high EPR setting

13. In identifying a compressor stall condition, which of the following would be the predominant symptoms?

1) loud explosive bangs
2) high oil temperature
3) lower EGT or ITT readings
4) Lower Torque or N1 readings
5) higher than normal fuel
6) higher compressor readings flow
7) higher EGT or ITT readings
8) engine surging

a) 1,4,7,8
b) 1,3,5,8
c) 3,4,6,8
d) 2,4,6,7

14. The purpose of a compressor bleed valve in a gas turbine engine is to:

a) provide hot air for anti-ice purposes
b) maintain a constant pressure across compressor and turbine sections of the engine
c) regulate gas generator RPM during rapid acceleration of the engine
d) reduce the possibility of compressor stall

15. The stationary blade-type airfoil devices that are installed between each compressor stage in order to direct the airflow into succeeding stages at the optimum angle in an axial flow compressor are known as:

a) cascade vanes.
b) stators.
c) impeller blades.
d) diffuser vanes.

16. A "hung" or false start of a gas turbine engine is one in which:

a) the engine lights up, but the exhaust gas temperature exceeds the allowable limit for an engine start
b) the engine lights up normally, but the RPM, rather than increasing to idling speed, remains at some lower speed
c) too high a fuel flow was scheduled before the engine attained self-accelerating speed
d) the engine shaft bows preventing rotation of the compressors.

17. Which of the following statements is true with reference to an engine hot start?

a) The engine lights up normally, but the RPM, rather than increasing to that of idle speed, remains at some lower value.
b) The engine lights up normally however the exhaust gas temperature readings are higher than a normal start.
c) During the start the internal turbine temperatures exceed the maximum allowable limit potentially causing damage to internal engine components.
d) During the start the exhaust gas temperature exceeds the maximum allowable limit potentially causing damage to the engine cowlings and tail pipe.

18. When air is extracted from the compressor section for service functions such as air conditioning or anti-icing, then:

a) thrust will decrease and turbine temperature will decrease.
b) thrust will increase due to increased combustion chamber efficiency.
c) thrust will decrease and turbine temperature will increase.
d) thrust will increase and exhaust gas temperature will decrease.

19. Which of the following statements is true with reference to thrust reversers on turbofan engines?

a) Clamshell type reversers are mounted around the engine exhaust duct and can only re-direct the hot gases exiting from the hot section forward.
b) Target type reverses utilize target doors and turning vanes to redirect both hot and cold thrust forward.
c) On Cascade type reverses, blocker doors seal off the fan exit as a sleeve moves to expose the cascade vanes.
d) Variable Fan reverses adjust the pitch of the fan blades to re-direct the fan air forward.

20. On a low-bypass turbofan engine, how much of engine thrust is reversed when clamshell type engine reversers are deployed on landing?

a) 100%
b) Between 50% to 75% depending on aircraft design
c) The effectiveness of reverse thrust is dependent on aircraft velocity
d) There will always be some forward thrust produced with engine reversers deployed

21. On large turbofan engines reverse thrust is accomplished by which of the following?

a) Reverse thrust is accomplished by pivoting a number of target type blocker doors to deflect the fan airstream forward.
b) Target doors which are mounted on the rear section of the engine nacelle open to form a clamshell behind the engine diverting fan and hot exhaust air forward.
c) A translating sleeve moves rearward to move the blocker doors in to position and expose the cascade vanes. The blocker doors divert the fan air through the cascades accomplishing reverse thrust.
d) Both a and c

22. During "BETA" operation in a turbo-prop aircraft, power lever position

a) schedules the operation of the constant speed unit
b) controls both blade angle and fuel flow (Beta plus power range)
c) determines the amount of negative torque signal fed to the constant speed unit
d) automatically programs the amount of oil entering the pitch lock regulator

23. A turboprop power plant design known as a "FREE TURBINE" type is one in which:

a) there are two separate shafts - one to drive the compressor section and the other to transmit power to the reduction gearbox and thus turn the propeller
b) the reduction gearbox unit is mounted on the outside of the engine in order to isolate the turbine section
c) each axial stage in the compressor section is designed so as to act independently of the previous stage
d) the compressor turbine and the accessory drive turbine are allowed to rotate in opposite directions in order to reduce gearbox vibration

24. In an aircraft equipped with reversing-type propellers, undesired propeller reversing in flight is prevented by the installation of which of the following devices?

a) low pitch synchro-transducers
b) a high pitch bias actuator and associated blade angle detector
c) a high pitch governor
d) low pitch stops

25. In reference to a turbo-prop, constant speed operation is achieved by

a) using the exhaust air exiting from the power section to drive the power section.
b) using a series of reduction gears to reduce the turbofan speed to approximately 2000 RPM.
c) brining the condition levers to the appropriate setting for the phase of flight.
d) matching the propeller load to the gas turbine power produced.

26. What is the main function of an Electronic Engine Control (EEC) or an Electronic Control Unit (ECU)?

a) To act in a fuel metering capacity to provide accurate fuel flow information to the cockpit engine gauges.
b) To provide accurate power or thrust information to the engine power gauges in the cockpit.
c) To regulate engine fuel flow to maintain specific power settings as flight and environmental conditions change.
d) In fly by wire designed aircraft to transmit the desired power or thrust from the throttle quadrant to the fuel control unit on the engines.

27. APU's on aircraft are generally used for...

1. generation of electrical power
2. heating/air-conditioning of the aircraft on the ground
3. hydraulic system operation when the A/C is on the ground.
4. starting jet engines.
5. aircraft anti-icing systems on the ground

Select the following correct combination.

a) 1, 2, 5
b) 1, 3, 5
c) 2, 4, 5
d) 1, 2, 4

Takeoff Performance Flap 15
Dash 8 100

RUNWAY LENGTH SLOPE			15 5300 -0.10	33 5300 0.10
TEMP °C	TORQUE (LIMIT)	CLIMB LIMIT		
-18	92.0	34500	34370	34500
-16	92.0	34500	34370	34500
-14	92.0	34500	34370	34500
-12	92.0	34500	34370	34500
-10	92.0	34500	34370	34500
-8	92.0	34500	34370	34500
-6	92.0	34500	34350	34500
-4	92.0	34500	34270	34500
-2	92.0	34500	34190	34500
0	92.0	34500	34120	34500
2	92.0	34500	34040	34500
4	92.0	34500	39900	34500
6	92.0	34500	33930	34500
8	92.0	34500	33840	34500
10	92.0	34500	33750	34500
12	92.0	34500	33650	34500
14	92.0	34500	33580	34500
16	92.0	34500	33490	34500
18	92.0	34500	33420	34500
20	92.0	34500	33330	34500
22	92.0	34500	33230	34500
24	91.8	34500	33140	34500
26	89.7	34500	32860	34500
28	88.2	34500	32320	34500
30	86.3	34160	31780	34200
32	84.1	33520	30840	33700
34	83.3	33040	30790	33160
36	81.8	32440	30690	32460
38	80.0	31780	30370	31820
40	78.6	31300	29900	31330
42	77.2	30760	29370	30990
44	75.8	30200	28850	30470

Headwind ADD LBS/Knot			25	55
Tailwind SUB LBS/Knot			140	75
Acceleration Height		640		400

QNH Less than 29.92 SUB 50 LBS per .02 in Hg
QNH greater than 29.92 no correction
Maximum tailwind 10 kts.

28. The flex temperature for a gas turbine engine refers to:

a) The maximum operating temperature limit for maximum continuous power.
b) The maximum operating temperature limit for compressor turbine section of the engine.
c) The ambient air minimum starting temperature for the engine.
d) The assumed temperature used in calculating the reduced thrust settings for take-off.

29. If the current temperature at an airport is 12°C, what is the minimum torque setting that a flight crew could set for a Dash 8-100 for departure on runway 15 if the aircraft's gross take-off weight is calculated to be 30,350 lbs. (refer to page 6-6).

a) 80.0 %
b) 88.8 %
c) 92%
d) 100% is required if the runway is contaminated.

30. At the Castlegar airport the wind is favoring runway 33 and the temperature is -4°C. If the aircraft's gross weight at take-off is 33,100 lbs., what minimum torque setting could the flight crew set for the take-off roll? (refers to page 6-6).

a) 83.3 %
b) 84.1 %
c) 92.0%
d) 100% if the runway is contaminated.

31. What is the purpose of assumed temperature or de-rated takeoffs?

a) They reduce fuel consumption
b) They increase passenger comfort by slowing acceleration
c) They reduce engine noise for certain noise abatement procedures
d) They reduce engine wear

32. In a turbo-jet aircraft, how does switching engine bleed-air valves off for departure provide better takeoff performance?

a) No bleed-air allows for the pressurization outflow valve to close reducing drag
b) This only applies to aircraft that use bleed-air for wing anti-ice
c) Having bleed-air valves closed allows the engines to produce greater thrust
d) Switching bleed-air off moves engine compressor blades to higher compression levels

33. A bleed leak warning light illuminated in the cockpit could be an indication that there is a:

a) brake bleed line fluid leak, which could result in a primary brake system failure.
b) hydraulic air bleed system failure resulting low hydraulic system pressure due to lack of air pressure in the reservoir.
c) bleed air leak within air cycle compressor and expansion turbine resulting in a pressurization failure.
d) pneumatic air bleed leak which left unattended could result in a fire within the aircraft.

34. Which of the following statements best describes an aircraft pressurization system?

a) Bleed air from the engines is continually distributed to the cabin area, outflow valves control the amount of air allowed to escape to obtain the desired level of pressurization.
b) Bleed valves control the amount of bleed air allowed to enter the cabin area to obtain the desired level of pressurization.
c) Ram air is vented into the cabin area utilizing ram air turbines, outflow valves control the amount of air allowed to escape to obtain the desired level of pressurization.
d) Engine driven air cycle packs distribute air to the cabin area, inflow valves control the amount of air allowed to enter the cabin area to obtain the desired level of pressurization.

35. With respect to aircraft pressurization systems, identify which of the following statements is FALSE?

a) Modern aircraft pressurization systems start to pressurize the cabin during the take-off run at which time a descent would be noted on the cabin rate of climb/descent indicator.
b) The maximum cabin altitude of a pressurized aircraft should not normally exceed 12,500 feet ASL.
c) During a normal pressurized climb, following take-off, the cabin rate of climb would be less than the aircraft rate of climb.
d) If during descent the aircraft altitude becomes equal to the cabin altitude, the rate of descent of both the cabin and the aircraft will be the same.

36. What is the purpose of a safety out flow valve on an aircraft pressurization system?

a) To prevent too low a cabin differential pressure from being reached.
b) To vent cabin air overboard when cabin altitude is reached.
c) To prevent ambient air pressure from exceeding cabin pressure.
d) To prevent excessive pressure within the pressure vessel.

37. The maximum ratio of cabin air pressure to ambient air pressure that a pressurization system and aircraft pressure vessel can sustain is referred to as _____ .

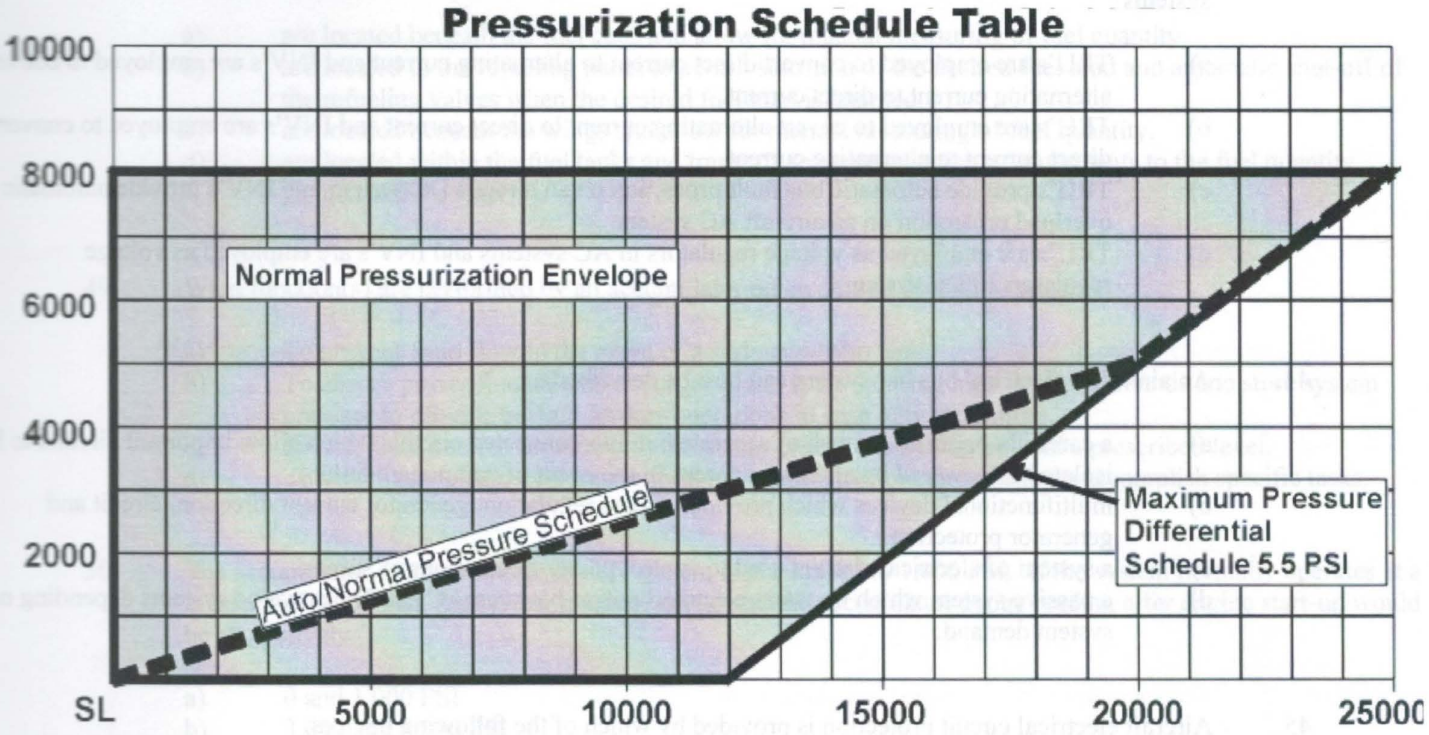
a) max cabin altitude.
b) max vessel pressure.
c) max ambient pressure.
d) max diff

38. With respect to aircraft pressurization systems, what is the purpose of a negative pressure relief valve?

a) To prevent the cabin differential pressure from becoming too low.
b) To vent cabin air overboard when cabin altitude is reached.
c) To prevent outside ambient air pressure from exceeding cabin internal pressure.
d) To prevent excessive pressure within the pressure vessel.

39. The pilot of a small turbojet aircraft cruising at FL330 wishes to descend and land at an airport that is 2,000 ft. ASL. The cabin altitude of the aircraft is 7,000 ft. ASL. If the jet descends at a rate of 2,500 ft. per minute, what rate of descent should the pilot set on the cabin rate selector to affect a cabin differential pressure of zero on landing?

a) 500 ft./min.
b) 400 ft./min.
c) 300 ft./min.
d) 200 ft./min.



40. With reference to the pressurization schedule table above what would the cabin altitude be if you were flying at 20,000 feet following the Auto/Normal aircraft pressurization schedule.

a) 8000 feet.
b) 5000 feet.
c) 2000 feet.
d) 1000 feet.

41. The pressurization system of a large commuter turbo-prop aircraft has been given a maintenance release for the auto mode part of the system provided it is operated in the manual mode only. What cabin altitude would you select, if your flight planned cruise altitude is 16000 feet and you wanted to obtain the maximum aircraft pressure differential?

a) 8000
b) 4000
c) 2500
d) 500 hundred feet above elevation.

42. A battery temperature overheat warning on the cockpit advisory panel could be an indication of a:

a) low battery voltage.
b) high battery voltage
c) battery thermal runaway
d) ground power failure causing battery depletion.

43. What functions do Transformer Rectifier Units (TRUs) and Inverters (INVs) perform on aircraft electrical systems?

a) TRU's are employed to convert direct current to alternating current and INV's are employed to convert alternating current to direct current.
b) TRU's are employed to covert alternating current to direct current and INV's are employed to convert direct current to alternating current.
c) TRU's provide automatic bus fault protection on an aircraft DC system and INV's provide automatic overload protection on an aircraft AC system.
d) TRU's are employed as voltage regulators in AC systems and INV's are employed as voltage regulators of DC systems.

44. An aircraft's electrical bus bar system can best be described as:

a) a carefully organized bunch of separate but interconnected circuits which allow important circuits to be isolated or powered by alternate sources in the event of component failure.
b) multifunctional devices which provide voltage regulation, generator current direction, circuit and generator protection.
c) a system of electrical circuits used to control power fluctuations or surges.
d) a passive system which transfers electrical power between AC and DC powered systems depending on system demand.

45. Aircraft electrical circuit protection is provided by which of the following devices.

1. Transformer Rectifier Unit (TRU)
2. Generator Control Unit (GCU)
3. Variable Frequency Generator (AC GEN)
4. Inverter (INV)
5. Circuit Breaker (CB)
6. AC and DC Emergency Busses (EMER BUS)

a) 1,2,6
b) 1,3,5
c) 2,5
d) 2,3,6

46. Many large turbine aircraft employ jet pumps to draw fuel into collector lines in order to ensure the high pressure fuel pump has enough fuel to supply the engine. These jet pumps are activated by:

a) high pressure fuel from the high pressure fuel pump.
b) electrical boost pumps located in the fuel tanks.
c) the hydromechanical fuel control unit.
d) direct drive from the engine accessory section.

47. Which of the follow statements is false with regards to capacitance fuel measurement systems?

a) It remains accurate in all phases of flight.
b) The system measures volume of fuel which is then converted to weight by the FMS computer.
c) Fuel measurement is achieved electrically without the need for moving parts by converting a capacitance measurement to an equivalent fuel measurement.
d) Depending upon the aircraft size there may be multiple fuel capacitance probes connected in parallel in each tank that assist with an average reading of fuel weight.

48. Magnasticks are fuel quantity measuring devices which:

a) are located beneath the fuel caps and allow for manual measuring of fuel quantity.
b) are located in the refueling panel to permit selection of the desired fuel load and automatic shut-off of the refueling valves when the desired fuel load is boarded.
c) are located beneath the wings and allow for manual measuring of fuel quantity.
d) are located within the fuel tanks and transmit accurate quantity measurements to the fuel quantity gauges in the cockpit.

49. What function(s) are performed by an accumulator on an aircraft hydraulic system?

a) To prevent fluid flow in the event of a serious system leak.
b) To absorb power fluctuations or surges in the system during high system demands and store system pressure to provide backup for key operations in case of pump failure.
c) Diverts fluid back to the reservoir as system pressure increases beyond a prescribed level.
d) To selectively channel hydraulic fluid to a component or components to accomplish specific tasks.

50. The accumulator of an aircraft hydraulic system is pre-loaded to 1,000 PSI. If the system normally operates at a pressure of 3,000 PSI, the system pressure gauge and the accumulator gauge reading after engine start-up would be respectively:

a) 0 and 1,000 PSI
b) 3,000 and 4,000 PSI
c) 3,000 and 3,000 PSI
d) 4,000 and 1,000 PSI

51. One method to compensate for variable system demands when one or more subsystems are activated on a hydraulic system is through the installation of _____ .

a) pressure control valves
b) fixed displacement hydraulic pumps
c) variable displacement hydraulic pumps
d) actuating cylinders

52. Which of the following statements best describe the operation of a typical anti-skid device?

a) As an aircraft begins to skid, pumping of the brakes initializes the anti-skid system to control brake pressure in order to obtain maximum stopping performance.
b) When the anti-skid control module detects that the wheel speed transducer velocity is lower than the reference speed velocity, a brake release signal is commanded.
c) When a wheel speed transducer detects a rapid deceleration, a signal is sent to the normal brake metering valve so that a constant metered pressure is applied to the brakes.
d) When the anti-skid control module detects a rapid deceleration in wheel speed, a signal is sent to the anti-skid warning system to advise the crew that a full skid condition is imminent.

53. Which of the following statements is true with reference to an anti-skid system's lock wheel and touchdown protection?

a) Lock wheel protection is implemented to automatically brake the main gear wheels following selection of landing gear retraction.

b) Lock wheel protection prevents tire scuffing by commanding full brake release following a bounced landing.

c) Touchdown protection is implemented when a skid condition is detected within 5 seconds after main gear compression.

d) Touchdown protection prevents inadvertent brake application prior to wheel spin up on low friction runways.

SAMPLE MEL BELOW IS FOR TRAINING PURPOSES ONLY

1. SYSTEM & SEQUENCE NUMBERS	ITEM		2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS OR EXCEPTIONS
71-1	Engine Intake Bypass Doors	C	2	1	(O) One may be inoperative in the closed position provided the flight is not conducted in known or forecast icing conditions.
			2	0	(M) (O) May be inoperative in the open position provided: a)OAT along the route flown is less than ISA + 25 degrees C, b)Related engine oil temperature indicator is operative and is monitored,and c)Associated engine intake heater is verified operational before each departure into known or forecast icing conditions

Inoperative Engine Intake Bypass Door(s) must be placarded in the flight compartment.

Operating procedures

Case 1 (Engine Intake Bypass door Closed).

1. Ensure aircraft is not dispatched into known icing conditions.

Case 2 (Engine Intake Bypass Door Open).

1. The OAT (outside air temperature along the route of flight is less than ISA + 25° C)

2. Start and run the associated engine(s) to ground idle. Check that engine oil temperature, when stabilized, is in the normal range (GREEN ARC) on ENG OIL indicator.

3. Shut down associated engine(s).

4. Monitor engine oil temperature during flight.

Maintenance Procedures

Case 1 (Engine Intake Bypass door Closed).

1. **Placard ENGINE INTAKE BYPASS DOOR panel in flight compartment.**
2. **Make appropriate entry in the journey log**

Case 2 (Engine Intake Bypass Doors Open).

1. **Start associated engine(s) and run to ground idle.**
2. **Ensure all busses are powered**
3. **Select VARABLE FREQUENCY switch, at AC SYSTEM power monitor panel, to 115 VAC electrical bus associated with inoperative Engine Bypass Door and monitor load.**
4. **Check that OAT outside air temperature is below 7° C**
5. **Press associated OPN/HTR switch on ENGINE INTAKE BYPASS DOOR panel and check that:**
   a. **associated HTR light at ENGINE INTAKE BYPASS DOOR panel illuminates; and**
   b. **selected VARIABLE FREQUENCY LOAD reading is decreasing.**
6. **Press associated CLOSED switchlight on ENGINE INTAKE BYPASS DOOR panel and check that:**
   a. **associated HTR light at ENGINE INTAKE BYPASS DOOR panel illuminates; and**
   b. **selected VARIABLE FREQUENCY LOAD reading is decreasing.**
7. **Shut down engine(s)**

54. With reference to MINIMUM EQUIPMENT LISTS (MEL) which of the following statement is true?

a) A Master Minimum Equipment List (MMEL) is the basis for development of individual operator MELs which take into consideration the operator's particular aircraft equipment configuration and operational conditions.
b) Any equipment not listed in an MEL, which is related to the airworthiness or operating regulations of the aircraft must be operative.
c) An MEL is intended to permit operation with inoperative items of equipment for a period of time until repairs can be accomplished. It is important that repairs be accomplished at the earliest opportunity.
d) All of the above.

55. If a Category B item is deferred under the Minimum Equipment List on May 2 at 1800Z, when would the MEL expire?

a) At 1800Z on May 5
b) At 0000Z on May 6
c) At 1800Z on May 6
d) At 0000Z on May 5

56. Referring to the sample MEL above which of the following statements is true.

a) With the engine bypass doors in the open position the flight can be operated unrestricted.
b) The aircraft may be operated unrestricted with one engine bypass door inoperative during the summer months only.
c) The aircraft may be flown with both engine intake bypass doors inoperative in the open position, provided it is done in accordance with the operating and maintenance procedures.
d) A maintenance release is not required to depart if the aircraft is not going to be flown in icing conditions.

57. Upon reviewing the logbook for a large turbo-prop aircraft, a flight crew ascertains that one Engine Intake Bypass Door is unserviceable in the open position. After reviewing MEL 71-1 and noting that icing conditions are forecasted along their intended routing, the crew determines...(see pages 6-12 & 6-13)

a) that maintenance personnel must conduct an engine intake heater test prior to each departure from any aerodrome along their intended routing.
b) that either the flight crew or maintenance personnel can perform the engine intake heater test prior to departure from any aerodrome along their intended routing.
c) that the flight crew only has to monitor the engine oil indications once maintenance personnel has tested the Engine Intake Bypass Door heater on the first flight of the day.
d) that maintenance personnel must conduct an engine intake heater test prior to each departure from an aerodrome where there is a maintenance base along their intended routing.

58. INDUCED drag is:

a) proportional to the square of the speed
b) proportional to the product of the coefficient of skin friction and the length of the mean camber line
c) inversely proportional to the square of the speed
d) directly proportional to the product of the speed and the square of the wingspan section

59. When operating an aircraft in the slow flight speed range, the required power is greater than that for endurance because:

a) more of the aircraft's total weight is acting along the longitudinal axis
b) the L/D ratio is reduced, and the drag increased
c) greater deflection of elevator control surface is causing a reduced downwash and a distorted boundary layer
d) the L/D ratio is increased, and the drag is increased

60. In order to obtain maximum range in a constant wind condition, a pilot who is flying a turbojet aircraft at near optimum altitude and at the recommended airspeed should:

a) maintain airspeed and reduce power as the fuel weight decreases due to burn-off
b) reduce power and indicated airspeed as fuel weight decreases
c) maintain a constant power setting and allow the indicated airspeed to attain the maximum allowable value
d) fly at an airspeed which corresponds to 0.66 x L/D max. x V^2

61. Which of the following features will improve the lateral stability of an aeroplane?

a) wing dihedral.
b) a yaw damper system.
c) servo tabs.
d) a differential aileron system.

62. An aircraft having wings with a pronounced DIHEDRAL encounters turbulence which causes one wing to lower. Before the dihedral design feature can provide the forces needed to restore the original "wings-level" position:

a) the aircraft must initiate a turn towards the "raised" wing
b) the aircraft must develop a sideslip towards the "dropped" wing
c) the aircraft must develop a yawing movement towards the "raised" wing
d) the aircraft must initiate a skid towards the "dropped" wing

63. If the C of G of an aircraft is at the most aft limit, what would be the effect on the stability of this aircraft:

a) increased longitudinal stability about the lateral axis.
b) increased lateral stability about the longitudinal axis.
c) decreased longitudinal stability about the lateral axis.
d) decreased lateral stability about the longitudinal axis.

64. An aircraft has greater longitudinal stability when:

a) the centre of pressure is forward of the C of G
b) the wings have a high angle of incidence
c) the C of G is well forward of the centre of pressure
d) the wings have a high dihedral angle

65. Why is having a moving horizontal stabilizer a more effective way of trimming large aircraft?

a) At high speeds it provides more longitudinal stability and a higher Critical Mach Number
b) It allows for a greater center of gravity range and reduces drag in flight
c) At low speeds the elevator is not a large enough control surface to effectively control aircraft pitch
d) At high speeds the elevator is not a large enough control surface to effectively control aircraft pitch

66. An aircraft in a constant descent, weight will equal:

a) Vertical component of lift and drag
b) Vertical component of lift only
c) Lift perpendicular to the flight path
d) Resultant of lift and thrust

67. A turbojet departing from an airport with a high elevation would have what affect on the takeoff airspeeds and distance?

a) There would not be an affect on airspeeds or takeoff distance.
b) V1 & Vr speeds and the takeoff distance would increase.
c) The takeoff distance would increase but V1, Vr and V2 would remain the same.
d) VR and V2 speeds would increase.

68. Wing tip vortices of MINIMUM strength would be developed by an aircraft:

a) flying at a low speed, having a short wing span, and with a clean configuration
b) flying at a high speed, having a long wing span, and with a clean configuration
c) flying at a low speed, having a long wing span, and with a landing configuration
d) flying at a high speed, having a short wing span, and with a clean configuration

69. With respect to departing aircraft, it is known that vortex generation is most severe:

a) in that airspace immediately following the point of rotation
b) during the initial acceleration period following the application of take-off thrust
c) at that moment when the aircraft climbs through an altitude equal to three times its wing span
d) during the third segment of the aircraft's take-off flight path profile

70. Wake turbulence research has disclosed that wing tip vortices of maximum strength are generated by aircraft operating under conditions of:

a) high gross weight, clean configuration and high speed
b) low gross weight, landing configuration and low speed
c) high gross weight, clean configuration and low speed
d) low gross weight, landing configuration and high speed

71. Considering flight in turbulent conditions at a given airspeed, what will the effect of a decrease in aircraft gross weight be:

a) acceleration forces will be higher
b) positive acceleration forces will be higher while negative acceleration forces will be lower
c) acceleration forces will be lower
d) acceleration forces will show no appreciable variation

72. The speed of sound in the atmosphere is solely dependent upon:

a) air temperature
b) true altitude
c) pressure altitude
d) the number of ionized particles present in a given volume of air

73. Within which of the following Mach ranges does the **transonic** flight regime usually occur?

a) 1.20M to 2.25M.
b) 0.85M to 1.50M.
c) 0.75M to 1.20M.
d) 0.50M to 1.15M.

74. The type of airflow normally present within the **transonic** regime of flight is:

a) subsonic and hypersonic.
b) transonic and supersonic.
c) supersonic and hypersonic.
d) subsonic and supersonic.

75. As airflow passes through a shock wave, pressure, temperature and velocity are affected. Which of the following statements would be correct?

a) pressure increases, temperature decreases, velocity decreases
b) pressure decreases, temperature increases, velocity increases
c) pressure decreases, temperature decreases, velocity increases
d) pressure increases, temperature increases, velocity decreases

76. How does Critical Mach Number (M_{CRIT}) change with air temperature?

a) As air temperature increases M_{CRIT} increases
b) As air temperature decreases M_{CRIT} decreases
c) Air temperature has no effect on Critical Mach Number
d) Critical Mach Number will increase only when temperatures are below ISA

77. Critical Mach Number may be defined as:

a) the Vmo structural limit of an aircraft at high altitudes.
b) the speed at which supersonic airflow covers the entire wing area of an aircraft.
c) the speed at which compressibility effects begin.
d) The highest airspeed at which airflow over any part of the aircraft first reaches (but does not exceed) Mach 1.0.

78. Limiting Mach Number may be defined as:

a) the speed at which supersonic airflow covers the entire wing area of an aircraft.
b) the Mach speed at which a shock wave first appears on the aircraft.
c) the maximum operating speed of an aircraft in relation to the speed of sound.
d) the speed at which boundary layer separation first occurs.

79. Which of the following statements is NOT true with respect to the Mach Meter?

a) This instrument contains an airspeed capsule and an altitude capsule.
b) Temperature and density errors occur and must be corrected by using a flight computer.
c) This instrument calculates the ratio between the aircraft's TAS and the local speed of sound.
d) The same Mach number can occur at markedly different indicated air speeds.

80. In high speed aircraft, SWEEPBACK design is utilized to:

a) prevent wing tip stalling at approach speeds
b) increase Critical Mach Number
c) prevent aileron control reversal during transonic flight
d) prevent Mach Tuck

81. An undesirable effect of Sweepback design in a jet aircraft is:

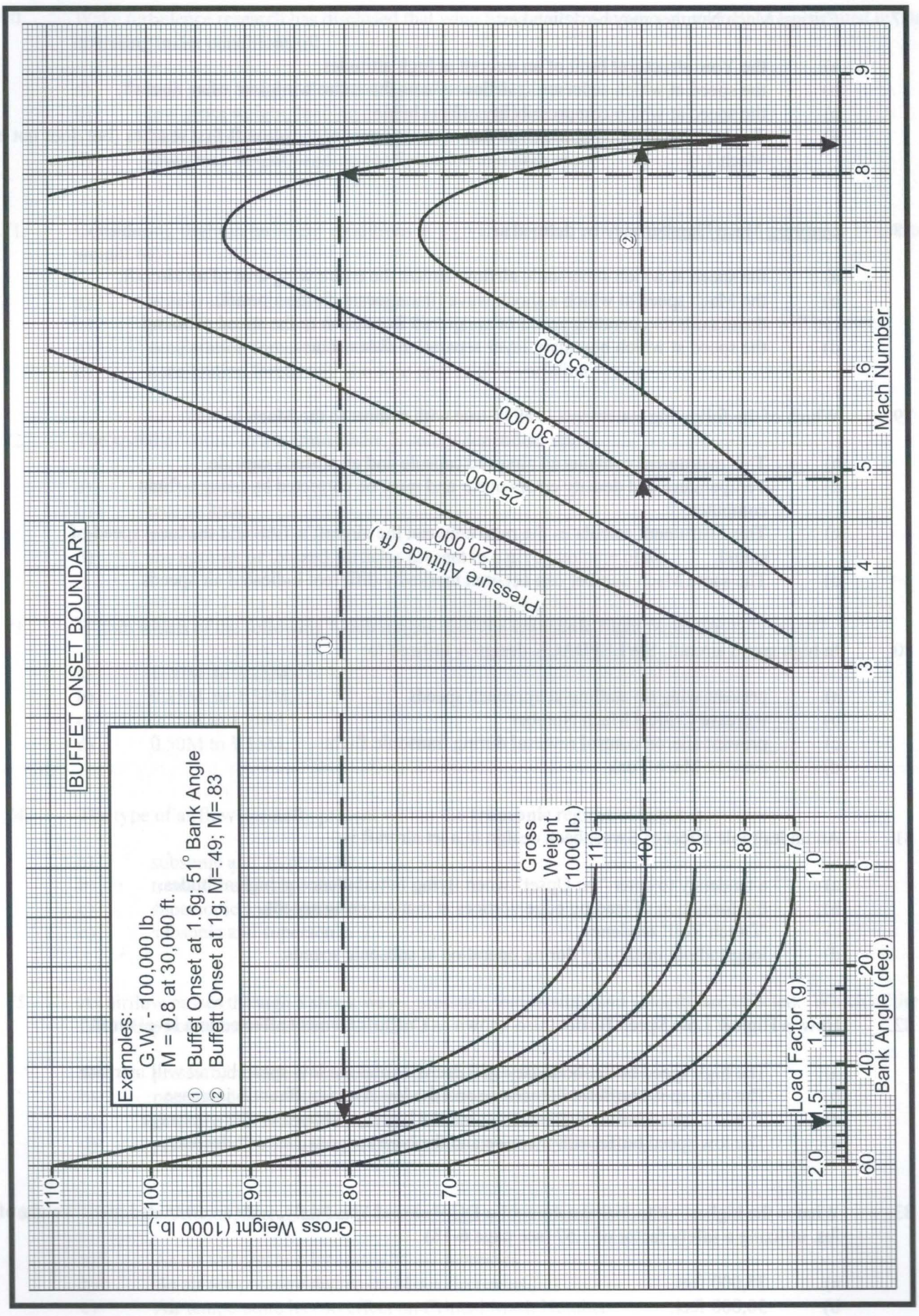
a) a tendency to enter "Jet Upset" when flying in turbulence at high altitudes.
b) the formation of leading edge vortices at maneuvering speeds.
c) "Dutch Roll" tendency.
d) longitudinal instability during operation at subsonic speeds.

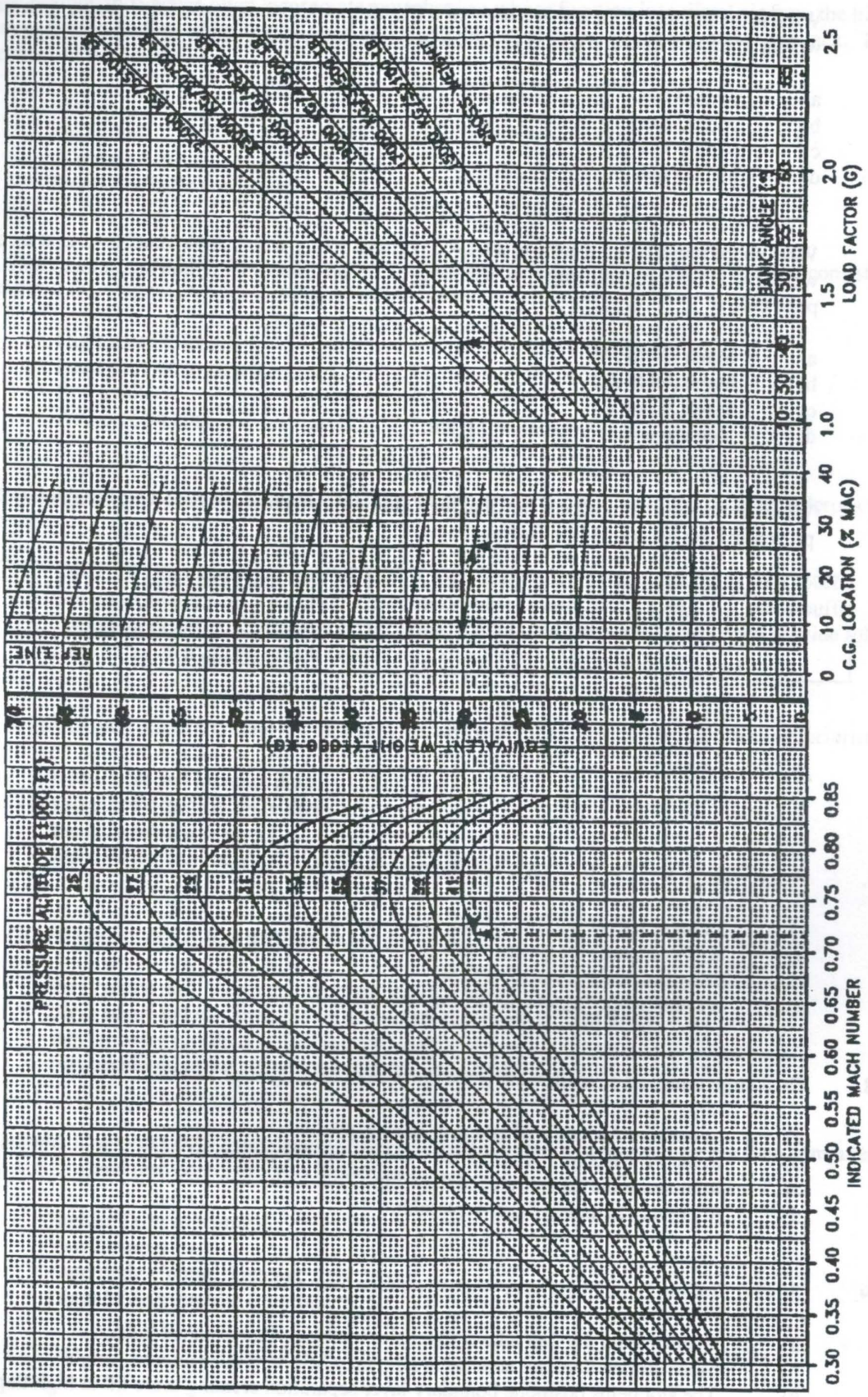
82. How is High & Low Speed Buffet (also known as Coffin's Corner) affected in a level turn?

a) The high speed buffet boundary will decrease and the low speed buffet will increase
b) The high speed buffet will increase and the low speed buffet will increase
c) The low speed buffet will increase, but the high speed buffet will not change
d) The low speed buffet will increase and the high speed buffet will decrease

83. What is the highest altitude that a crew of a DC-9 aircraft should fly, with an estimated gross weight of 100,000 lbs. utilizing a safety factor of 1.5? (see page 6-18)

a) 35,000 feet.
b) 30,000 feet.
c) 25,000 feet.
d) 20,000 feet.


BUFFET ONSET BOUNDARY
Examples:
G.W. - 100,000 lb.
M = 0.8 at 30,000 ft.
① Buffet Onset at 1.6g; 51° Bank Angle
② Buffett Onset at 1g; M=.49; M=.83
Gross Weight (1000 lb.)
110
100
90
80
70
Pressure Altitude (ft.)
20,000
25,000
30,000
35,000
.3
.4
.5
.6
.7
.8
.9
Mach Number
Gross Weight (1000 lb.)
110
100
90
80
70
Load Factor (g)
.5
1.0
1.2
1.4
2.0
0
20
40
60
Bank Angle (deg.)



CRUISE MANEUVERING SPEED

04

84. What is the highest altitude that a crew of a CL-65 should fly on a scheduled flight, with an estimated gross weight of 25,000 kgs. and a C of G 15% MAC utilizing a safety factor of 1.4 ? (see page 6-20)

a) 33,000 feet.
b) 35,000 feet.
c) 37,000 feet.
d) 39,000 feet.

85. What speed range could a crew of a CL-65 regional jet fly with a 25% MAC C of G at an estimated gross weight of 23000kgs., utilizing a safety factor of 1.5 for forecasted turbulence at an altitude of 39,000 feet? (see page 6-20)

a) Mach .74 to .78
b) Mach .68 to .82
c) Mach .61 to .85
d) You are unable to climb to FL390

86. When jet transport aircraft are flown at high altitudes, which of the following factors should be considered in preventing the onset of Mach Buffet.

1) Aircraft Weight	5) Fuel Loading
2) Angle of Bank	6) Upper Level Winds
3) Temperature	7) Turbulence Gust Loads
4) Mach Crit Speed	8) Altitude

a) 1,2,6,7
b) 1,3,6,8
c) 2,3,5,7
d) 3,4,5,8

87. Wing VORTEX GENERATORS are employed on jet aircraft to:

a) increase lateral stability during high speed cruise
b) improve control response while in the approach configuration
c) delay boundary layer separation
d) prevent Mach "tuck" and "roll-off" at transonic speeds

88. On a large transport aircraft, what is the purpose of leading-edge flaps?

a) to increase the angle of attack at low airspeeds
b) to increase the coefficient of lift by changing the camber of wing
c) to increase the aspect ratio of the wing
d) to prevent boundary layer separation

89. Slotted Trailing Edge Flaps have what advantage over plain flaps?

a) A slot within the flap allows for easier locating of mechanical linkages
b) Since slotted flaps are smaller in size, they help to reduce aircraft weight
c) The slot helps postpone boundary layer separation creating more lift at high flap settings
d) Slotted flaps do not have an advantage over plain flaps

90. High performance wings often incorporate a mechanism whose function is to direct air from the high pressure area under the leading edge through a slot and along the top of the wing at high angles of attack. This mechanism is known as a:

a) slat.
b) spoileron.
c) Krueger flap.
d) boundary layer energizer.

91. _____are installed on the upper wing surfaces directly forward of the flaps and consist of panels that assist the ailerons in obtaining maximum roll rates.

a) High speed ailerons
b) Load alleviation devices.
c) Roll spoilers
d) Aileron trim tabs

92. Why do aircraft with inboard and outboard ailerons restrict the movement of the outboard ailerons at high speeds?

a) Outboard ailerons are too small to have a significant effect on roll control at high speeds
b) Outboard ailerons have a greater effect on Coffin's Corner, particularly low speed buffet
c) In addition to reducing stresses on the wing, the inboard aileron is sufficient to provide roll control
d) Restricting aileron movement helps to increase Critical Mach Number

93. On large transport aircraft ground spoilers provide which of the following aerodynamic characteristics?

a) Reduce lift and increase drag.
b) Increase lift and decrease drag.
c) Increase lift and drag.
d) Increase the camber of the wing to produce more lift.

94. Which of the following is true with respect to winglets?

a) they reduce profile drag but increase induced drag
b) they reduce induced drag but do cause some increase in form drag.
c) they increase profile drag and induced drag
d) they increase induced drag but reduce parasite drag

95. An automatic system on large transport category aircraft which utilize inputs from air data computers to provide yaw damping and turn coordination is known as a:

a) Rudder Trim Actuator
b) Yaw Damper
c) Auto Fight Control System
d) Digital Flight Rudder Controller

96. One of the main advantages of CANARD design is:

a) a reduction of "Dutch Roll" tendency
b) a delay of boundary layer separation
c) a reduced stall speeds
d) an increase in critical mach number

97. The calibrated airspeed corrected for adiabatic compressible flow for a certain altitude is known as:

a) True Airspeed
b) Rectified Airspeed
c) Absolute Airspeed
d) Equivalent Airspeed

98. Which of the following air conditions would provide the highest indicated airspeed?

a) cold, moist.
b) hot, humid.
c) cold, dry.
d) hot, dry.

99. The following information relates to a turbojet aircraft cruising at FL330:

Indicated Airspeed:	267 kts.
Indicated Outside Air Temperature:	–28°C
Instrument & Position Error:	+8 kts.
Temperature Rise	+20°C
Compressibility Error:	-13 kts.

The computed True Air speed is:

a) 456 kts
b) 477 kts.
c) 427 kts.
d) 433 kts

100. An aircraft is cruising at FL370 at a T.A.S. of 470 kts.. If the speed of sound at that altitude is 580 kts., what is the Mach No.?

a) 0.78
b) 0.81
c) 0.91
d) 1.00

101. The following wind report relates to a westbound flight of a small business jet aircraft:
274045
How long would this aircraft take to cover a distance of 150 N.M. if it cruised at .83 Mach?

a) 31 mins.
b) 25 mins.
c) 20 mins.
d) 17 mins.

102. Hydroplaning is a phenomenon that occurs when a tire loses contact with the runway surface due to a buildup of water between the tire and the runway. Hydroplaning is a function of:

a) the square of the tire pressure.
b) the gross weight of the aircraft.
c) the number and size of the aircraft tires.
d) the speed of the airplane, tire pressure and water depth.

103. Which of the following statements is true with reference to dynamic hydroplaning?

a) It may occur when a runway is contaminated by a thin film of water.
b) It normally occurs with a thin film of water on smooth runways or where rubber deposits are present causing the tire to loose partial contact with the runway.
c) The tire lifts off the pavement and rides on a wedge of water which causes wheel rotation to stop. It normally does not occur unless a severe rain storm is in progress.
d) It occurs when heat is generated during a locked wheel condition, which causes the tire to revert back to its chemical properties.

104. A small executive jet aircraft has a main wheel pressure of 135 PSI, and a nosewheel pressure of 45 PSI. Which of the following statements about hydroplaning would be correct?

a) the main wheels will hydroplane at a lower speed than the nosewheel
b) the nosewheel will hydroplane at a lower speed than the main wheels
c) both the nosewheel and main wheels will hydroplane at the same speed
d) the main wheels will only hydroplane in a crosswind situation and the nosewheel will only hydroplane in a turn

105. An aircraft that is flying an ILS approach initially in a headwind situation encounters an abrupt wind shear zone which involves a headwind to a calm wind shear. Which of the following represents the power management required to track the 3 degree glide slope at a constant airspeed during the conditions given?

a) Initially, a higher than normal power setting followed by a further power increase as the shear is encountered; then a reduction in power to stabilize on glide slope.
b) Initially, a lower than normal power setting followed by a further power decrease as the shear zone is encountered; then an increase in power to stabilize on glide slope.
c) Initially, a higher than normal power setting followed by a decrease at the shear zone; then an increase when on glide slope.
d) Initially, a lower than normal power setting followed by an increase at the shear zone; no further power change required.

106. Aircraft are not certified to successfully complete a go-around without ground contact once it has entered the low-energy landing regime. Which of the following is not a characteristic of the low energy landing regime?

a) Aircraft flaps and landing gear are in the landing configuration
b) Airspeed is stable at Vref + wind additive
c) Aircraft height is at 50 feet (representative depending on type) or less above the runway elevation
d) Aircraft is in a descent

107. When a constant headwind component shears to a calm wind, the initial cockpit indications to a pilot would be:

a) aircraft pitches up; altitude and indicated airspeed increase
b) aircraft pitches down; altitude and indicated airspeed decrease
c) aircraft pitches up; indicated airspeed decreases; altitude increases
d) aircraft pitches down; altitude decreases; indicated airspeed increases

108. On take off you encounter vertical wind shear. What actions should be taken with the aircraft with respect to angle of attack and airspeed?

a) Increase the angle of attack to 10° nose up
b) Ease the nose forward to increase the airspeed
c) Set full power and increase the angle of attack to achieve an airspeed just above the stick shaker.
d) Set the power and angle of attack to achieve turbulent penetration speed

109. An aeroplane flying at a given altitude experiences a complete blockage of its static air source. If the aeroplane were to depart from that altitude, the airspeed indicator would:

a) over-read during either descent or climb
b) show no change during any change of altitude
c) under-read during either descent or climb
d) under-read during a climb and over-read during a descent

110. The pendulous unit and the vanes of a pressure-driven attitude indicator are responsible for the acceleration errors noticeable during the take-off phase of flight. The false indications presented to the pilot are:

a) a false left bank
b) a false right bank
c) a false climb
d) a false descent

111. In transport category aircraft the importance recognizing a stall in flight is paramount to flight safety. Which of the following will always occur in an aerodynamic stall?

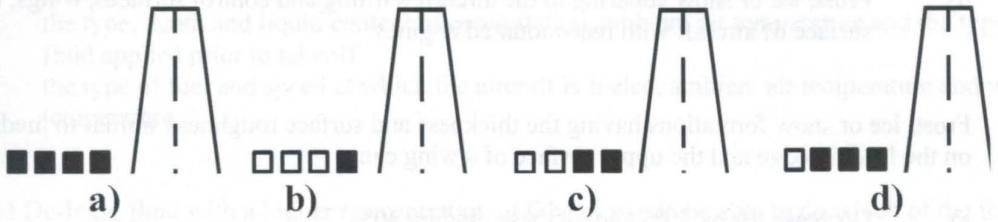
1) Buffeting
2) High G loads
3) Slow speed
4) Lots of aerodynamic noise
5) Stall warning systems will always activate.
6) The aircraft will always descend
7) Stall warnings can sometimes be mistaken for high speed warnings.

a) 1, 4, 6
b) 4, 5, 6
c) 1, 3, 5
d) All six answers are correct

112. Your approach is such that you arrive over the landing threshold with a higher than normal airspeed. Which technique should you use to achieve the shortest landing ground roll?

a) set the aircraft down normally and use aerodynamic braking
b) let the aircraft float until the normal touchdown speed is achieved then use medium braking
c) set the aircraft down as soon as possible and use maximum braking
d) flare the aircraft slightly lower than normal and apply the brakes before touchdown

113. An aircraft flying an approach to a runway with a PAPI (Precision Approach Path Indicator) system would have which of the following indications, if it was slightly above the approach slope?



114. What are the minimum PAPI Approach Slope Indicator System Safe Obstruction Clearance Area dimensions?

a) 6 degrees on either side of the extended runway centreline out to 4 NM from the threshold.
b) 4 degrees on either side of the extended runway centreline out to 4 NM from the threshold.
c) 4 degrees on either side of the extended runway centreline out to 6 NM from the threshold.
d) 6 degrees on either side of the extended runway centreline out to 6 NM from the threshold.

115. Which of the following is a low intensity approach lighting system?

a) MALSF
b) LIAL
c) MALSR
d) SSALS

116. What do each of the following ground marshalling signals indicate?

a) Gate identification, straight ahead and start right engine.
b) Proceed to next wing walker, straight ahead and left engine fire.
c) Release brakes, slow down and start left engine.
d) Gate identification slow down and right engine fire.

117. " The Clean Aircraft Concept" refers to:

a) The in-flight use of aircraft de-icing and anti-icing equipment.
b) De-icing and anti-icing fluids application principals.
c) Takeoff being prohibited when frost, snow or ice is adhering to any critical surface of the aircraft.
d) An Air Carrier's operating philosophy with regards to passenger public relations.

118. What is the definition of critical surface contamination?

a) Ice or snow adhering to the aircraft's wings or tail.
b) Frost, ice or snow adhering to the aircraft's engines, wings, tail or landing gear.
c) Frost, ice or snow adhering to any part of the aircraft.
d) Frost, ice or snow adhering to the aircraft's lifting and control surfaces, wings, tail or upper fuselage surface of aircraft with rear-mounted engines.

119. Frost, ice or snow formations having the thickness and surface roughness similar to medium/coarse sand paper on the leading edge and the upper surface of a wing can:

a) Decrease lift by 30% and increase drag by 40%
b) Decrease lift by 10% and increase drag by 20%
c) Decrease lift by 40%
d) Increase drag by 20%

120. Following the application of Type I and Type IV fluid, the crew observe snow on top of the applied fluids. Which of the following is true?

a) Takeoff is permitted when the aircraft's rotation speed over 100 knots.
b) Takeoff is not permitted.
c) Takeoff is permitted provided the appropriate maximum hold over time is not exceeded.
d) Takeoff is permitted if the aircraft is de-iced first and then later anti-iced.

121. What is required when Type II or IV anti-icing fluids are applied to an aircraft?

a) The rotation speed must be 100 knots or greater.
b) The rotation speed must be 80 knots or greater.
c) The takeoff run must be increased.
d) The rotation speed must be increased.

122. In flight as ice accumulates on a wing...

a) the stalling speed will increase and the angle at which the wing will stall will decrease.
b) the stalling speed will decrease and the angle at which the wing will stall will increase.
c) there will be no change in the stall characteristics of the aircraft.
d) the aircraft will not be able to be loaded to the MCTOW.

123. The wing icing phenomenon called Cold-Soaking has been known to:

a) cause the formation of clear ice on top of the wing areas above the fuel tanks.
b) cause frost to form on the upper and lower part on the wings near the fuel tanks.
c) cause frost to form in conditions of high relative humidity even when temperatures are well above freezing.
d) all of the above.

124. Which of the following statements is false with regard to tail plane stalls.

a) A tail plane stall is most likely to occur on approach at relatively high airspeeds.
b) An uncontrollable pitch down may occur without any warning when landing flap is selected.
c) Some symptoms of an impending tail plane stall may include; loss of elevator effectiveness, elevator pulsing, oscillation or vibration.
d) Planning to fly approaches with maximum flap settings can minimize the chance of having a tail plane stall occurrence.

125. The formation of clear ice above the fuel tanks of cold soaked wings is dependant on:

a) the type, depth and liquid content of precipitation, ambient air temperature and wing temperature.
b) the type fuel, the temperature of the fuel at altitude is cruise and liquid content of precipitation.
c) the type, depth and liquid content of precipitation, ambient air temperature and the type of de-icing fluid applied prior to takeoff.
d) the type of fuel and speed at which the aircraft is fueled, ambient air temperature and wing temperature.

126. Type I De-Icing fluid with a higher concentration of Glycol would be able to do which of the following with respect to re-freezing and further accumulation after being applied to aircraft surfaces;

a) prevents re-freezing and further accumulation for the duration of holdover time.
b) is used for removal of contamination and does nothing to prevent re-freezing or further accumulation.
c) provides some protection against re-freezing but not much against further accumulation.
d) Only prevents further accumulation.

127. Holdover time is the estimated time that the application of de-icing/anti-icing fluid will prevent the formation of frost, ice or the accumulation of snow on treated surfaces of an aircraft. Holdover time begins...

a) when the application of a de-icing/anti-icing fluid is completed, and expires when the fluid losses it's effectiveness.
b) when the final application of a de-icing/anti-icing fluid commences, and expires when the fluid blows off during the takeoff roll.
c) when the final application of a de-icing/anti-icing fluid commences, and expires when the fluid losses it's effectiveness.
d) when the first application of a de-icing/anti-icing fluid commences, and expires when the fluid losses it's effectiveness.

128. Following the application of Type I fluid, what is the maximum time before a pre-takeoff inspection is required if the outside air temperature is -5°C in snow? (refer to page 6-28)

a) 6 minutes
b) 3 minutes
c) 25 minutes
d) 1:15 minutes

129. Following the application of Type IV fluid during nighttime operations, what is the maximum time before a pre-takeoff inspection is required if the temperature is -6°C in light freezing rain? (refer to page 6-28)

a) 1:00 hour
b) 47 minutes
c) 35 minutes
d) 30 minutes

SAE TYPE I FLUID HOLDOVER TABLE
(For Training Purposes Only)

APPROXIMATE HOLDOVER TIMES (HOURS:MINUTES) UNDER VARIOUS WEATHER CONDITIONS							
OAT (DEG. C)	*FROST (1)	FREEZING FOG	MODERATE SNOW	***FREEZING DRIZZLE (2)	LIGHT FREEZING RAIN	RAIN ON COLD SOAKED WING	OTHER (3)
ABOVE 0°	0:45	0:12-0:30	0:07-0:12	0:05-0:08	0:02-0:05	0:02-0:05	
0° TO -10°	0:45	0:06-0:11	0:03-0:06	0:05-0:08	0:02-0:05	**CAUTION: NO HOLDOVER TIME GUIDELINES EXIST**	
BELOW -10°	0:30	0:06-0:09	0:02-0:04				

I. During conditions that apply to aircraft protection for active frost.
II. Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
III. Heavy snow, snow pellets, snow grains, ice pellets, moderate and heavy freezing rain, and hail

TYPE IV FLUID HOLDOVER TABLE
(For Training Purposes Only)

APPROXIMATE HOLDOVER TIMES (HOURS:MINUTES) UNDER VARIOUS WEATHER CONDITIONS						
OAT (DEG. C)	*FROST	FREEZING FOG	SNOW	***FREEZING DRIZZLE	LIGHT FREEZING RAIN	RAIN ON COLD SOAKED WING
ABOVE 0°	12:00	2:20-3:00	0:50-1:40	1:00-2:00	0:35-1:00	0:10-0:50
0°TO -3°	12:00	2:20-3:00	0:35-1:15	1:00-2:00	0:35-1:00	**CAUTION:**
BELOW -3°TO -14°	10:00	0:40-3:00	0:25-0:55	**0:50-1:35	**0:30-0:50	**NO HOLDOVER TIME GUIDELINES EXIST**
BELOW -14°TO -24°	6:00	0:20-2:00	0:20-0:45			
BELOW -24°	Ultra Plus fluid is prohibited for use below -24°C. Consider use of SAE Type I fluid below -24°C					

I. During conditions that apply to aircraft protection for active frost.
II. The lowest use temperature is limited to -10°C.
III. Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.

Human Factors

130. Oxygen is transported by the circulating blood to the tissues of the body combined with which of the following carrier molecules:

a) gamma globulin
b) activated blood platelets
c) hemoglobin in the erythrocytes
d) fibrinogen

131. **Hypoxia** may be defined as:

a) a deficiency in the amount of oxygen reaching bodily tissues.
b) an excessive accumulation of carbon monoxide in bodily tissues.
c) a type of neuromuscular irritability due to excess carbon dioxide in the blood.
d) an abnormally low level of carbon dioxide in the blood.

132. Some of the subjective symptoms of hypoxia might include:

a) combative behavior, loss of hearing, delirium.
b) apprehension, headache, euphoria
c) slight nausea, ringing in the ears, laryngeal edema.
d) vertigo, itching, gastrointestinal pain.

133. The duration of "Useful Consciousness" for an altitude of 40,000 feet is:

a) 5 to 12 seconds
b) 15 to 30 seconds
c) 30 to 45 seconds
d) 40 to 55 seconds

134. What would the duration of useful "Useful Consciousness" for a person at 30,000 feet following a rapid depressurization:

a) 8 to 13 seconds.
b) 15 to 30 seconds.
c) 45 to 75 seconds.
d) 40 to 55 seconds.

135. Which of the following statements is NOT true with respect to **hyperventilation**?

a) hyperventilation symptoms always develop very rapidly.
b) it is an abnormal increase in the rate and depth of breathing.
c) it results in an abnormally low level of carbon dioxide in the blood.
d) there are very few distinguishable differences between the signs and symptoms of hyperventilation and hypoxia.

136. A condition characterized by a variety of symptoms resulting from exposure to low barometric pressures that cause inert gases (mainly nitrogen) to come out of solution and form bubbles in body tissues and fluids is known as:

a) denitrogenation disorder.
b) hypobaric syndrome.
c) pulmonary syndrome.
d) decompression sickness.

137. A potentially very dangerous condition due to nitrogen bubbles present in the smaller blood vessels of the lungs and in the tissue of the trachea is:

a) parasthesia.
b) the bends.
c) the chokes.
d) pulmonary stenosis.

138. **Carbon Monoxide** is:

a) A highly toxic pungent gas that is often produced by faulty hot water heaters.
b) A constituent of the natural gas molecule.
c) A highly toxic, odorless gas that is a product of incomplete fuel combustion.
d) A flammable, odorless, toxic gas released by aircraft batteries during charging.

139. From the statements listed below concerning the physiological aspects of exposure to carbon monoxide, select those which are true:

1) The binding affinity of carbon monoxide for hemoglobin is about 210 times that of oxygen.
2) The symptoms of carbon monoxide poisoning can be easily recognized.
3) The oxygen carrying capacity of the blood is reduced in heavy smokers.
4) Severe carbon monoxide poisoning can be very quickly cured once the source of the gas is removed and fresh air is breathed.
5) Heavy smokers may become hypoxic at altitudes below 10,000 feet ASL.

a) 1, 2, 4
b) 1, 3, 5
c) 2, 3, 4
d) 2, 4, 5

140. An initial symptom of carbon monoxide poisoning would be:

a) euphoria.
b) rapid, shallow respiration.
c) tingling in the extremities.
d) blurred thinking.

141. The four areas of the body that are most sensitive to the mechanical effect of trapped gas are the:

a) joints, pericardial sac, inner ear, cerebral ventricles.
b) outer ear, pleural cavity, subdural space, eye sockets.
c) middle ear, sinuses, teeth, gastrointestinal tract.
d) spinal cord, outer ear, medulla, pleural cavity

142. The pilot of an aircraft climbing to an assigned altitude experiences a "popping" sensation within the ears. He/she should be aware that:

a) this is a normal occurrence and is due to air escaping through the Eustachian tubes into the back of the throat.
b) this sensation can indicate a severe sinus infection that requires medical attention.
c) air is trying to enter the inner ear and is causing the fluid pulsate in the semicircular canals.
d) outside ambient air pressure is forcing the eardrum to push inward against trapped air bubbles which subsequently burst.

143. The primary focusing element of the human eye (i.e., that structure through which most of the light refraction occurs) is the:

a) pupil.
b) optic disk.
c) lens.
d) cornea.

144. The two types of photoreceptor cells in the retina of the eye are known as rods and cones. The rods:

a) are responsible for daylight vision as well as for all high resolution vision.
b) are less numerous and less sensitive than are the cones.
c) are very sensitive to color.
d) are responsible for night vision.

145. Any flight crew member donating blood should not fly:

a) until he/she has consulted with a physician
b) until he/she has consulted with a Regional Aviation Medical Officer
c) for at least 48 hours
d) for at least 8 hours

146. Alcohol consumption, even in small quantities, can:

a) result in enhanced cognitive ability.
b) increase the susceptibility of an individual to hypoxia.
c) drastically lower a person's blood pressure.
d) temporarily improve short term memory.

147. With reference to reducing the alcohol content in an individual's bloodstream, you should know that:

a) The rate at which alcohol leaves the blood due to metabolic processes in the liver is always much faster in a person who is a frequent consumer.
b) Such a reduction can only be attained over the passage of time.
c) Alcohol removal from the blood can be accelerated by taking an analgesic such acetaminophen or ASA (acetylsalicylic acid).
d) Drinking strong, black coffee, breathing 100% oxygen or taking a cold shower are effective ways of speeding up the of alcohol metabolism or removal.

148. A very insidious illusion known as the "Black Hole Illusion" can be experienced by pilots while on approach at night over dark terrain with no lights below or to the sides of the approach path, and with only the distant airport runway lights to provide visual stimuli. This illusion induces a false perception of aircraft altitude and results in the pilot flying the approach:

a) too high.
b) not aligned with the runway centerline and below V_{REF} .
c) too low.
d) at a speed that is well above V_{REF} .

149. While holding on a taxiway, an aeroplane that was holding next to you with its wing tip in line with yours, edges forward to proceed to the active runway. Your brain interprets this peripheral visual information as though you were moving backwards and causes you to apply additional brake pressure. The illusion that you have just experienced is known as the:

a) autokinetic illusion.
b) false visual reference illusion.
c) vection illusion.
d) coriolis illusion.

150. During the transition from instrument to visual reference, the pilot of an aircraft on a night approach to a lighted, downslope runway is likely to develop the illusion of being:

a) high, resulting in a dangerously low approach
b) low, causing the aircraft to cross the threshold low and slow
c) high, resulting in an abnormally high rate of descent close to the threshold
d) low, causing the aircraft to cross the threshold high and fast

151. Rain on an aircraft's windscreen may cause a runway to appear?

a) Farther away and higher.
b) Closer and lower.
c) Farther away and lower.
d) Closer and higher.

152. Shortly after commencing a missed approach you enter cloud, what sensations are you likely to have?

a) A normal climb.
b) A high nose up attitude thus having the tendency of lowering the nose.
c) A descent thus having the tendency of raising the nose.
d) No sensation at all.

153. You are on an instrument approach at night. During the transition phase to a lighted up slope runway there is the possible illusion of _____ when there is rain on the windscreen.

a) being too low and thus decreasing the rate of descent.
b) being very low and thus increasing the rate of descent.
c) being very high and thus increasing the rate of descent.
d) being too high and thus decreasing the rate of descent.

154. You are flying a low altitude on a downwind with a strong tailwind. What illusions will be sensed as you enter the base turn?

a) aircraft slipping, airspeed decreasing.
b) aircraft skidding, airspeed increasing.
c) aircraft skidding, airspeed decreasing.
d) aircraft slipping, airspeed increasing.

155. It is known that improper pilot seat height adjustment has been responsible for a number of specific landing problems and accidents. A pilot seat that has been adjusted to a height position that is too low would most likely:

a) adversely affect a pilot's instrument scan technique.
b) result in an undetected undershoot during a visual approach.
c) cause the pilot to fly a visual approach at a too low a speed.
d) result in an undetected overshoot during a visual approach.

156. Consider the scenario where a VFR pilot with limited flying experience encounters deteriorating weather conditions during a cross-country flight and decides to press on. In this case, which of the following statements would best describe this pilot's decision making behavior?

a) A person will tend to react only to information that confirms that his/her decision was right and to discount or ignore other subsequent information that doesn't support that decision.
b) False assumptions once made can still be easily changed.
c) A person's subconscious will tend to focus on unfavorable incoming information during times of stress.
d) It is very difficult to shape new information to support personal preferences.

157. CFIT (Controlled Flight Into Terrain) continues to pose a major threat to the safety of aircraft passengers and crew worldwide. The definition of a CFIT accident is an event which:

a) An aeroplane impacts the ground, water, or an obstacle during the approach and landing phase of flight.
b) An aeroplane is inadvertently flown into the ground, water, or an obstacle while the crew was involved with an in-flight emergency.
c) An airworthy and normally functioning aeroplane is inadvertently flown into the ground, water, or an obstacle with no prior awareness by the crew.
d) An aeroplane that was mechanically sound is inadvertently flown into the terrain while the crew was following erroneous navigation signals from ground based navigation aids or was receiving radar vectors from ATC.

158. Which of the following statements is true with regards to the causes and prevention of CFIT accidents?

a) Loss of situation awareness is a major contributing factor.
b) A stabilized final approach is recognized as an aid in preventing CFIT accidents.
c) Knowledge of IFR and VFR weather minima is essential.
d) All of the above.

159. Under the Threat and error management model a threat may be defined as:

a) an incorrect action taken by the flight crew.
b) an event or error that occurs beyond the influence of the flight crew.
c) a security event.
d) the result of an error by the flight crew.

160. Identify the threat in the following sequence of events:

a) A crew is fatigued due to a delay caused by unforecast adverse weather at their departure point.
b) The crew forget to obtain an updated ATIS and program the FMS for the wrong runway.
c) The crew are high on the arrival due to the wrong programming.
d) The approach is unstable and the crew elect to go around.

161. You are awaiting takeoff clearance when you observe a heavy aircraft carry out a missed approach at 100' on the active runway. You are cleared for an immediate takeoff by ATC. You should:

a) Proceed to takeoff as cleared.
b) Ignore the clearance.
c) Refuse the clearance and advise ATC of the reason why.
d) Slowly taxi to position in the hope that wake vortices will dissipate quickly.

162. If a pilot has a good overall mental picture of what is going on during a flight, he or she has:

a) A positive attitude.
b) good situational awareness.
c) Good CRM.
d) the Right Stuff.

163. The best way for a pilot to assess his or her level of fatigue is:

a) to ask crew scheduling
b) self assessment using a fatigue prediction model
c) count the number of time zones from origin to destination
d) all of the above

164. Jet lag may be described as:

a) A pilot who is always "behind" the aircraft.
b) The time taken for a jet engine to spool up.
c) Interruption of circadian rhythm making it hard to sleep when required, and to stay awake later when needed.
d) Exhaustion.

165. Which of the following are effects of fatigue that have been observed in pilots:

a) Poor performance of tasks.
b) Poor judgement.
c) diminished decision-making skills.
d) all of the above.

166. Use of charts, checklists and manuals is:

a) to be avoided.
b) a fundamental part of modern airline SOPs.
c) outdated.
d) none of the above.

167. Management of risk in airline operations is an important part of:

a) Performance engineering.
b) Maintenance operational control.
c) the Safety Management System.
d) Load Control.

168. A fundamental component of the Safety Management System is:

a) ensuring that blame is correctly placed.
b) allowing managers to avoid responsibility.
c) encouraging the reporting of incidents and safety concerns.
d) all of the above.

Answer Key Flight OPS General

1. a	46. a	91. c	136. d
2. b	47. b	92. c	137. c
3. d	48. c	93. a	138. c
4. c	49. b	94. b	139. b
5. a	50. c	95. b	140. d
6. d	51. c	96. c	141. c
7. c	52. b	97. d	142. a
8. b	53. d	98. c	143. d
9. d	54. d	99. a	144. d
10. a	55. b	100. b	145. c
11. a	56. c	101. c	146. b
12. c	57. a	102. d	147. b
13. a	58. c	103. c	148. c
14. d	59. b	104. b	149. c
15. b	60. b	105. a	150. d
16. b	61. a	106. b	151. b
17. c	62. b	107. b	152. b
18. c	63. c	108. c	153. c
19. c	64. c	109. d	154. c
20. a	65. b	110. c	155. b
21. d	66. a	111. a	156. a
22. b	67. b	112. c	157. c
23. a	68. b	113. b	158. d
24. d	69. a	114. a	159. b
25. d	70. c	115. b	160. a
26. c	71. a	116. d	161. c
27. d	72. a	117. c	162. b
28. d	73. c	118. d	163. b
29. a	74. d	119. a	164. c
30. b	75. d	120. b	165. d
31. d	76. c	121. a	166. b
32. c	77. d	122. a	167. c
33. d	78. c	123. d	168. c
34. a	79. b	124. d	
35. b	80. b	125. a	
36. d	81. c	126. c	
37. d	82. d	127. c	
38. c	83. b	128. b	
39. b	84. c	129. d	
40. b	85. a	130. c	
41. c	86. b	131. a	
42. c	87. c	132. b	
43. b	88. b	133. b	
44. a	89. c	134. c	
45. c	90. a	135. a	

Appendix I

ATPL FORMULAS

VHF RECEPTION DISTANCE = 1.23 $\sqrt{\text{ALT}}$

ALT=Aircraft's Altitude above the station in feet

DISTANCE TO STATION = $\frac{\text{GS} \times \text{TIME IN MINUITES}}{\text{DEGREES OF BEARING CHANGE}}$

MAX PAYLOAD = MZFW - BOW

MZFW - Max Zero Fuel Weight
BOW - Basic Operating Weight

CENTRE OF GRAVITY SHIFT $\frac{w}{W} = \frac{d}{D}$

w = Weight of the object that must be moved
W = Gross Weight of the Aircraft
d = Number of inches that the C of G must be moved
D = Distance between cargo compartments

DISTANCE TO CRITICAL POINT = $\frac{D \times H_R}{O_R + H_R}$

D = Total Trip Distance
H_R = Reduced or 3 Engine Groundspeed Home
O_R = Reduced or 3 Engine Groundspeed Out

SPECIFIC GROUND RANGE = $\frac{\text{TAS}}{\text{FUEL FLOW}}$

SPECIFIC GROUND RANGE = $\frac{\text{GROUND SPEED}}{\text{FUEL FLOW}}$

$$\text{MACH NUMBER} = \frac{\text{TAS}}{\text{S}}$$

S = The Speed of Sound at Flight Temperature

$$\text{ANGLE OF BANK FOR A RATEONE TURN} = \frac{\text{TAS}}{\text{S}} + 7$$

$$\text{STALL SPEED OF AN AIRCRAFT EXECUTING A BANKED TURN} = \text{NORMAL STALLSPEED} \times \sqrt{\text{LOAD FACTOR}}$$

60°= 2G
45°= 1.4G

$$\text{HYDROPLANING SPEED} = 7.7 \times \sqrt{\text{TIRE PRESSURE}}$$

Non-Rotating tire during landing

$$\text{HYDROPLANING SPEED} = 9.0 \times \sqrt{\text{TIRE PRESSURE}}$$

Rotating tire during take-off

Appendix II

References and Recommended Readings

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In addition to the above references, Pilot Training Manuals for many aircraft type were consulted, including de Havilland Dash 8, Aerospatiale/ Aeritalia ATR 42, Beechcraft King Air BE-200 and BE-1900, Boeing 737& 767 and Airbus A320 & A330