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Recreational Pilot Permit and Private Pilot Licence

Aeroplane

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FOREWORD

This sample examination has been developed by Transport Canada to assist candidates in preparing for the Recreational Pilot Permit or Private Pilot Licence written examinations.

The questions contained in the sample paper are selected to indicate the form and type of questions that may be encountered.

The Recreational Pilot Permit examination consisting of 80 questions and the Private Pilot Licence examination consisting of 100 questions are set out in much the same proportion and order as in this sample paper.

Candidates are referred to the Study and Reference Guide titled *Recreational Pilot Permit – Aeroplane* (TP 12467E) or, *Private Pilot Licence, including Helicopter to Aeroplane Pilot Licence – Aeroplane* (TP 12880E) which specifies the subject areas from which questions may be set.

ABBREVIATIONS

NOTE: The abbreviations and acronyms listed below may be used throughout this guide.

ADF	– automatic direction finding	lb.	– pound(s)
AGL	– above ground level	M	– magnetic
AME	– aircraft maintenance engineer	mb	– millibar(s)
ASL	– above sea level	METAR	– aviation routine weather report
ATC	– Air Traffic Control	MHz	– megahertz
ATS	– Air Traffic Services		
C	– Celsius	NM	– nautical mile(s)
CARs	– Canadian Aviation Regulations	OAT	– outside air temperature
CAS	– calibrated airspeed	OBS	– omnibearing selector
CDI	– course deviation indicator		
C of A	– Certificate of Airworthiness	SM	– statute mile(s)
DF	– direction finding	SVFR	– special VFR flight
ELT	– emergency locator transmitter	TAF	– terminal aerodrome forecast
ETA	– estimated time of arrival	TAS	– true airspeed
GFA	– graphical area forecast	TCA	– terminal control area
gph	– gallons per hour	UTC	– co-ordinated universal time (Z)
IAS	– indicated airspeed	VFR	– visual flight rules
IFR	– instrument flight rules	VHF	– very high frequency
in. Hg	– inches of mercury	VNC	– VFR Navigation Chart
kHz	– kilohertz	VOR	– VHF Omnidirectional Range
kt.	– knot(s)	VORTAC	– combination of VOR and TACAN

AIR LAW

1. Unless otherwise specified, a control zone is
 - (1) the same as a control area.
 - (2) controlled airspace around an aerodrome that extends vertically from the surface to 3,000 feet AGL.
 - (3) always Class D airspace.
 - (4) controlled airspace along airways above 2,200 feet ASL.

2. Would the Regulations be violated, if a pilot voluntarily landed an aircraft in bright moonlight at an aerodrome where the length of the landing area was indicated by a single row of white lights?
 - (1) There would be no violation, provided the lights were in the centre of the landing area.
 - (2) There would be no violation, provided the aeroplane was equipped with a functioning landing light.
 - (3) Yes, the CAR for aerodrome minimum lighting would have been violated.
 - (4) There would be no violation, provided air to ground communication was available.

3. "Day" in Canada is defined as that period of time between
 - (1) sunrise and sunset.
 - (2) one hour before sunrise and one hour after sunset.
 - (3) the end of morning civil twilight and the beginning of evening civil twilight.
 - (4) the beginning of morning civil twilight and the end of evening civil twilight.

4. No person shall walk, drive or park a vehicle on any part of an uncontrolled aerodrome used for the movement of aircraft except in accordance with permission given by
 - (1) the operator of the aerodrome.
 - (2) a qualified representative of a commercial air service being operated from the aerodrome.
 - (3) a Federal Peace Officer.
 - (4) the aerodrome UNICOM operator.

5. No person shall fly or attempt to act as a flight crew member of an aircraft if that person
 - (1) is less than 18 years of age.
 - (2) has consumed alcohol or drugs 48 hours prior to take-off.
 - (3) is suffering or is likely to suffer from fatigue.
 - (4) is over 60 years of age.

6. A person may conduct aerobatic manoeuvres in an aircraft
 - (1) only when no passengers are carried.
 - (2) over a built-up area above 2,000 feet AGL.
 - (3) within Class F advisory airspace when visibility is 3 miles or greater.
 - (4) within Class C advisory airspace when the visibility is greater than 1 NM.

7. When two aircraft are converging at approximately the same altitude, the aircraft that has the other on its right shall give way except that
 - (1) aeroplanes shall give way to rotary wing aircraft.
 - (2) helicopters shall give way to aeroplanes.
 - (3) gliders shall give way to aeroplanes.
 - (4) power-driven heavier-than-air aircraft shall give way to airships, gliders and balloons.
8. When two aircraft are approaching head-on or approximately so and there is danger of collision, each pilot shall
 - (1) alter heading to the right.
 - (2) alter heading to the left.
 - (3) avoid the other by changing altitude.
 - (4) turn on the anti-collision lights.
9. Pilots are responsible for taking action as necessary to avoid a collision
 - (1) unless flying in accordance with an ATC clearance.
 - (2) only when flying in VFR conditions.
 - (3) except when within visual range of the control tower.
 - (4) at all times.
10. Unless conducting a take-off, approach or landing, no person shall fly an aeroplane over a built-up area unless the aeroplane is operated at an altitude that is not lower than above the highest obstacle within a radius of from the aircraft.
 - (1) 500 ft, 500 ft
 - (2) 1,000 ft, 2,000 ft
 - (3) 2,000 ft, 1,000 ft
 - (4) 3,000 ft, 1 mile
11. What is the minimum fuel required on an aeroplane, other than an ultra-light, at the commencement of a day VFR flight? Sufficient fuel to fly to the destination
 - (1) at minimum cruising speed.
 - (2) plus 45 minutes at normal cruising speed.
 - (3) plus 30 minutes at normal cruising speed.
 - (4) and then to a specified alternate.
12. The signal to an aircraft in flight which means “give way to other aircraft and continue circling” is
 - (1) a steady red light.
 - (2) a series of green flashes.
 - (3) an intermittent white light.
 - (4) a succession of pyrotechnics showing red and green stars on bursting.

13. Any person holding a licence, permit or certificate issued under the authority of the CARs shall produce such document for inspection, upon demand by
- (1) an airport owner or operator.
 - (2) any pilot holding a senior licence.
 - (3) a peace officer, or immigration officer.
 - (4) a pilot holding a valid instructor rating.
14. If your Private Pilot Licence is endorsed for night flying you may carry passengers at night provided you have completed at least take-offs and landings by night in the same category and class of aircraft during the months immediately preceding the flight.
- (1) 2, 3
 - (2) 3, 4
 - (3) 5, 6
 - (4) 10, 12
15. An ATC clearance authorizing SVFR
- (1) relieves the pilot of the responsibility for avoiding weather conditions beyond the pilot's own flying capabilities.
 - (2) relieves the pilot of the responsibility of avoiding other aircraft.
 - (3) relieves the pilot of the responsibility of complying with the CARs.
 - (4) permits a pilot to fly in below VFR weather conditions without complying with instrument flight rules.
16. In Southern Domestic Airspace, the selection of a cruising altitude above 3,000 feet AGL shall be based on the
- (1) true track.
 - (2) true heading.
 - (3) magnetic track.
 - (4) magnetic heading.
17. The minimum flight visibility for VFR flight in a control area is
- (1) 1 mile.
 - (2) 2 miles.
 - (3) 3 miles.
 - (4) 4 miles.
18. When in VFR flight within the altimeter setting region, the altimeter should be set to
- (1) the current altimeter setting of the nearest station along the route of flight.
 - (2) 29.92 in. Hg. or 1013.2 mb.
 - (3) the station pressure of the nearest weather reporting station.
 - (4) the standard altimeter setting.

19. In Southern Domestic Airspace, runway 27 at an aerodrome would have a bearing of approximately
- (1) 027°T.
 - (2) 270°T.
 - (3) 027°M.
 - (4) 270°M.
20. Unless otherwise authorized, a pilot on a VFR flight entering Class C airspace must
- (1) request a clearance from the appropriate ATC unit immediately after entering.
 - (2) establish radio contact with the appropriate ATC unit only when transiting the associated control zone.
 - (3) receive a clearance from the appropriate ATC unit prior to entering.
 - (4) contact radar service only when taking off or landing at the associated airport.

AERONAUTICS – GENERAL KNOWLEDGE

21. If an aeroplane stalls while descending in a co-ordinated left turn, it may enter
- (1) an incipient right spin.
 - (2) an incipient left spin.
 - (3) a steep right spiral.
 - (4) a shallow left spiral.
22. The manoeuvring speed for an aeroplane is the maximum
- (1) speed at which the aeroplane can be safely operated in smooth air.
 - (2) speed at which full travel of the flight controls may be used without exceeding the design load factor.
 - (3) speed at which the aeroplane may be flown with the flaps lowered.
 - (4) safe speed at which the aeroplane should be operated.
23. If ice has accumulated on an aerofoil in flight, the stalling speed will
- (1) remain unchanged.
 - (2) decrease in all flight conditions.
 - (3) increase in level flight only.
 - (4) increase in all flight conditions.
24. The indicated stalling speed of an aeroplane
- (1) is higher when flying downwind than upwind.
 - (2) increases with altitude.
 - (3) decreases with altitude.
 - (4) does not change with change of altitude.
25. The stalling speed of an aeroplane
- (1) is the same in a co-ordinated turn as in straight and level flight.
 - (2) is less in a co-ordinated turn than in straight and level flight.
 - (3) is greater in a co-ordinated turn than in straight and level flight.
 - (4) increases in climbing turns, decreases in gliding turns.

26. The use of low octane fuel in a high compression engine may result in
- (1) too lean a mixture for best operation.
 - (2) carburettor icing.
 - (3) fouling of the spark plugs.
 - (4) detonation.
27. If one magneto should fail on an engine equipped with dual ignition
- (1) a slight loss of power would result.
 - (2) there would be no effect on the engine.
 - (3) the engine would stop.
 - (4) half of the cylinders would not fire.
28. The use of carburettor heat will
- (1) increase manifold pressure and enrich the mixture.
 - (2) increase manifold pressure and lean out the mixture.
 - (3) decrease manifold pressure and enrich the mixture.
 - (4) decrease manifold pressure and lean out the mixture.
29. Under which conditions would the most serious carburettor icing be expected?
Outside air temperature range of and humidity.
- (1) -5°C to 15°C, high
 - (2) 5°C to 27°C, low
 - (3) -21°C to 0°C, low
 - (4) -21°C to 0°C, high
30. It is possible for carburettor icing to occur
- (1) in clear air with high relative humidity at above freezing temperatures.
 - (2) only when precipitation is present at freezing temperatures.
 - (3) only in cloud with high relative humidity.
 - (4) only when water droplets are in suspension in the air.
31. Prolonged idling of an aircraft engine would most likely cause
- (1) detonation.
 - (2) backfiring in the induction system.
 - (3) fouled plugs.
 - (4) pre-ignition.
32. Ground effect will enable an aeroplane to become airborne below normal flying speed primarily due to
- (1) a decreased lift/drag ratio.
 - (2) a decrease in induced drag.
 - (3) an increase in downwash.
 - (4) an increase in wing tip vortices.

33. The correct height above sea level is indicated on a pressure altimeter set to 29.92 in. Hg only when
- (1) the conditions of a standard atmosphere exist.
 - (2) a standard lapse rate exists.
 - (3) you are in the Standard Pressure Region.
 - (4) the barometric pressure is 29.92 in. Hg.
34. The altimeter setting is 29.70 in. Hg. If the pilot inadvertently sets 30.70 in. Hg on the altimeter subscale, the altimeter will read
- (1) 1,000 ft too high.
 - (2) 1,000 ft too low.
 - (3) 100 ft too high.
 - (4) 100 ft too low.
35. A major early symptom of hypoxia is
- (1) drowsiness.
 - (2) dizziness.
 - (3) euphoria.
 - (4) hyperventilation.
36. If you are looking at a featureless sky during hazy or dark conditions, your eyes will tend to focus at a point approximately ft away.
- (1) 3 to 5
 - (2) 30 to 50
 - (3) 300 to 500
 - (4) 3,000 to 5,000
37. The effects of one drink of alcohol at sea level will
- (1) increase with an increase in altitude.
 - (2) decrease with an increase in altitude.
 - (3) remain the same with an increase in altitude.
 - (4) remain constant to 6,000 feet ASL.
38. During an approach to land on an upsloping runway, the pilot may experience the illusion that the aeroplane is than it actually is.
- (1) higher
 - (2) lower
 - (3) closer in
 - (4) approaching faster
39. When turning from downwind to into-wind at low altitude, a pilot may experience an illusion of
- (1) slipping and decreasing airspeed.
 - (2) skidding and decreasing airspeed.
 - (3) slipping and increasing airspeed.
 - (4) skidding and increasing airspeed.

40. Wheelbarrowing on landing may result from a
- (1) low approach speed.
 - (2) shallow approach angle.
 - (3) high approach speed.
 - (4) strong cross-wind.
41. Wake turbulence caused by a departing aeroplane is most severe immediately
- (1) following full power application.
 - (2) before rotation.
 - (3) following rotation.
 - (4) above its flight path.
42. An aircraft flying an approach into a strong head wind encounters a sudden tailwind near the ground. The wind shear hazard to be expected is a sudden
- (1) increase in groundspeed and increase in lift.
 - (2) decrease in groundspeed and loss of lift.
 - (3) increase in airspeed and increase in lift.
 - (4) decrease in airspeed and loss of lift.
43. Refer to the Appendix: AIRSPEED INDICATOR (DIAGRAM #1).
- The upper limit of the white arc on an airspeed indicator is the maximum
- (1) normal operating speed.
 - (2) flap extension speed.
 - (3) manoeuvring speed.
 - (4) range speed.
44. Refer to the Appendix: TURN CO-ORDINATOR (DIAGRAM #1).
- The turn co-ordinator indicates that the aircraft is in a
- (1) slipping left turn.
 - (2) skidding left turn.
 - (3) slipping right turn.
 - (4) skidding right turn.
45. Deceleration errors in the magnetic compass would be most pronounced on headings of
- (1) north and south.
 - (2) east and north.
 - (3) east and west.
 - (4) west and south.

46. Aerodrome elevation 4,600 feet ASL
Altimeter Setting 29.52 in. Hg

Using the above information, what is the pressure altitude?

- (1) 5,000 ft.
- (2) 4,640 ft.
- (3) 4,560 ft.
- (4) 4,200 ft.

47. Pressure Altitude 4,500 ft
Temperature 20°C

Using the above information, what is the density altitude?

- (1) 7,300 ft.
- (2) 6,100 ft.
- (3) 5,100 ft.
- (4) 4,500 ft.

48. Refer to the Appendix: CROSS-WIND GRAPH #2.

For a take-off on runway 31 with the wind from 270° at 20 kt, the aircraft would be subject to head wind and cross-wind components respectively of

- (1) 20 and 15 kt.
- (2) 15 and 13 kt.
- (3) 15 and 20 kt.
- (4) 13 and 15 kt.

49. Refer to the Appendix: TAKE-OFF DISTANCE (Table #1).

Runway level, dry grass
Aerodrome Pressure Altitude 4,000 ft
Temperature 20°C
Head wind component 9 kt
Aeroplane weight 1600 lb

Using the above data, the total distance to clear a 50 foot obstacle is

- (1) 1,912 ft.
- (2) 2,063 ft.
- (3) 2,199 ft.
- (4) 2,444 ft.

50. Refer to the Appendix: LOADING GRAPH #4 & CENTRE OF GRAVITY MOMENT ENVELOPE #6.

Load Details	Weight lb.	Moment 1000 lb in.
Basic empty weight (includes full oil/unusable fuel)	1,365	51.0
Usable fuel at take-off – 38 U.S. gal.	–	–
Pilot & front Passenger	360	–
Two rear seat passengers	282	–
Baggage	50	–

Using the above data the aeroplane

- (1) is within the weight limits for the utility category only.
- (2) is within the weight limits but is not within the CG limits.
- (3) exceeds both the weight limits and the CG limits.
- (4) is within both the weight and the CG limits.

METEOROLOGY

51. Relative humidity is the

- (1) amount of moisture present in the air.
- (2) weight of water present in the air.
- (3) amount of moisture present in the air compared to the amount the air could hold at that temperature and pressure.
- (4) temperature to which the air must be lowered to bring about saturation.

52. The cloud type usually associated with steady rain is

- (1) altostratus.
- (2) altocumulus.
- (3) stratocumulus.
- (4) nimbostratus.

53. Clouds form when moist warm air overruns cold air because the warm air

- (1) is cooled by the cold air underneath.
- (2) is cooled by the surrounding cold air aloft.
- (3) becomes unstable as a result of cooling from below.
- (4) cools as a result of expansion as it rises.

54. Advection fog forms when

- (1) moist air moves from a warm surface to a colder surface.
- (2) the cold ground cools the air in contact with it at night.
- (3) moist air is influenced by orographic effect.
- (4) moist cool air moves from a cold surface to a warm surface.

55. Radiation fog forms as a result of the
- (1) passage of cold air over a warm surface.
 - (2) air becoming moist as it moves over the sea.
 - (3) clouds becoming cold and heavy at night so that they settle to the ground.
 - (4) ground becoming cold at night and cooling the air in contact with it.
56. In the northern hemisphere, the winds blow
- (1) clockwise around high and low pressure areas.
 - (2) counter-clockwise around high and low pressure areas.
 - (3) clockwise around a high pressure area and counter-clockwise around a low pressure area.
 - (4) counter-clockwise around a high pressure area and clockwise around a low pressure area.
57. During a descent from 2,000 feet AGL to the surface, you will usually find that the wind
- (1) veers and increases.
 - (2) backs and increases.
 - (3) veers and decreases.
 - (4) backs and decreases.
58. The diurnal change of surface wind velocity is such that during the day the surface wind will usually
- (1) veer and increase in speed.
 - (2) veer and decrease in speed.
 - (3) back and increase in speed.
 - (4) back and decrease in speed.
59. In the standard atmosphere, the temperature at an altitude of 5,000 feet will be closest to
- (1) 0°C.
 - (2) 5°C.
 - (3) 8°C.
 - (4) 10°C.
60. The conditions required for the formation of thunderstorms are
- (1) moist air, high temperature, and an inversion.
 - (2) stratus cloud, high humidity and a lifting force.
 - (3) unstable air, high humidity and a lifting force.
 - (4) a mixing of two different air masses.
61. A condition when the air temperature aloft is higher than that of the lower atmosphere is generally referred to as
- (1) a low pressure area.
 - (2) an inversion.
 - (3) a reverse temperature condition.
 - (4) an inverse convection condition.

62. Air masses that are being cooled from below are characterized by
- (1) strong winds, cumulus cloud, good visibility.
 - (2) uniform temperature, good visibility.
 - (3) continuous rain, freezing temperature.
 - (4) fog, poor visibility and layer cloud.
63. A front is a
- (1) narrow zone of fog between a cyclone and an anticyclone.
 - (2) line of thunderstorms.
 - (3) narrow transition zone between two air masses.
 - (4) mass of layer cloud which is very thick and which covers a wide area.
64. During the passage of a cold front
- (1) warm air is compressed as cold air rides over it.
 - (2) temperature rises owing to increased pressure.
 - (3) fog will always form from the interaction of warm and cold air.
 - (4) warm air is lifted as colder air pushes under it.
65. The following sequence of clouds is observed at an airport: cirrus, altostratus, nimbostratus. The observer should expect
- (1) the passage of a cold front.
 - (2) anticyclonic weather.
 - (3) the passage of a warm front.
 - (4) clearing skies and a decrease in temperature.
66. Cloud heights in Canadian Aerodrome Forecasts (TAF) are given in
- (1) feet AGL.
 - (2) feet ASL.
 - (3) metres AGL.
 - (4) metres ASL.
67. Failure to adjust the altimeter when flying from an area of low pressure to an area of higher pressure will result in the altimeter indicating
- (1) too high.
 - (2) too low.
 - (3) the pressure altitude.
 - (4) the true altitude.
68. Refer to the Appendix: WEATHER SYNOPSIS # 100 (FD).
- The average wind applicable to a direct flight from Winnipeg (CYWG) to Brandon (CYBR) at 5,500 ft would be
- (1) 290°M at 30 kt.
 - (2) 290°T at 30 kt.
 - (3) 310°M at 31 kt.
 - (4) 310°T at 31 kt.

69. The forecast surface wind will be included in a GFA if it has a sustained speed of at least kt.
- (1) 5
 - (2) 10
 - (3) 15
 - (4) 20
70. Refer to the Appendix: WEATHER SYNOPSIS # 100 (GFA).
- The center of the low pressure system is between 1800Z and 0000Z.
- (1) stationary
 - (2) moving south-easterly
 - (3) moving north-westerly
 - (4) moving easterly
71. Refer to the Appendix: WEATHER SYNOPSIS # 100 (GFA).
- This forecast covers a period of hours and includes a hour IFR outlook.
- (1) 24, 12
 - (2) 24, 6
 - (3) 12, 12
 - (4) 12, 24
72. Refer to the Appendix: WEATHER SYNOPSIS # 100 (TAF).
- The cloud condition at Churchill (CYYQ) is forecast to
- (1) remain clear.
 - (2) thicken and lower.
 - (3) remain scattered until 0900Z.
 - (4) become overcast at 200 ft.
73. Refer to the Appendix: WEATHER SYNOPSIS # 100 (TAF).
- The forecast visibility at Churchill (CYYQ) between 1500Z and 2100Z is
- (1) 15 SM in wet snow.
 - (2) 15 NM in wet snow.
 - (3) greater than 6 NM.
 - (4) greater than 6 SM.
74. Refer to the Appendix: WEATHER SYNOPSIS # 100 (TAF).
- The Gillam (CYGX) aerodrome forecast covers a period of hours.
- (1) 24
 - (2) 12
 - (3) 10
 - (4) 6

75. Refer to the Appendix: WEATHER SYNOPSIS # 100 (TAF).

The Gillam (CYGX) 1800Z wind is forecast to be

- (1) 260°T at 10 kt.
- (2) 260°M at 10 kt.
- (3) variable at 3 kt.
- (4) calm.

76. Refer to the Appendix: WEATHER SYNOPSIS # 100 (METAR/TAF).

The 1500Z Portage La Prairie (CYPG) METAR indicates that the

- (1) visibility is greater than forecast.
- (2) ceiling is lower than forecast.
- (3) winds are weaker than forecast.
- (4) ceiling is as forecast.

77. Refer to the Appendix: WEATHER SYNOPSIS # 100 (METAR).

The ceiling at Brandon (CYBR) at 1500Z is

- (1) 200 ft.
- (2) 1,000 ft.
- (3) 2,000 ft.
- (4) 10,000 ft.

78. Refer to the Appendix: WEATHER SYNOPSIS # 100 (METAR).

The 1500Z temperature/dewpoint spread at Portage La Prairie (CYPG) is

- (1) 24°C.
- (2) 20°C.
- (3) 15°C.
- (4) 4°C.

79. Refer to the Appendix: WEATHER SYNOPSIS # 100 (METAR).

The altimeter setting at Winnipeg (CYWG) is

- (1) 30.43 in. Hg.
- (2) 30.43 mb.
- (3) 933.2 in. Hg.
- (4) 1332.0 mb.

80. A METAR describes the weather

- (1) expected at a station at a given time.
- (2) expected at a station over a 12 hour period.
- (3) observed at a station at the time of the report.
- (4) observed at a station during the previous day.

NAVIGATION

81. If a heading of 250°M maintains your outbound track of 242°M, the required heading to maintain the reciprocal track back to your departure point would be
- (1) 078°M.
 - (2) 070°M.
 - (3) 062°M.
 - (4) 054°M.

NOTE: For questions 82 to 100 inclusive, refer to the Appendix, CROSS-COUNTRY FLIGHT and to the Toronto VNC Chart.

82. Refer to the VNC.

What is the distance between the following two geographic co-ordinates: N44°00' W78°00' and N45°00' W78°00'?

- (1) 10 NM.
 - (2) 10 SM.
 - (3) 60 NM.
 - (4) 60 SM.
83. Refer to the Appendix: CFS – Lindsay, Ont. (CNF4).

Select the correct statements with respect to the aerodrome information.

- A. Circuits are right hand on runways 13 and 20.
- B. Aircraft radio controlled aerodrome lighting is available.
- C. There are PAPI lights on runways 31 and 13.
- D. Customs service is available.
- E. There is an FSS at the aerodrome.
- F. Aviation gasoline is available.

- (1) A, B, F.
- (2) B, E, F.
- (3) C, D, F.
- (4) A, B, D.

84. Refer to the VNC.

The hypsometric tinting on the chart indicates that between the Lindsay and Gananoque aerodromes the flight will be conducted over ground which is between

- (1) sea level and 1,000 ft.
- (2) sea level and 1,500 ft.
- (3) 1,000 ft and 2,000 ft.
- (4) sea level and 2,000 ft.

85. Wind 250°T at 20 kt.
True Air Speed 105 kt.
Track 010°T

Using the above information the computed heading and groundspeed en route Oshawa to Lindsay is nearest to

- (1) 010°M and 105 kt.
 - (2) 360°M and 112 kt.
 - (3) 012°M and 114 kt.
 - (4) 031°M and 105 kt.
86. Refer to the VNC.
- En route from Oshawa to Lindsay you pass through CYA 520(T). You must be more alert for
- (1) aircraft on approach to Lester B. Pearson International Airport (Toronto).
 - (2) civilian flight training activity.
 - (3) aerobatic activity.
 - (4) military flight training activity.

87. Refer to the VNC.

What is the magnetic track from Lindsay (CNF4) to Gananoque (CNN8)?

- (1) 281°.
 - (2) 077°.
 - (3) 089°.
 - (4) 101°.
88. Refer to the VNC.
- The estimated flight time from Lindsay to Gananoque at 5,500 ft with a groundspeed of 100 kt is nearest to

NOTE: Add an extra 2 minutes for each 1,000 ft of climb.

- (1) 1 hour and 05 minutes.
- (2) 1 hour and 15 minutes.
- (3) 1 hour and 20 minutes.
- (4) 1 hour and 25 minutes.

89. Average fuel consumption 5.5 gph
Total flight time 1 hour and 50 minutes

NOTE: Add 2.0 gal for taxi, take-off and climb at Oshawa.
Add 2.0 gal for taxi, take-off and climb at Lindsay.

Using the above information, calculate the day VFR fuel requirements for a flight from Oshawa to Gananoque with a stop at Lindsay.

- (1) 18.1 gal.
- (2) 16.9 gal.
- (3) 14.1 gal.
- (4) 12.8 gal.

90. Pressure Altitude 6,500 ft
Outside Air Temperature 15°C
Indicated Airspeed 100 kt

Using the above information, what is the true airspeed? Assume indicated airspeed is equal to calibrated airspeed.

- (1) 89 kt
- (2) 94 kt
- (3) 106 kt
- (4) 113 kt

91. Refer to the VNC.

The highest obstacle within 5 NM either side of your track from Lindsay to Gananoque is

- (1) 1,857 feet ASL.
- (2) 1,600 feet ASL.
- (3) 1,475 feet ASL.
- (4) 1,246 feet AGL.

92. Refer to the VNC.

While on track abeam Peterborough (N44°13' W78°21'), you wish to obtain the latest weather for Kingston (N44°13' W76°35') to get some indication of what conditions will be at Gananoque. What would be the most appropriate station and frequency to call for this information?

- (1) Peterborough UNICOM 122.8 MHz.
- (2) London Radio 126.7 MHz.
- (3) Campbellford Radio 113.5 MHz.
- (4) Trenton Tower 128.7 MHz.

93. Refer to the VNC.

Your aircraft crosses the town of Bridgenorth (N44°23' W78°23') at 1810Z.
At 1822Z your aircraft is abeam the town of Norwood (N44°23' W77°59').
Your ETA at Gananoque aerodrome will be closest to

- (1) 1902Z.
- (2) 1908Z.
- (3) 1914Z.
- (4) 1920Z.

94. Refer to the VNC.

You are north of track over the town of Marlbank (N44°26' W77°05'). Using the opening and closing angles method, you should alter heading to the right

- (1) 2°.
- (2) 5°.
- (3) 8°.
- (4) 10°.

95. Refer to the VNC.

What class of airspace would you be flying through when your aircraft is at 5,500 feet ASL, over Marlbank (N44°26' W77°05')?

- (1) D.
- (2) E.
- (3) F.
- (4) G.

96. Refer to the VNC.

With the VOR receiver tuned to the Coehill VOR (N44°40' W77°50'), when you are over the town of Marlbank (N44°26' W77°05') the CDI should be

- (1) centred with a "FROM" indication when the OBS is 123°.
- (2) centred with a "FROM" indication when the OBS is 303°.
- (3) deflected full left when the OBS is 123°.
- (4) deflected full right when the OBS is 303°.

97. Refer to the VNC or to the Appendix: CFS – Kingston, Ont. (CYGK).

Due to deteriorating weather you decide to divert to Kingston (N44°13' W76°35'), but you become disoriented. To assist in locating the airport, Kingston FSS could give you a

- (1) radar vector.
- (2) ADF steer.
- (3) DF steer.
- (4) VOR vector.

98. When a VFR flight plan has been filed and no search and rescue time has been specified in the flight plan, the pilot-in-command shall file an arrival report with the appropriate ATS unit not later than

- (1) 30 minutes after the last reported ETA.
- (2) 1 hour after the last reported ETA.
- (3) 12 hours after landing.
- (4) 24 hours after landing.

99. Refer to the VNC.

What class of airspace is CYR 503, located 3 NM east of the Kingston airport (N44°13' W76°35')?

- (1) D.
- (2) E.
- (3) F.
- (4) G.

100. Refer to the VNC or to the Appendix: CFS – Kingston, Ont. (CYGK).

The reported ceiling at Kingston is 1,000 ft broken and visibility is 4 miles. To remain VFR in controlled airspace, an aircraft must join the circuit at Kingston

- (1) at 800 ft ASL.
- (2) at 1,300 ft ASL.
- (3) in accordance with SVFR.
- (4) as high as possible without entering cloud.



Transport
Canada

Transports
Canada

APPENDIX and ANSWER KEY **for** **Sample Examination**

Recreational Pilot Permit and Private Pilot Licence

Aeroplane

Fourth Edition

November 2008



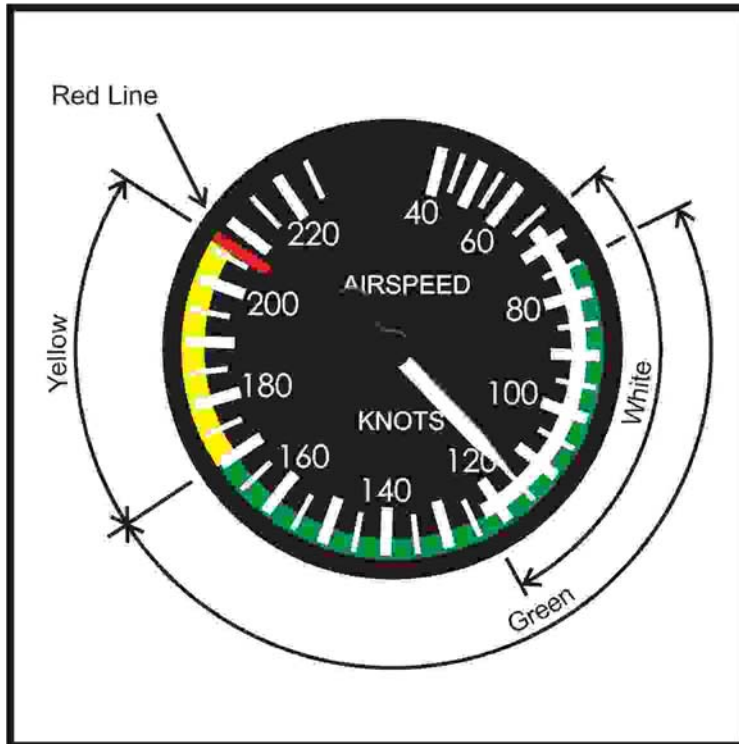
Canada

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Pg

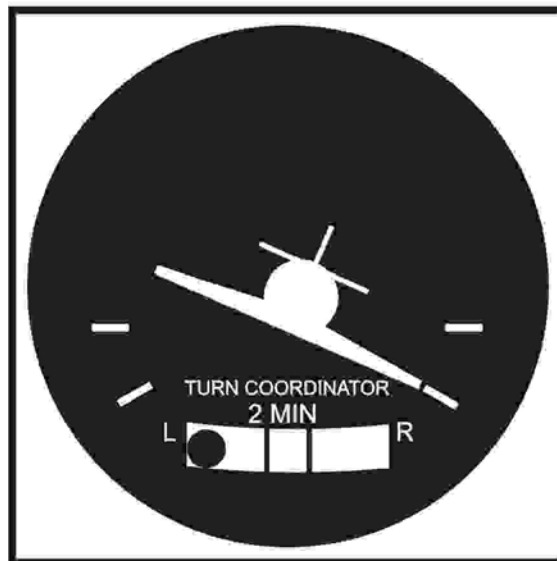
- 23. AIRSPEED INDICATOR (Diagram #1)
TURN CO-ORDINATOR (Diagram #1)
- 24. CROSS-WIND GRAPH #2
- 25. TAKE-OFF DISTANCE (Table #1)
- 26. LOADING GRAPH #4
- 27. CENTRE OF GRAVITY MOMENT ENVELOPE #6
- 28. WEATHER SYNOPSIS # 100 (Page 1 of 7)
- 29. WEATHER SYNOPSIS # 100 (Page 2 of 7)
- 30. WEATHER SYNOPSIS # 100 (Page 3 of 7)
- 31. WEATHER SYNOPSIS # 100 (Page 4 of 7)
- 32. WEATHER SYNOPSIS # 100 (Page 5 of 7)
- 33. WEATHER SYNOPSIS # 100 (Page 6 of 7)
- 34. WEATHER SYNOPSIS # 100 (Page 7 of 7)
- 35. CROSS-COUNTRY FLIGHT
- 36. CFS – LINDSAY, Ont.
- 37. CFS – KINGSTON, Ont.
- 38. ANSWER KEY

AIRSPEED INDICATOR (Diagram #1)



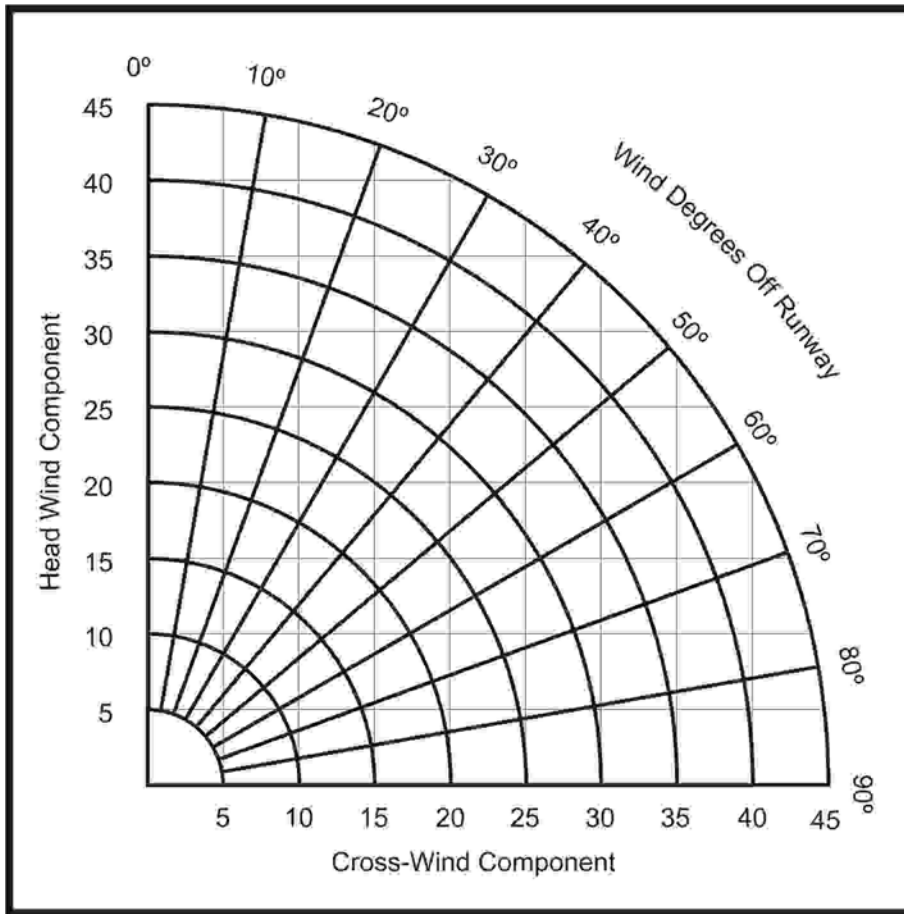
Appendix 0035

TURN COORDINATOR (Diagram #1)



Appendix 0038

CROSS-WIND GRAPH #2



Appendix 0048

TAKE-OFF DISTANCE (Table #1)

CONDITIONS:

Zero Wind
 Paved, Level, Dry Runway
 Full Throttle Prior to Brake Release
 Flaps Up

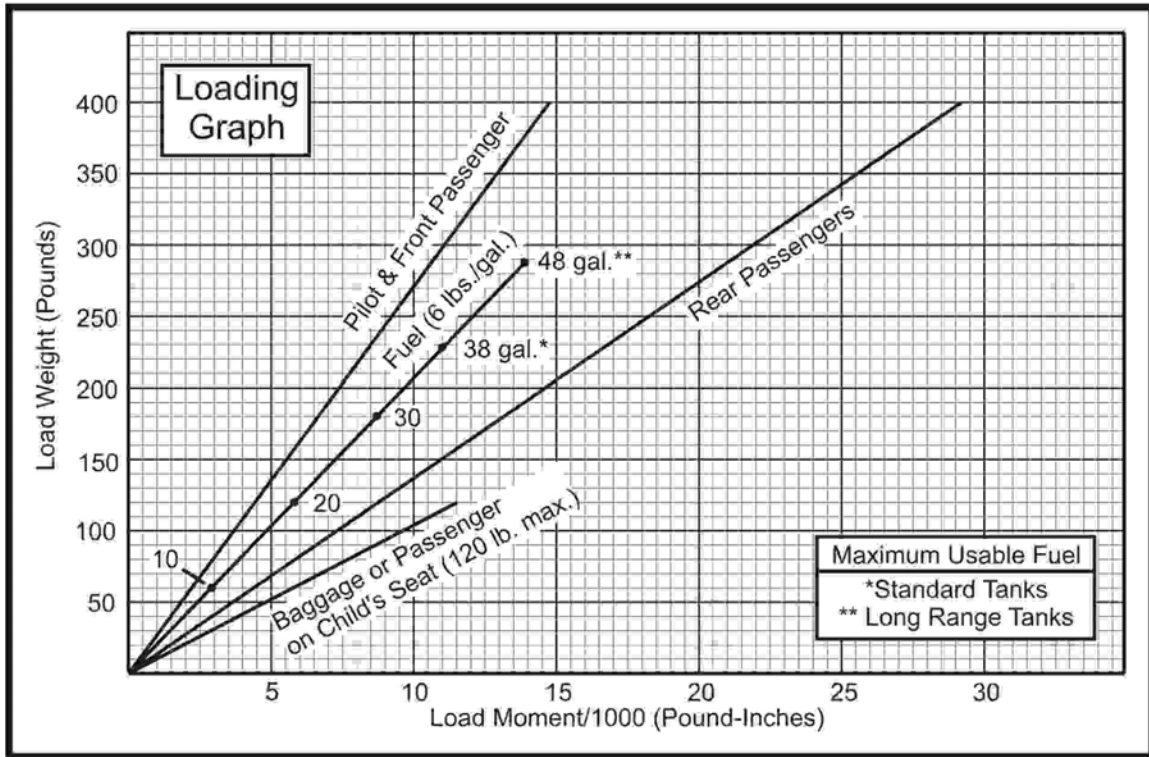
NOTES:

1. Maximum performance technique as specified.
2. Prior to takeoff from fields above 5000 feet elevation, the mixture should be leaned to give maximum RPM in a full throttle, static runup.
3. Decrease distances 10% for each 9 knots headwind. For operation with tailwinds up to 10 knots, increase distances by 10% for each 2 knots.
4. Where distance value has been deleted, climb performance after lift-off is less than 150 fpm at takeoff speed.
5. For operation on a dry, grass runway, increase distances by 15% of the "ground roll" figure.

WEIGHT LBS	TAKEOFF SPEED KIAS		PRESS ALT FT	0°C		10°C		20°C		30°C		40°C	
	LIFT OFF	AT 50 FT		GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS
1600	53	60	S.L.	655	1245	710	1335	765	1435	820	1540	880	1650
			1000	720	1365	775	1465	835	1575	900	1690	970	1815
			2000	790	1500	855	1615	920	1735	990	1865	1065	2005
			3000	870	1650	935	1780	1010	1915	1090	2065	1170	2225
			4000	955	1820	1030	1965	1115	2125	1200	2290	1290	2475
			5000	1050	2015	1140	2185	1230	2360	1325	2555	1430	2770
			6000	1160	2245	1255	2435	1360	2640	1465	2870	1580	3120
			7000	1285	2510	1390	2730	1505	2970	1625	3240	—	—
			8000	1420	2820	1540	3080	1670	3370	—	—	—	—

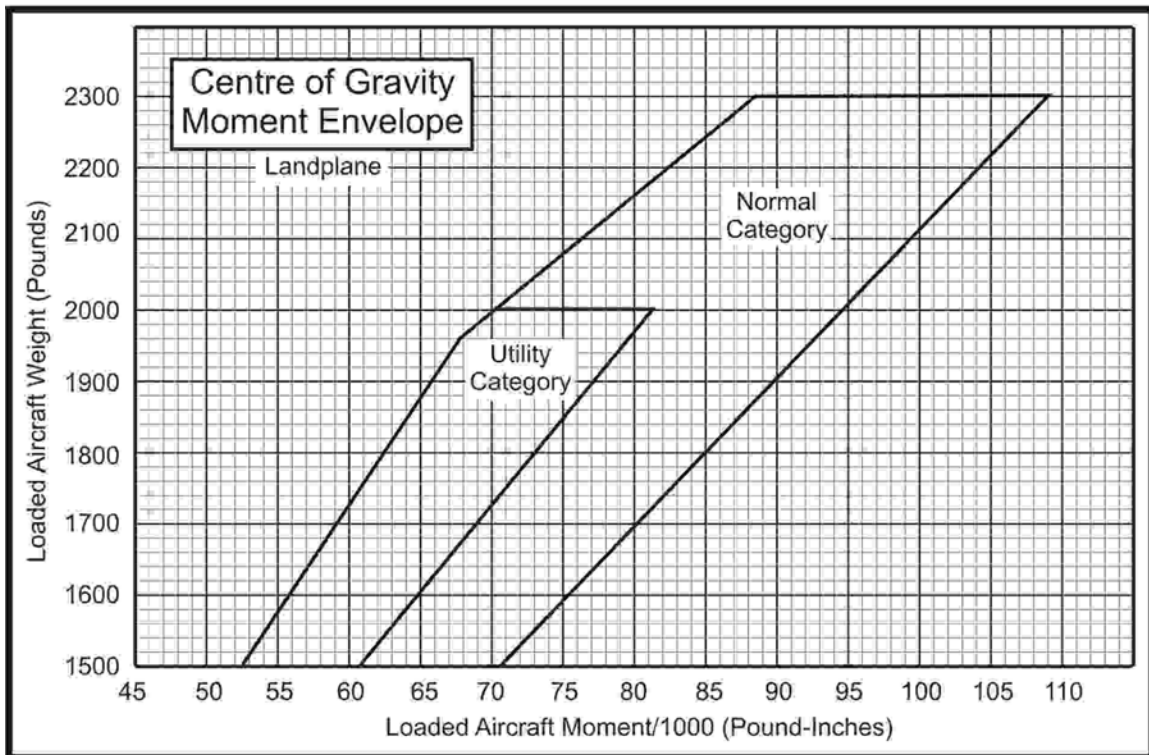
Appendix 0051

LOADING GRAPH #4



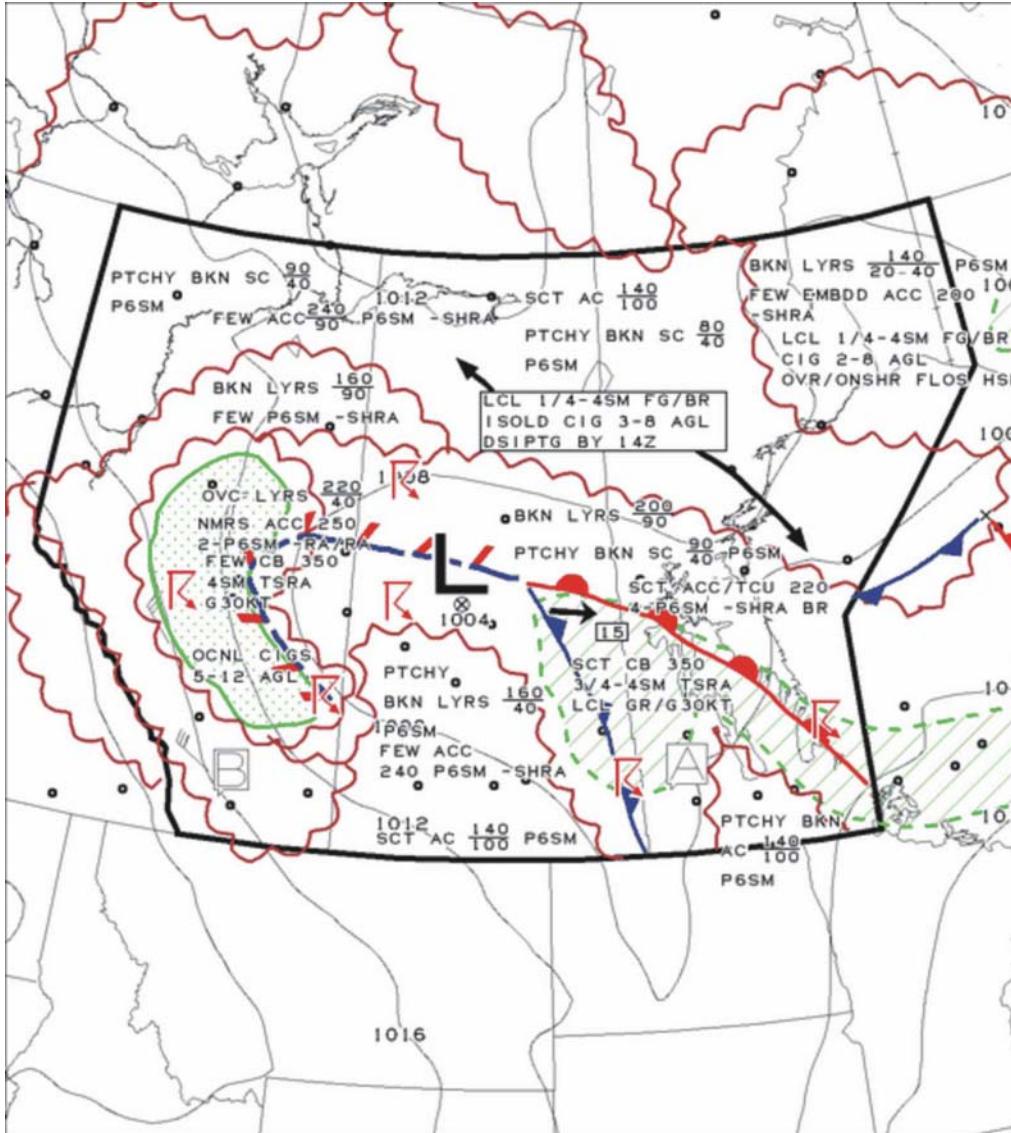
Appendix 0306

CENTRE OF GRAVITY MOMENT ENVELOPE #6



Appendix 0307

WEATHER SYNOPSIS # 100 (Page 1 of 7)



GFACN33 CWAO

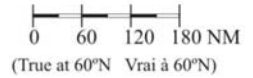
PRAIRIES REGION
REGIONS DES PRAIRIES

CLOUDS AND WEATHER
NUAGES ET TEMPS

ISSUED AT 24/06/2008 1114Z
ÉMIS A

VLD 24/06/2008 1200Z

LEGEND/LÉGENDE



COMMENTS/COMMENTAIRES

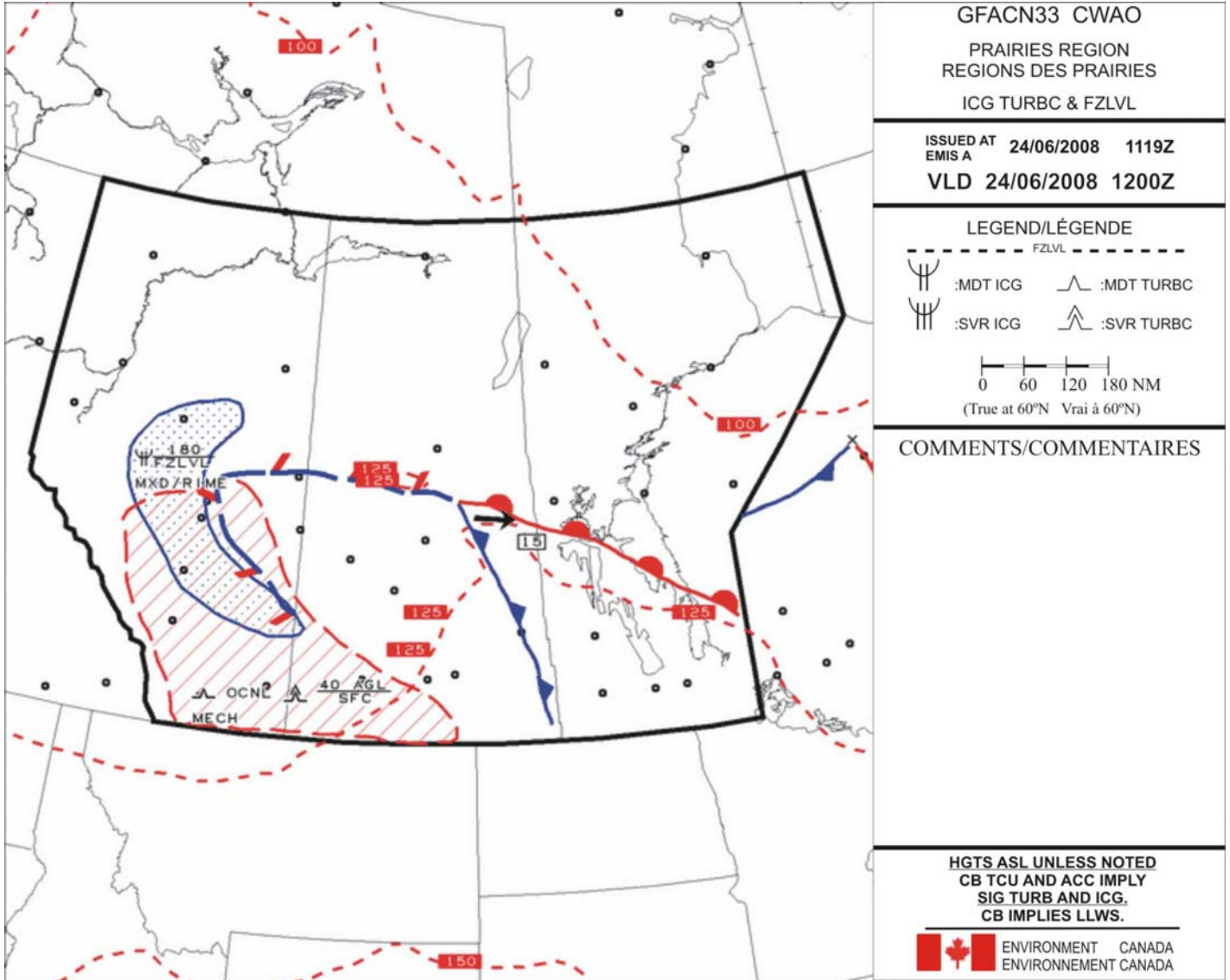
- A: DVLPG IN PCPN LCL CIG 5-15 AGL.
- B: PTCHY BKN ST CIGS 6-12 AGL LCL 4 AGL.

HGTS ASL UNLESS NOTED
CB TCU AND ACC IMPLY
SIG TURB AND ICG.
CB IMPLIES LLWS.

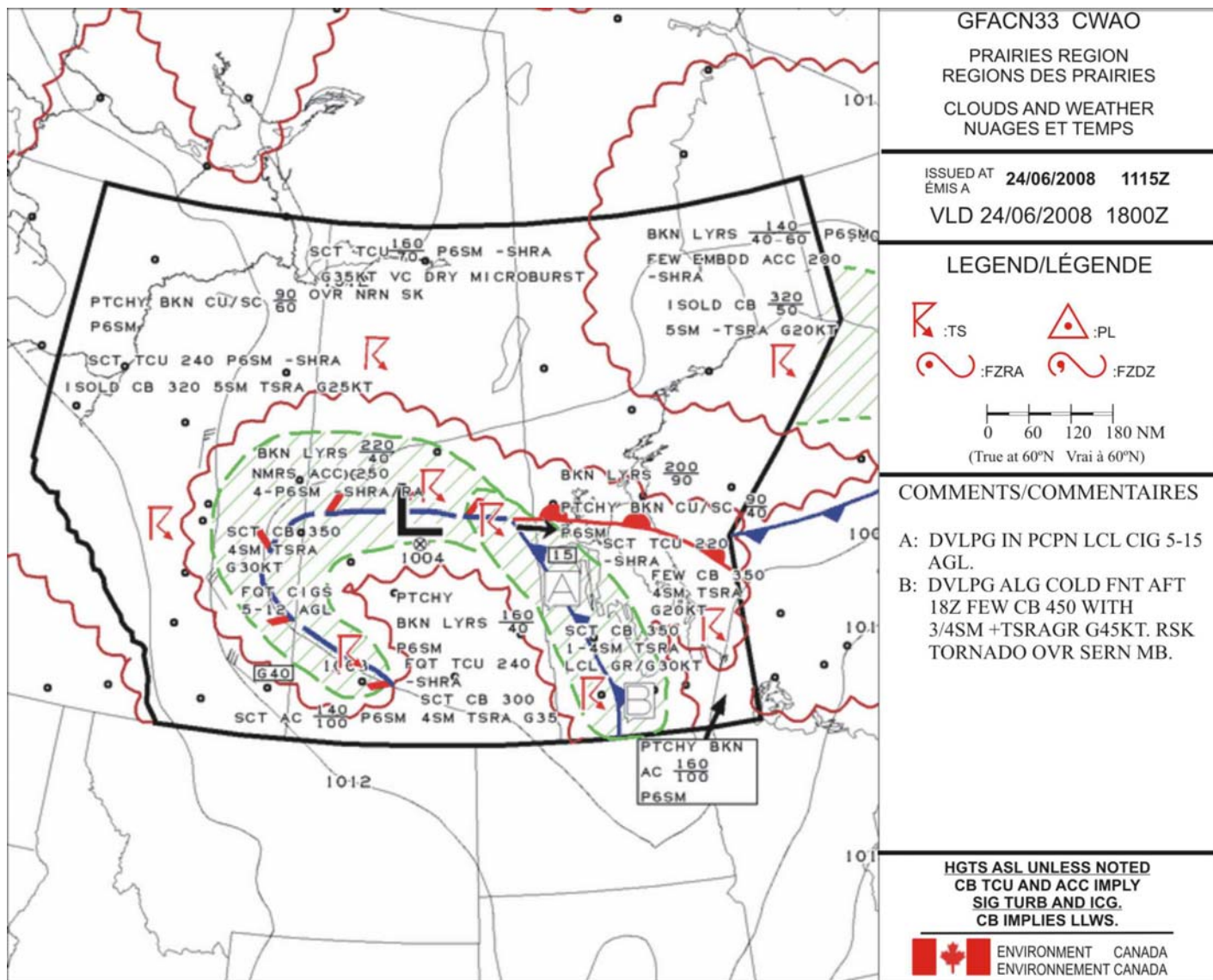


ENVIRONMENT CANADA
ENVIRONNEMENT CANADA

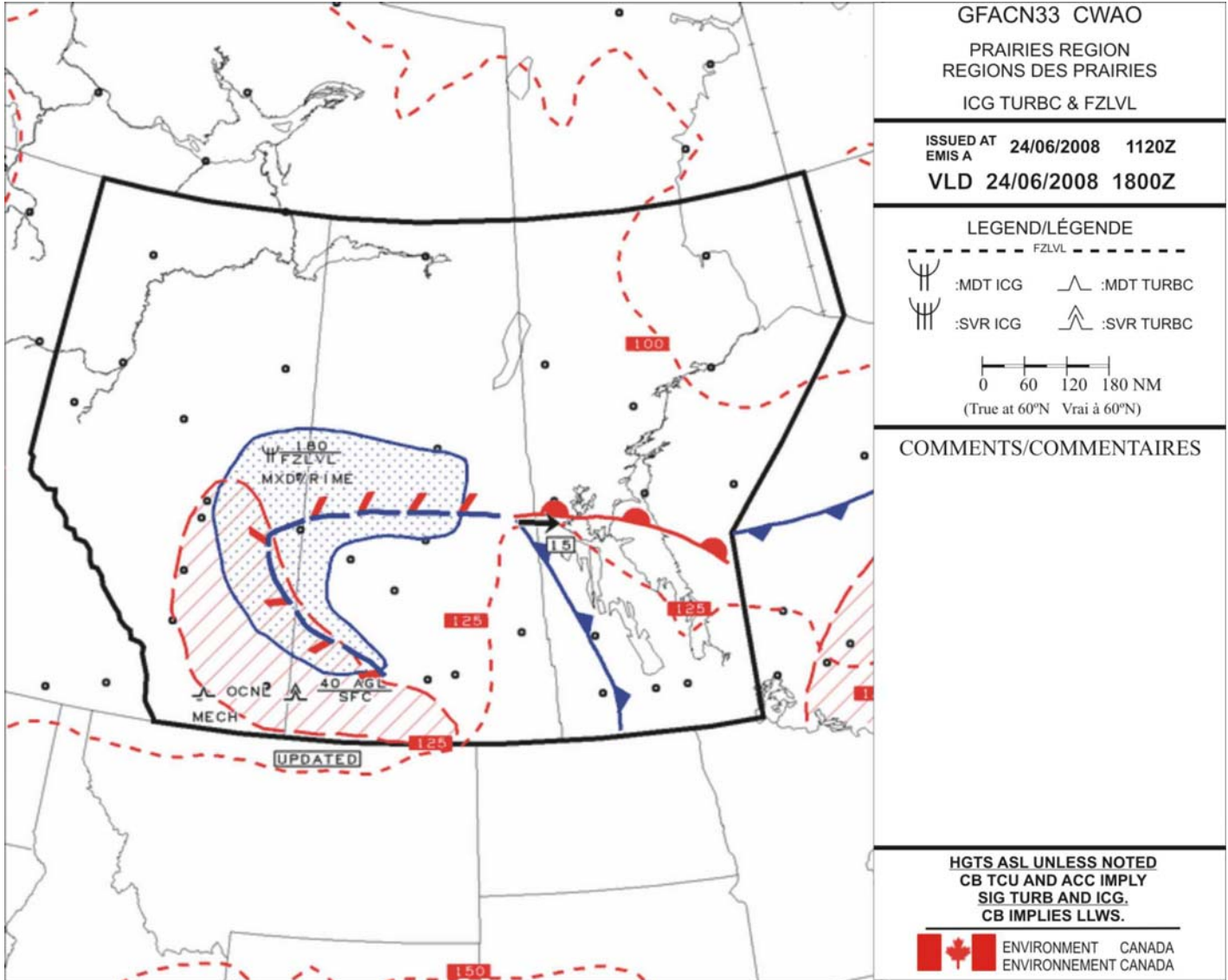
WEATHER SYNOPSIS # 100 (Page 2 of 7)



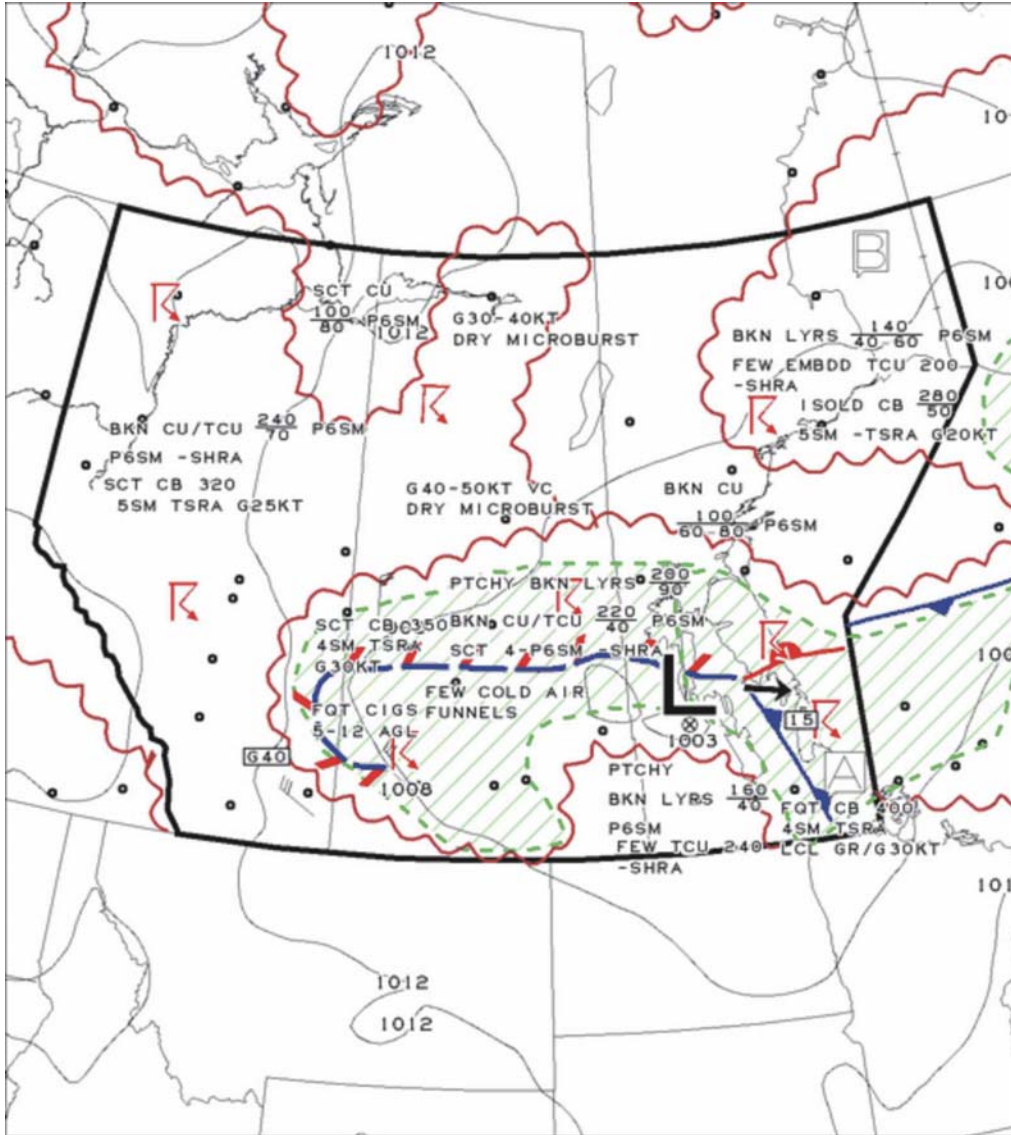
WEATHER SYNOPSIS # 100 (Page 3 of 7)



WEATHER SYNOPSIS # 100 (Page 4 of 7)



WEATHER SYNOPSIS # 100 (Page 5 of 7)



GFACN33 CWAO

PRAIRIES REGION
REGIONS DES PRAIRIES

CLOUDS AND WEATHER
NUAGES ET TEMPS

ISSUED AT 24/06/2008 1117Z
EMIS A

VLD 25/06/2008 0000Z

LEGEND/LÉGENDE

⚡ :TS ▲ :PL
 ~~~~~ :FZRA      ~~~~~ :FZDZ

0 60 120 180 NM  
 (True at 60°N Vrai à 60°N)

**COMMENTS/COMMENTAIRES**

- A: ALG COLD FNT FEW CB 550 WITH 3/4SM +TSRAGR G60KT. RSK TORNADO OVR SRN MB.
- B: OVR/IN ONSHR FLOS HSNBA PTCHY CIG 2-8 AGL AND 1/4-4SM FG/BR.

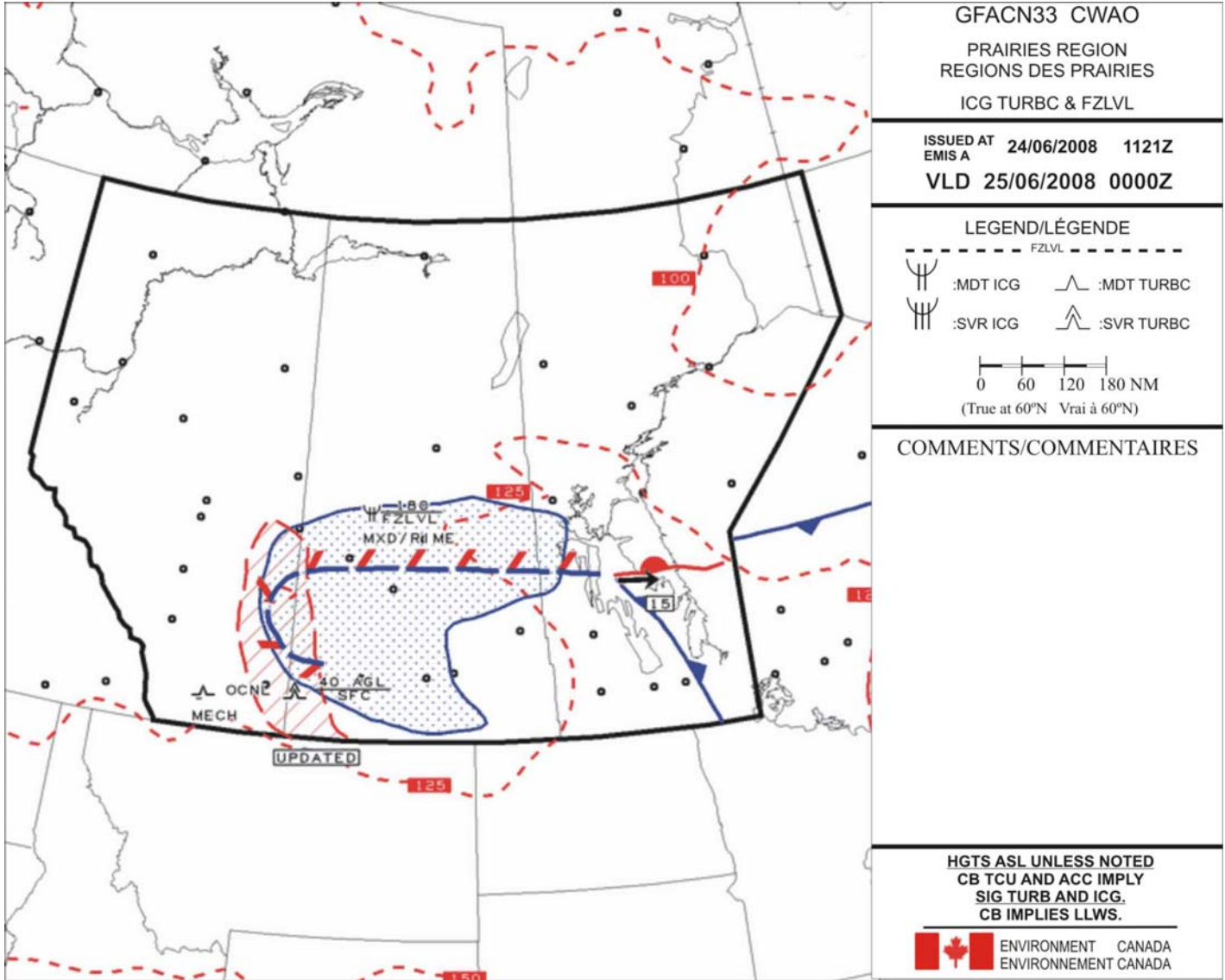
----IFR OTLK----  
 VLD 00-12Z 25 JUN/JUIN 2008  
 FQT IFR CIG/RA/FG OVR SRN MB/SERN SK.

**HGTS ASL UNLESS NOTED  
 CB TCU AND ACC IMPLY  
 SIG TURB AND ICG.  
 CB IMPLIES LLWS.**



ENVIRONMENT CANADA  
 ENVIRONNEMENT CANADA

**WEATHER SYNOPSIS # 100 (Page 6 of 7)**



GFCACN33 CWAO  
 PRAIRIES REGION  
 REGIONS DES PRAIRIES  
 ICG TURBC & FZLVL

ISSUED AT 24/06/2008 1121Z  
 EMIS A  
 VLD 25/06/2008 0000Z

LEGEND/LÉGENDE

- FZLVL - - - - -
- :MDT ICG
  - :MDT TURBC
  - :SVR ICG
  - :SVR TURBC

0 60 120 180 NM  
 (True at 60°N Vrai à 60°N)

COMMENTS/COMMENTAIRES

HGTS ASL UNLESS NOTED  
 CB TCU AND ACC IMPLY  
 SIG TURB AND ICG.  
 CB IMPLIES LLWS.



## **WEATHER SYNOPSIS # 100 (PAGE 7 OF 7)**

### **FTCN34 CWEG 071000**

TAF CYBR 071030Z 071123 27010KT P6SM SCT020 RMK NXT FCST BY 17Z =  
TAF CYPG 071245Z 071323 34015KT P6SM SCT010 SCT020 RMK NXT FCST BY 17Z =  
TAF CYWG 071030Z 071111 36015KT P6SM SCT010 SCT020 FM1200Z 36015KT P6SM  
SCT020 BECMG 2300 27010KT RMK NXT FCST BY 17Z =  
TAF CYGX 071245Z 071323 VRB03KT P6SM IC SKC FM1800Z 26010KT P6SM SCT100  
SCT250 RMK NXT FCST BY 17Z =  
TAF CYYQ 071030Z 071111 30010KT WS015/35030KT P6SM IC SCT250 FM2100Z 26010KT  
WS015/35030KT P6SM SCT030 SCT100 BKN250 FM0200Z 33015KT P6SM BKN030  
BKN100 TEMPO 0209 3SM -SN FM0900Z 34020KT 3SM BLSN OVC020 TEMPO 0911  
1SM -SN BLSN OVC020 RMK NXT FCST BY 17Z =

### **SACN31 CWA0 071500**

METAR CYBR 071500Z 29012KT 15SM SCT020 BKN 100 M21/M25 A3043 RMK SLP351 =  
METAR CYPG 071500Z 34010KT 15SM FEW015 FEW250 M20/M24 A3045 RMK SC1CI1  
SLP342 =  
METAR CYWG 071500Z 34008KT 15SM SKC M24/M28 A3043 RMK SLP332 =  
METAR CYGX 071500Z 26006KT 15SM SKC M29/M34 A3027 RMK SLP275 =  
METAR CYYQ 071500Z 25006KT 15SM IC FEW090 M30/M35 A3023 RMK AC1 SLP249 =

### **FDCN CWA0 061920**

ISSUED 1200Z 07 FEB 2007 FOR USE 6-17Z

|          |         |         |         |         |         |
|----------|---------|---------|---------|---------|---------|
| 3000     | 6000    | 9000    | 12000   | 18000   | 24000   |
| YWG 2825 | 2728-07 | 2932-10 | 2935-15 | 2939-26 | 2841-38 |
| YBR 3030 | 3132-06 | 3133-10 | 3135-15 | 3041-28 | 2948-40 |
| YYQ 3529 | 3428-13 | 3229-14 | 3130-19 | 3032-32 | 2733-42 |
| YYL 3327 | 3435-10 | 3338-14 | 3337-19 | 3136-31 | 3038-44 |

### **STATION IDENTIFIERS**

|                           |                  |
|---------------------------|------------------|
| CYBR – Brandon            | CYTH – Thompson  |
| CYPG – Portage la Prairie | CYGX – Gillam    |
| CYWG – Winnipeg           | CYYL – Lynn Lake |
| CYQD – The Pas            | CYYQ – Churchill |

## **CROSS-COUNTRY FLIGHT**

### **CHART:**

This navigational exercise is based on the Toronto VFR Navigation Chart AIR 5000, 24<sup>th</sup> Edition dated March 2006.

### **FLIGHT PLANNING DETAILS:**

The cross-country is a day VFR flight from the Oshawa airport (CYOO) to the Gananoque aerodrome (CNN 8) via the Lindsay aerodrome (CNF4).

Depart the Oshawa airport and set course overhead direct to the Lindsay aerodrome at an altitude of 3,500 feet ASL with a planned stop at Lindsay. Depart the Lindsay aerodrome and set course overhead direct to the Gananoque aerodrome at an altitude of 5,500 feet ASL.

| Identifier | Aerodrome Name | Geographical Co-ordinates |
|------------|----------------|---------------------------|
| CYOO       | Oshawa         | N43°55' W78°54'           |
| CNF4       | Lindsay        | N44°22' W78°47'           |
| CNN8       | Gananoque      | N44°24' W76°15'           |

**CFS - LINDSAY, Ont.**

| <b>LINDSAY ON</b> |                                                                                                                                                                                      | <b>CNF4</b> |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>REF</b>        | N44 21 53 W78 47 02 1.1WNW<br>11°W UTC-5(4) Elev 882' A5000<br>F-21 LO6 HI5 CAP                                                                                                      |             |
| <b>OPR</b>        | Lindsay Airpark Ltd. 705-324-8921<br>Reg ltd hrs                                                                                                                                     |             |
| <b>PF</b>         | B-1,2 C-3,4,5,6                                                                                                                                                                      |             |
| <b>FLT PLN</b>    | NOTAM FILE CYPQ CZYZ                                                                                                                                                                 |             |
| <b>FIC</b>        | London 866-WXBRIEF                                                                                                                                                                   |             |
| <b>SERVICES</b>   | 100LL, Nov-Apr 14-22Z†,<br>May-Oct 13-23Z†                                                                                                                                           |             |
| <b>FUEL</b>       | All                                                                                                                                                                                  |             |
| <b>OIL</b>        | 3                                                                                                                                                                                    |             |
| <b>RWY DATA</b>   | Rwy 13/31 3500x75 asphalt<br>Rwy 02/20 2642x75 turf Thld 02 displ 360'                                                                                                               |             |
| <b>RCR</b>        | Opr No win maint rwy 02/20                                                                                                                                                           |             |
| <b>LIGHTING</b>   | 13-(TE LO), 31-(TE LO) ARCAL-122.8 type K;<br>rotating bcn inop after 0459Z†.                                                                                                        |             |
| <b>COMM</b>       | unicom ltd hrs O/T tfc 122.8 5NM 3900 ASL<br>Toronto Centre 134.25<br>Toronto Centre 134.25                                                                                          |             |
| <b>ATF</b>        |                                                                                                                                                                                      |             |
| <b>ARR</b>        |                                                                                                                                                                                      |             |
| <b>DEP</b>        |                                                                                                                                                                                      |             |
| <b>NAV</b>        | SIMCOE YSO 117.35 Ch 120(Y) N44 14 19 W79 10 18 (931') 076°                                                                                                                          |             |
| <b>VOR/DME</b>    | 18.4NM to A/D                                                                                                                                                                        |             |
| <b>PRO</b>        | Rgt hand circuits rwys 13 & 20 (CAR 602.96). Trng activity btwn<br>Toronto/Buttonville Municipal & Oshawa aprts. See Planning, Ontario,<br>Hazards to acft ops, Claremont trng area. |             |

Appendix 0312

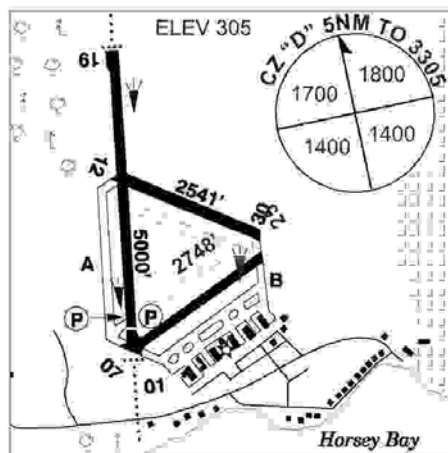
**CFS - LINDSAY, Ont.**

| <b>LINDSAY ON</b>                                        |                                                                                                                                                                                      | <b>CNF4</b> |
|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>REF</b>                                               | N44 21 53 W78 47 02 1.1WNW<br>11°W UTC-5(4) Elev 882' A5000<br>F-21 LO6 HI5 CAP                                                                                                      |             |
| <b>OPR</b>                                               | Lindsay Airpark Ltd. 705-324-8921<br>Reg ltd hrs                                                                                                                                     |             |
| <b>PF</b>                                                | B-1,2 C-3,4,5,6                                                                                                                                                                      |             |
| <b>FLT PLN</b><br><b>FIC</b>                             | NOTAM FILE CYPQ CXYZ<br>London 866-WXBRIEF                                                                                                                                           |             |
| <b>SERVICES</b><br><b>FUEL</b><br><b>OIL</b><br><b>S</b> | 100LL, Nov-Apr 14-22Z‡,<br>May-Oct 13-23Z‡<br>All<br>3                                                                                                                               |             |
| <b>RWY DATA</b><br><b>RCR</b>                            | Rwy 13/31 3500x75 asphalt<br>Rwy 02/20 2642x75 turf Thld 02 displ 360'<br>Opr No win maint rwy 02/20                                                                                 |             |
| <b>LIGHTING</b>                                          | 13-(TE LO), 31-(TE LO) ARCAL-122.8 type K;<br>rotating bcn inop after 0459Z‡.                                                                                                        |             |
| <b>COMM</b><br><b>ATF</b><br><b>ARR</b><br><b>DEP</b>    | unicom ltd hrs O/T tfc 122.8 5NM 3900 ASL<br>Toronto Centre 134.25<br>Toronto Centre 134.25                                                                                          |             |
| <b>NAV</b><br><b>VOR/DME</b>                             | SIMCOE YSO 117.35 Ch 120(Y) N44 14 19 W79 10 18 (931') 076°<br>18.4NM to A/D                                                                                                         |             |
| <b>PRO</b>                                               | Rgt hand circuits rwys 13 & 20 (CAR 602.96). Trng activity btwn<br>Toronto/Buttonville Municipal & Oshawa aprts. See Planning, Ontario,<br>Hazards to acft ops, Claremont trng area. |             |

Appendix 0312

## CFS - KINGSTON, ON

| <b>KINGSTON ONT</b> |                                                                                                                                               | <b>CYGK</b> |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>REF</b>          | N44 13 31 W76 35 57 4.3W 13°W<br>UTC-5(4) Elev 305' A5000 F21<br>LO6 LO7 HI5 CAP                                                              |             |
| <b>OPR</b>          | City 613-389-6404 Cert ltd hrs                                                                                                                |             |
| <b>PF</b>           | B-1, D-2,3,5                                                                                                                                  |             |
| <b>CUST</b>         | AOE/30 888-226-7277 13-02Z‡<br>excl Dec 25 & Jan 1                                                                                            |             |
| <b>FLT PLN</b>      | NOTAM FILE CYGK                                                                                                                               |             |
| <b>FIC</b>          | London 866-WXBRIEF                                                                                                                            |             |
| <b>WX</b>           | METAR 11-04Z‡<br>TAF 13-04Z‡; issue times 13, 20, 02Z                                                                                         |             |
| <b>SERVICES</b>     | All svcs avbl 12-04Z‡,<br>O/T PNR call out chg 613-389-9300                                                                                   |             |
| <b>FUEL</b>         | 80, 100, JA-1                                                                                                                                 |             |
| <b>OIL</b>          | 65, 80, 100, 120                                                                                                                              |             |
| <b>S</b>            | 1,2,4,5,6                                                                                                                                     |             |
| <b>ARFF</b>         | 4 13-2130Z‡ Mon-Fri, O/T PNR                                                                                                                  |             |
| <b>JASU</b>         | CE15, 16                                                                                                                                      |             |
| <b>SUP FL</b>       | ADI, D-Ice                                                                                                                                    |             |
| <b>PVT ADV</b>      | Central airways 123.35 13-0230Z‡; Kingston Flying Club 122.8 ltd hrs                                                                          |             |
| <b>RWY DATA</b>     | Rwy 01(009°)/19(189°) 5000x100 asphalt Thld 01 displ 365'<br>Rwy 07(066°)/25(246°) 2748x100 asphalt<br>Rwy 12(124°)/30(304°) 2541x100 asphalt |             |
| <b>RCR</b>          | opr Twy alfa W of rwy 01 rstd to acft less than 25,000 lbs, JBI, PLR                                                                          |             |
| <b>LIGHTING</b>     | 01-AJ AS(TE ME), 19-AJ AS(TE ME), 07-(TE ME), 25-(TE ME),<br>Lgtg avbl O/R thru FSS                                                           |             |
| <b>COMM</b>         |                                                                                                                                               |             |
| <b>RADIO</b>        | 122.5 238.3 (E) (emerg only 613-389-7558)                                                                                                     |             |
| <b>RCO</b>          | London rdo 126.7 (FISE)                                                                                                                       |             |
| <b>MF</b>           | rdo 122.5 5NM 3300 ASL                                                                                                                        |             |
| <b>VDF</b>          | 122.5 (V) 1115-04Z‡                                                                                                                           |             |
| <b>NAV</b>          |                                                                                                                                               |             |
| <b>ILS</b>          | IA7-111.3 Pvt                                                                                                                                 |             |
| <b>NDB</b>          | YGK 263 (M) N44 17 48 W76 36 21 192° 3.8NM to A/D                                                                                             |             |
| <b>PRO</b>          | Due to rwy slope on 01-19 acft on rwy ends may not be vis to pilots at<br>opposite ends of rwy                                                |             |



Appendix 0059

## **ANSWER KEY**

|        |        |        |         |
|--------|--------|--------|---------|
| 1-(2)  | 26-(4) | 51-(3) | 76-(3)  |
| 2-(3)  | 27-(1) | 52-(4) | 77-(4)  |
| 3-(4)  | 28-(3) | 53-(4) | 78-(4)  |
| 4-(1)  | 29-(1) | 54-(1) | 79-(1)  |
| 5-(3)  | 30-(1) | 55-(4) | 80-(3)  |
| 6-(3)  | 31-(3) | 56-(3) | 81-(4)  |
| 7-(4)  | 32-(2) | 57-(4) | 82-(3)  |
| 8-(1)  | 33-(1) | 58-(1) | 83-(1)  |
| 9-(4)  | 34-(1) | 59-(2) | 84-(1)  |
| 10-(2) | 35-(3) | 60-(3) | 85-(3)  |
| 11-(3) | 36-(1) | 61-(2) | 86-(2)  |
| 12-(1) | 37-(1) | 62-(4) | 87-(4)  |
| 13-(3) | 38-(1) | 63-(3) | 88-(2)  |
| 14-(3) | 39-(2) | 64-(4) | 89-(2)  |
| 15-(4) | 40-(3) | 65-(3) | 90-(4)  |
| 16-(3) | 41-(3) | 66-(1) | 91-(1)  |
| 17-(3) | 42-(4) | 67-(2) | 92-(2)  |
| 18-(1) | 43-(2) | 68-(2) | 93-(3)  |
| 19-(4) | 44-(4) | 69-(4) | 94-(2)  |
| 20-(3) | 45-(3) | 70-(2) | 95-(2)  |
| 21-(2) | 46-(1) | 71-(3) | 96-(1)  |
| 22-(2) | 47-(2) | 72-(2) | 97-(3)  |
| 23-(4) | 48-(2) | 73-(4) | 98-(2)  |
| 24-(4) | 49-(2) | 74-(3) | 99-(3)  |
| 25-(3) | 50-(4) | 75-(1) | 100-(1) |