

2012
METEOROLOGICAL INSTRUMENT PROFICIENCY
OPEN BOOK EXAM

Prepared for: 1 Canadian Air Division Instrument Check Pilot

As this is an OPEN BOOK examination, the candidate will require the following publications:

- Weather Update and Review 2012
- B-GA-007-001/PT-D01, Air Command Weather Manual, 2008

INSTRUCTIONS

Write your unit, SN and name in the space provided.

Check this examination to ensure it is complete and legible.

There are 15 pages including this page and charts.

The examination consists mainly of short answer questions.

Answer questions as per the current issue of the above publications.

There are no marks allotted or passing standards set. However, each incorrect response will be corrected to 100% in your presence.

SN _____ RANK _____

NAME _____

UNIT _____ DATE _____ SCORE _____

EXAMINER _____

PART ONE

Reference: B-GA-007-001/PT-D01, Air Command Weather Manual, 2008

Circle the correct answer:

1. The density of air (increases / decreases) with decreased atmospheric pressure.
2. The density of air (increases / decreases) with increased temperature.
3. The density of air (increases / decreases) with increased water vapour content.
4. Aircraft performance (increases / decreases) with increasing air density.
5. Instability is developed in a layer by that layer being (cooled / heated) in the lower levels or (cooled / heated) in the upper levels.
6. On a flight from west to east on a track just south of a low pressure center, the winds would (veer / back) along the flight path.

7. In low pressure areas, troughs of low pressure, and in up slope flow areas, air rises. Generally explain how this affects the formation or dissipation of cloud.

8. From the following list circle all those items which are related to a stable atmosphere.
 - a. Poor visibility near surface
 - b. Showers
 - c. Gusty wind
 - d. Hot tropical air moving northward over the cold Labrador current
 - e. Turbulence
 - f. Fog Layers
 - g. Layered clouds

9. Weather Services provide both surface wind conditions and winds aloft in what units of speed and direction?

Wind speed: _____ Direction: _____

10. How does the stability of the air mass change when the air mass is heated from below?

11. What does the term TROWAL stand for?

12. Indicate how each of the following variables will usually change with the passage of a cold front:

- a. Temperature will (decrease / increase).
- b. Dew point will (decrease / increase).
- c. Visibility will (decrease / increase).
- d. Altimeter setting will (decrease / increase).
- e. Wind direction will (back / veer).

13. What type of cloud is most common near active warm fronts and forms by precipitation falling from warm air into cold air then cooling and saturating the air to form cloud?

14. What types of precipitation does stratus cloud commonly produce?

15. What kinds of aviation hazards can stratus produce?

16. What should you do when encountering moderate icing in flight?

17. True or false deicing and anti-icing equipment are effective tools to remove clear ice? (True / False)

18. As you approach an airport at night, you see all the lights on the ground for some distance but the current METARS indicate a visibility of 1/4SM. Explain the reason for the difference in the visibility.

19. During white-out conditions neither shadows, horizon, nor clouds are discernible and orientation and depth perception are lost. Only what two kind of objects may be seen?

20. In an advection fog situation or in upslope fog conditions, where can you usually find alternate aerodromes? Why?

21. In the evening, generally the surface winds speed (increases / decreases) and the wind direction (backs / veers)?

22. The greatest wing tip vortex strength occurs close behind an aircraft with what three characteristics?

23. Around a jet stream, the (vertical / horizontal) shear is many times stronger than the (vertical / horizontal) shear.

24. If the air temperature is colder than the ISA, the aircraft will be at an altitude (higher / lower) than that indicated on the altimeter.

25. If the temperature is warmer than the ISA at a pressure level, the density will be (lower / higher) than ISA and aircraft performance and indicated airspeed will be (increased / reduced).

26. If you are flying towards a low pressure system without changing the altimeter setting, the aircraft will be (higher / lower) than indicated.

27. List three causes of low-level wind shear.

28. What is the temperature range with the most significant icing in stratiform or layered cloud?

----- **END OF PART ONE** -----

PART TWO

Reference: Weather Update and Review 2012

METAR PABR 271353Z 11005KT 1/4SM R07/2800VP6000FT FG VV002 03/03 A2982
RMK A02 SLP099

Refer to the above METAR for the following questions.

1. Decode the visibility report in the METAR.

2. Decode the group "VV002".

3. Circle true or false regarding the following statements about Canadian automatic weather observing stations:
 - a. Clouds are sensed in the entire sky around the station. (true / false)
 - b. Clouds are sensed up to an altitude of 25,000 feet. (true / false)
 - c. Legacy AWOS senses cloud up to an altitude of 10,000 feet on. (true / false)
 - d. Cloud amount (SCT, BKN, etc) is assessed depending on the persistence of cloud over the last 10 minutes. (true / false)

CYYZ 271438Z 2715/2818 36005KT P6SM FEW250
FM271700 21005KT WS005/27030KT P6SM SCT050
FM280600 VRB03KT P6SM BKN100 PROB30 2809/2810 2SM +TSRA OVC050CB
FM281000 VRB03KT P6SM –SHRA OVC050 PROB30 2810/2812 1SM +TSRA
SCT005 OVC025CB
FM281200 12005KT 6SM –SHRA BR SCT008 OVC015 TEMPO 2812/2816 3SM
– SHRA BR SCT003 OVC008 PROB30 2812/2816 OVC002
RMK NXT FCST BY 271800Z

Refer to the above TAF for the following questions.

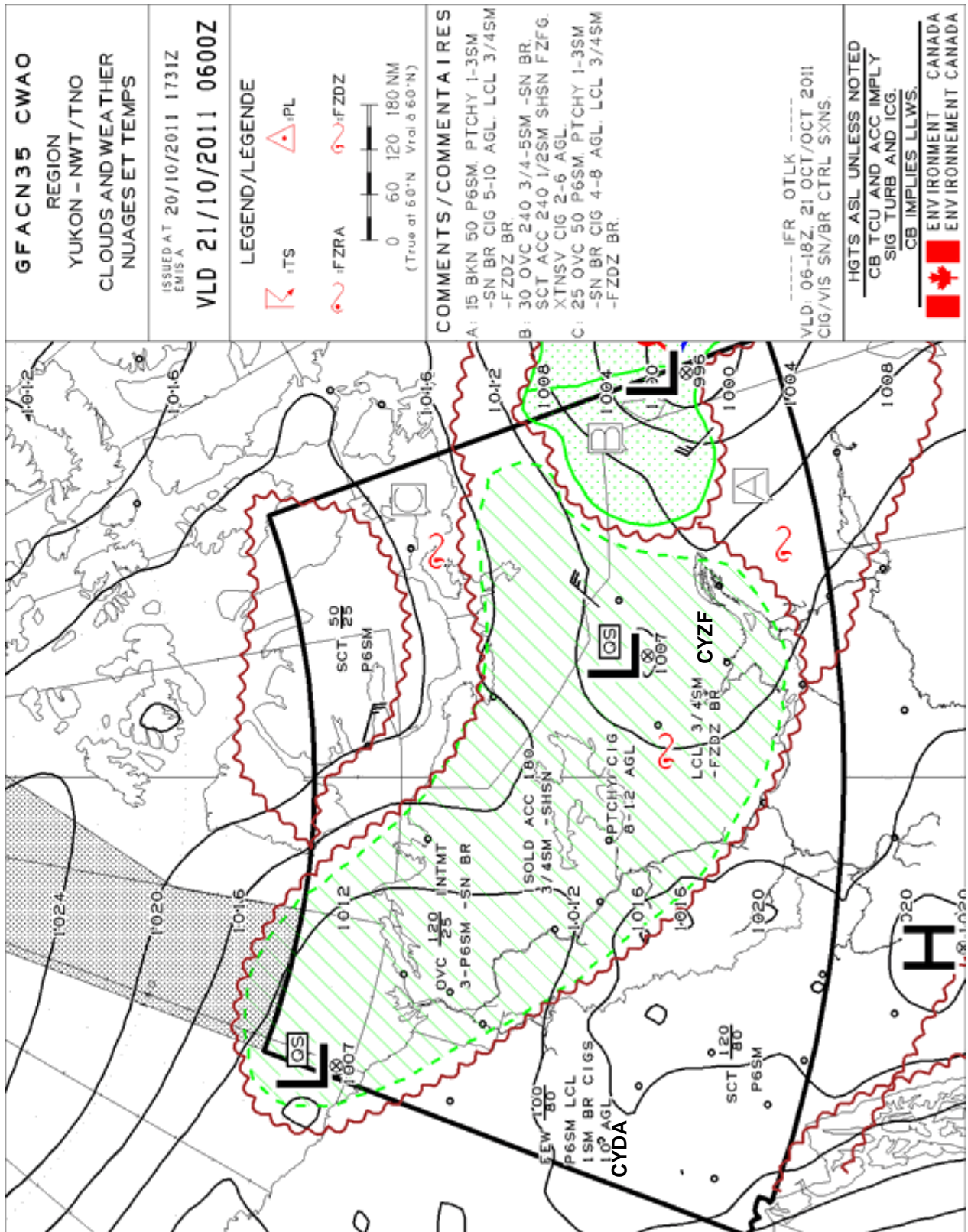
4. What is the forecast sky condition for 1300Z?

5. What is the forecast sky condition for 1100Z?

6. What is the forecast visibility and significant weather at 1000Z?

7. When will the next TAF be issued?

8. What is the full meaning of “WS005/27030KT” in the TAF?

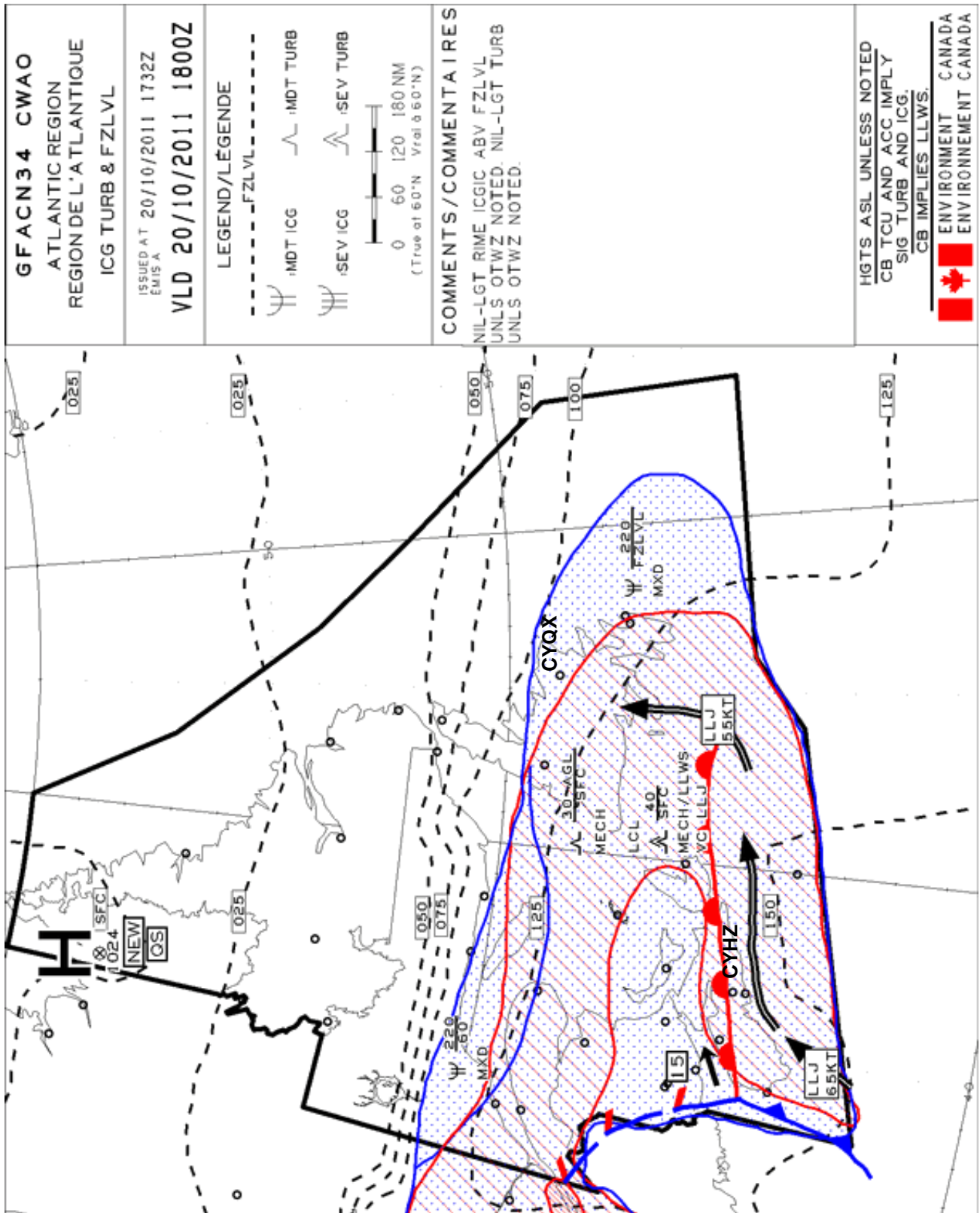


Refer to the above clouds and weather GFACN35 Yukon-NWT region for the following questions.

9. Decode the cloud and weather for the area around Yellowknife Airport (CYZF). Include cloud amounts, bases and tops, visibility, weather, obstructions to vision, and ceilings (all as available).

10. What kind of ceilings and visibility would you expect near Dawson Airport (CYDA) Yukon?

11. What weather and flying conditions are expected to occur over central and southern sections of the in the next 12 hours?



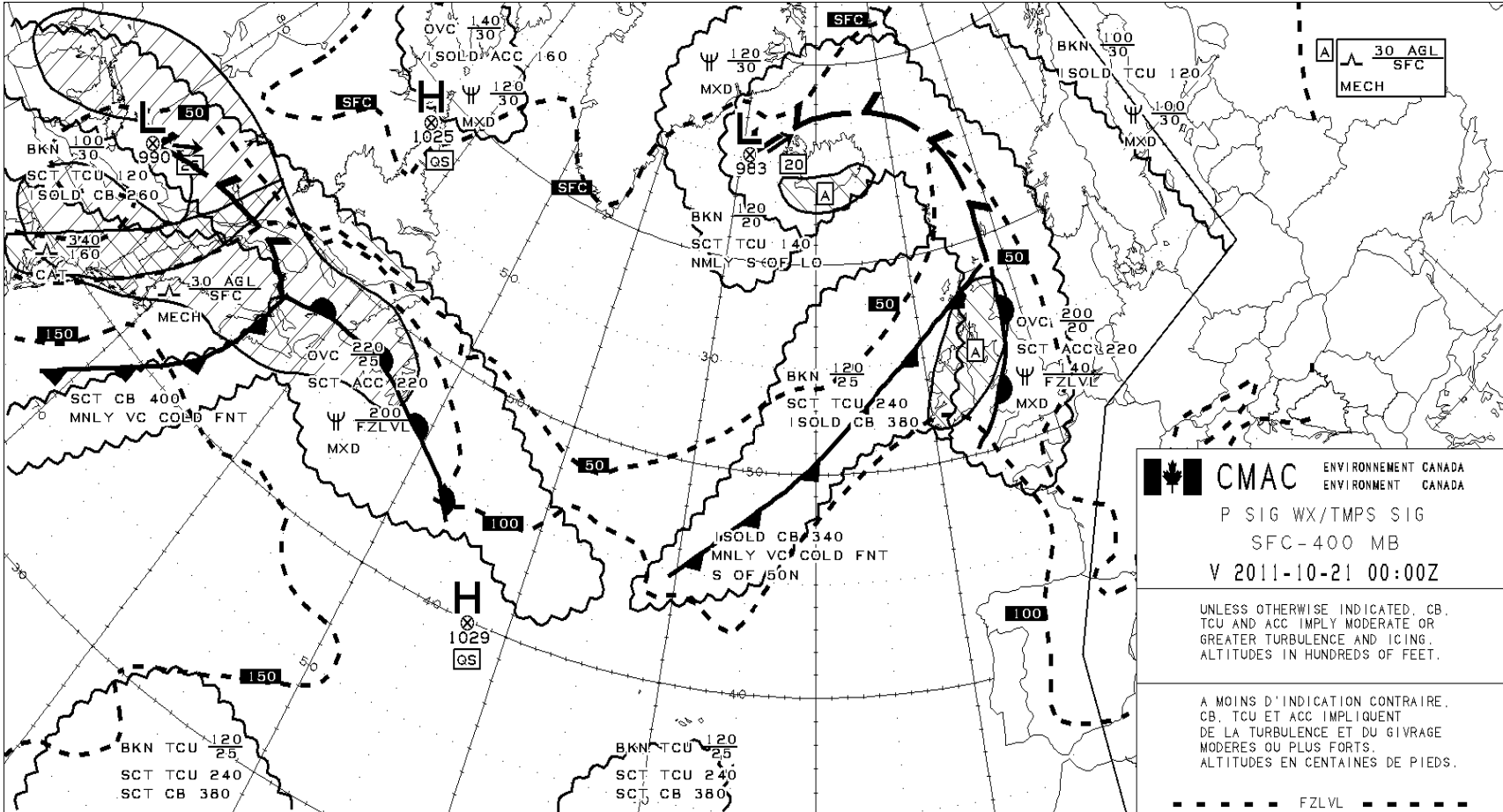
HGTS ASL UNLESS NOTED
 CB TCU AND ACC IMPLY
 SIG TURB AND ICG.
 CB IMPLIES LLWS.
 ENVIRONMENT CANADA
 ENVIRONNEMENT CANADA

Refer to the above icing, turbulence and freezing level GFACN34 for the following questions.

12. What is the forecast freezing level over Gander Airport (CYQX) in Newfoundland?

13. Completely decode the icing statements for the area near Gander Airport (CYQX) in Newfoundland. Include intensity, type, base, top and any freezing precipitation. Be aware that more than one type of icing may exist in the area.

14. Completely decode the turbulence statement for the area near Halifax Airport (CYHZ) Nova Scotia. Include intensity, type, base, top, and any additional info.



Refer to the above significant weather prog surface-400hpa Atlantic region for the following questions.

15. What do the heavy dashed lines on the chart represent?

16. Decode the aviation hazard for the hatched area over southern Iceland denoted by the letter 'A'.

FBCN31 KWNO 182015

FD1CN1

DATA BASED ON 181800Z

VALID 190000Z FOR USE 2000-0300Z. TEMPS NEG ABV 24000

FT 24000 30000 34000 39000 45000 53000

YVR 2675-23 269940 771449 269751 258248 277554

Refer to the high level wind digital forecast above to answer the following question.

17. Decode the wind/temperature for YVR (Vancouver) for 34,000'.

18. What is the type and height of the aviation weather hazard enclosed by the dashed line just to the east of Newfoundland?

19. What does the graphic symbol over southern Italy represent?

20. What is the purpose of AIRMETS?

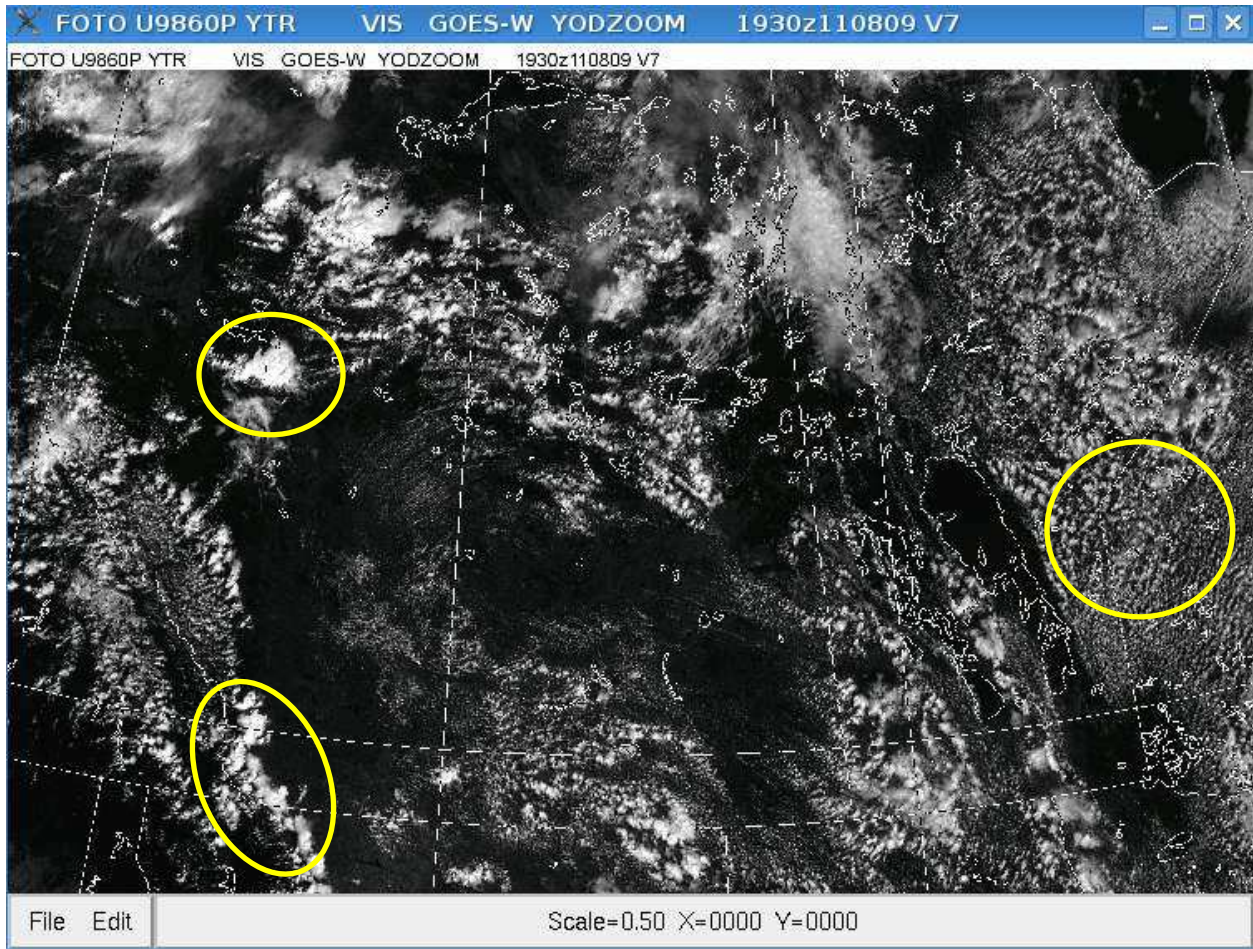
WACN31 CWEG 121231
AIRMET N1 ISSUED AT 1231Z CWEG-
AMEND GFACN31 CWA0 121130 ISSUE
WTN 15 NM OF LN /5208N11836W/25 E BLUE RIVER - /5111N11637W/40 W
BANFF - /5000N11546W/25 N CRANBROOK.
ADD XTNSV 1/4-2SM FG/BR CIGS 1-5 AGL. FG OBSD ON MULTIPLE WEBCAMS.
AREA QS. FG FCST TO DSIPT BY 16Z.
END/GFA31/DGP/CMAC-W

Refer to the AIRMET above from 121231z for the following questions.

21. For where is the AIRMET valid?

22. Why was the AIRMET issued?

23. How long is the aviation hazard expected to persist?



Refer to the visual satellite image above from 19:30z 09Aug 2011 (mid afternoon) for the following questions.

24. On the visual image over southwestern Alberta and over central Alberta near Slave lake, you see small cellular elements that are bright white. What are these individual elements?

25. Just east of Lake Winnipeg on the visual image you see small cellular elements that are grey to off white in color. What are these individual elements?

26. On conventional infrared satellite imagery, temperature is sensed and displayed as various grey tones. Indicate the comparative differences in tone by circling the most representative shade for the following:

- a. Warm earth's surfaces appear: (black, dark grey, light grey, white)
- b. Cumulonimbus cloud tops appear: (black, dark grey, light grey, white)
- c. Low clouds appear: (black, dark grey, light grey, white)
- d. Middle clouds appear: (black, dark grey, light grey, white)

27. With respect to volcanic eruptions indicate whether the following statements are true or false.

- a. Drifting volcanic ash clouds are detectable by airborne radar. (true / false)
- b. Drifting ash clouds pose the greatest threat to aircraft. (true / false)
- c. Gaseous components do not cause long term damage to aircraft. (true / false)
- d. Within ½ hour, some volcanic cloud columns can rise to over 40,000'. (true / false)

28. What is the URL or internet address for the Canadian Forces Weather site?

----- END OF PART TWO -----