

2011

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 2011
- 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 16 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 standard 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)

1. Flying from a cold air mass to a warm air mass, the moisture content of the air usually _____ (decreases/increases) causing the aircraft performance to slightly _____ (decrease/increase).

2. What is the value of knowing the temperature and dew point difference (spread)?

_____.

3. Is the thickness of the troposphere higher in the winter or the summer?

_____.

4. What causes a nocturnal inversion?

5. How does a nocturnal inversion effect low level wind shear?

_____.

6. State two reasons why water areas warm and cool much more slowly than land areas.

7. In high pressure areas, ridges of high pressure, and in down slope flow areas, air descends. Generally explain how this affects the formation or dissipation of cloud.

_____.

8. Stability is developed in a layer by that layer being _____ (cooled/heated) in the lower levels or _____ (cooled/heated) in the upper levels.

9. Choose from the following list all those items which are related to an unstable 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) 1600 hrs local at the Equator
- g) Layer clouds

10. In the northern hemisphere, describe the direction of flow around a low pressure system.

_____.

11. What is the boundary between two air masses called?

_____.

12. Which air mass would be colder mT or mP?

_____.

13. Define the term TROWAL. _____
_____.

14. Name three types of convective clouds and give their abbreviations.
_____, _____, _____.

15. What significant aviation hazard is implied when there is a report of Ice pellets at a station?

_____.

16. The sky condition changes from CI, to CS, followed by AS, then NS. This indicates the approach of a _____.

17. What should you do when encountering moderate icing in flight?
_____ or _____.

18. What is the temperature range with the most significant icing?

In cumulonimbus _____.

In layer cloud _____.

19. Smoke and haze will tend to accumulate near the ground when the air is stable/unstable (choose one), whereas sand and particularly dust can be raised high into the atmosphere when the air is stable/unstable (choose one).

20. Name that fog:

- a) Wind blows from northeast into southern Alberta. _____.
- b) Squadron starts engines on calm morning at -35°C _____.
- c) Commonly forms in precipitation _____.
- d) Forms in arctic with very cold air flowing over open ice leads (cracks)
_____.
- e) Forms towards morning with clear skies, light winds, humid air
_____.
- f) Tropical air moves over cold Labrador current off East coast
_____.

21. There is an east/west warm front with significantly different winds either side of the front near your operational area. Explain where relative to the front and why very low level wind shear may be experienced.

_____.

22. True or false? (assume no adjustment of altimeter for each case)

- a) If you fly at an indicated altitude of 3,000' from high pressure to low pressure, your aircraft decreases in altitude. _____.
- b) When flying at a constant indicated altitude from warmer to colder temperature with MSL pressure the same, your aircraft increases in altitude. _____.
- c) An aircraft flying at a constant indicated altitude and experiencing starboard drift is descending. _____.

23. At what height should you fly to minimize the effects of mountain waves?

_____.

24. What are the two main characteristics of warm front thunderstorms?

1. _____ 2. _____.

25. The recommended technique using radar is to avoid thunderstorm returns by

_____ miles when flying below the freezing level,
_____ miles when flying above the freezing level and
_____ miles when flying above 30,000 feet.

End of Part One

SECTION TWO

(Reference: WU & R)

**METAR LIPL 281700Z 30008KT 240V360 3000N 1000S -RA BR SCT014 BKN040 13/13
Q0993 RERA RMK VIS MIN 1000**

REFER TO THE METAR ABOVE FOR THE FOLLOWING QUESTIONS.

1. Decode the wind report in the METAR.

_____.

2. Decode the group “**RERA**”. _____.

3. What is the meaning of “**Q0993**” in this METAR? _____

_____.

4. Decode “ **3000N 1000S** “. _____.

5. Which of the following are true about Canadian automatic weather observing stations?

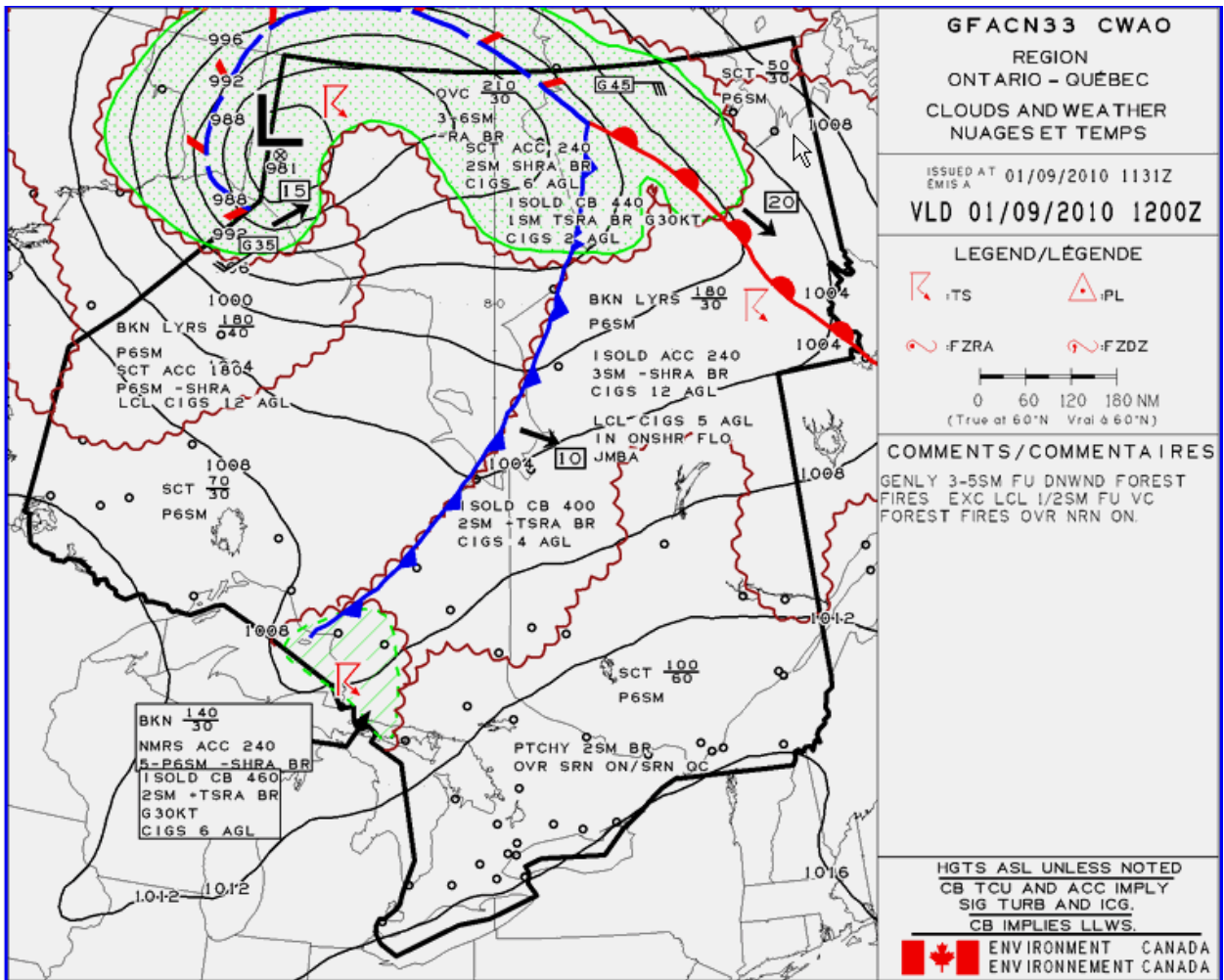
- Clouds are sensed only above the station
- Clouds are sensed in the entire sky around the station
- Clouds are sensed up to an altitude of 25,000'
- Clouds are sensed up to an altitude of 10,000'
- Cloud amounts (SCT, BKN, etc) are assessed depending on persistence of cloud over the last 10 minutes
- Cloud amounts are assessed depending on persistence of cloud over the last hour.

TAF AMD CYYT 101815Z 1018/1118 05005KT P6SM OVC006
TEMPO 1018/1020 SCT006 BKN015
FM102000Z VRB03KT P6SM SCT025
TEMPO 1022/1101 BKN025
FM110300Z 18001KT P6SM SCT006 BKN025
TEMPO 1103/1105 3SM BR BKN006 OVC025
FM110500Z 16015G25KT WS008/02030KT 3SM BR SCT004 OVC010
TEMPO 1105/1113 1/2SM FG OVC004
NXT FCST BY 110000Z=

6. REFER TO THE TAF ABOVE FOR THE FOLLOWING QUESTIONS.

- a) For CYYT: the forecast sky condition for 2100Z_____.
- b) The forecast sky condition for 0200Z is_____.
- c) The forecast visibility and significant weather at 06Z are
_____.
- d) What will be the valid period of the next forecast to be issued issued for CYYT?_____.
- e) What is the full meaning of WS008/02030KT in the CYYT TAF?

_____.



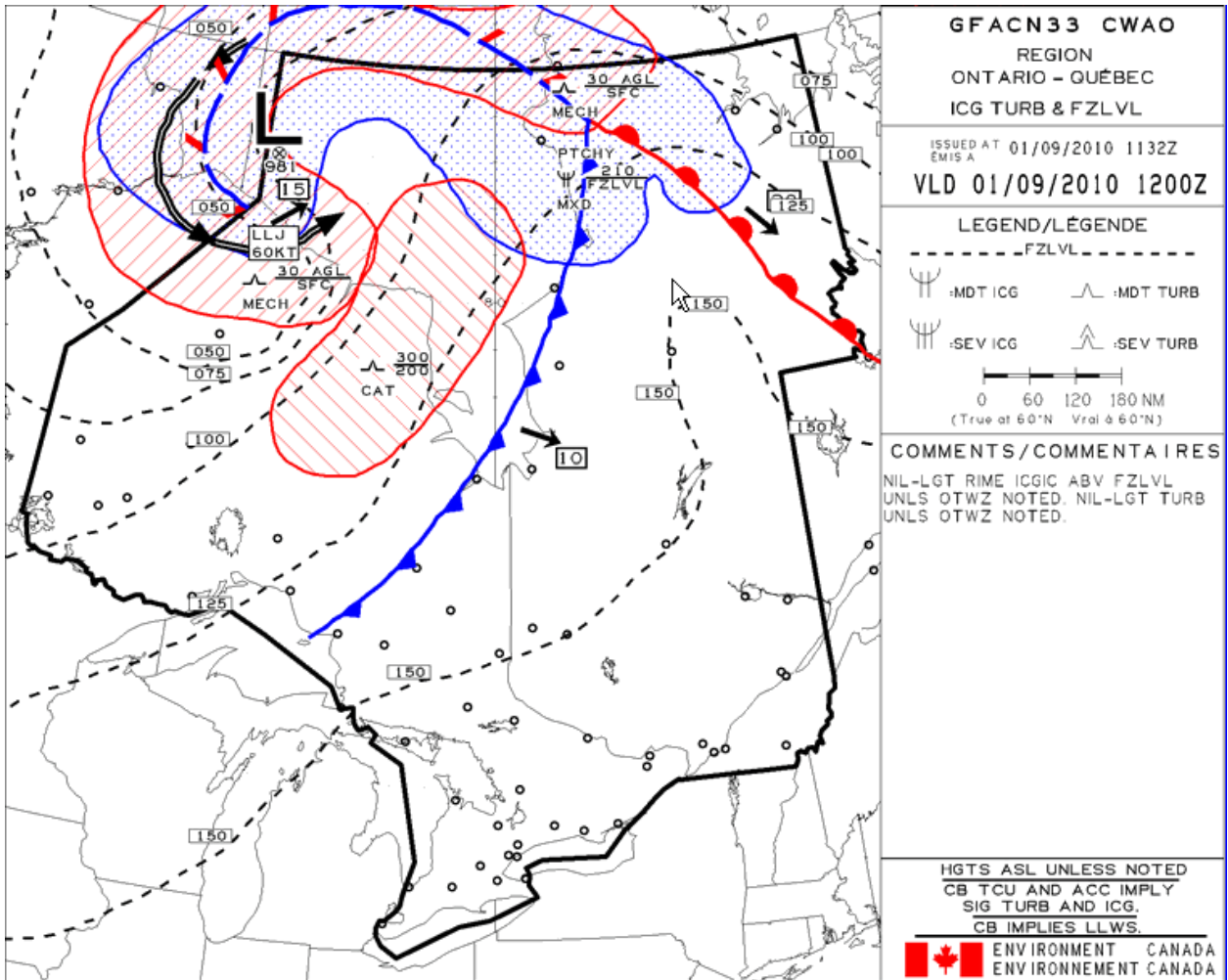
WACN33 CWUL 011254
AIRMET K1 ISSUED AT 1254Z CWUL-
AMEND GFACN33 CWAO 011130 ISSUE
WTN AREA BOUNDED BY /4831N08639W/25 SE TERRACE BAY - /4636N08441W/10
NW SAULT STE MARIE - /4808N08431W/15 NE WAWA - /4831N08639W/25 SE
TERRACE BAY.
PTCHY 1/2SM -RA FG AND CIGS 2 AGL OBSD AND FCST IN ONSHR FLO LK SUPR.
AREA QS. DS IPTG BY 17Z.
END/GFA33/CMAC-E/KD/MF

7. REFER TO THE CLOUDS AND WEATHER GFACN33 (ONTARIO/QUEBEC REGION) VALID 01/09/2010 1200Z and AIRMET WACN33 issued at 1254Z FOR THE FOLLOWING QUESTIONS.

- a) Decode the cloud and weather listed for the area just east of the TROWAL. Include clouds bases, tops, amounts, ceilings, visibility, weather, obstructions to vision and wind (all as available).

- b) What is the lowest visibility and associated obstruction of vision expected east of James Bay? _____.

- c) According to the GFA, and AIRMET what is the lowest visibility and expected weather just Northwest of Saulte Ste Marie, Ontario? _____.



REFER TO THE ICING, TURBULENCE AND FREEZING LEVEL GFACN33 AND THE CLOUDS AND WEATHER GFACN33 ABOVE VALID 1/10/2010 1200Z FOR THE FOLLOWING QUESTIONS.

8. Completely decode the turbulence statements for the area just east of the TROWAL. Include base, top, type, and intensity.

9. Completely decode the icing statements for the area just east of the TROWAL.
Include base, top, type, and intensity.

10. What is the approximate height of the freezing level over Toronto?

FBCN31 KWNO 182015

FD1CN1

DATA BASED ON 181800Z

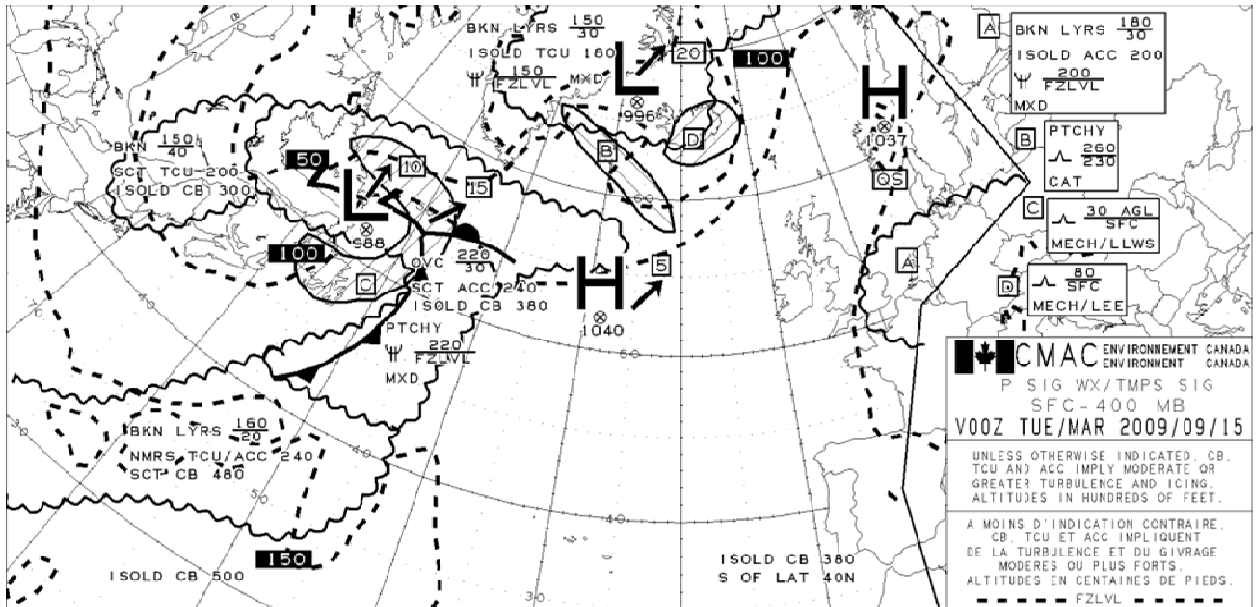
VALID 190000Z FOR USE 2000-0300Z. TEMPS NEG ABV 24000

FT 24000 30000 34000 39000 45000 53000

YVR 2675-23 269940 771449 269751 258248 277554

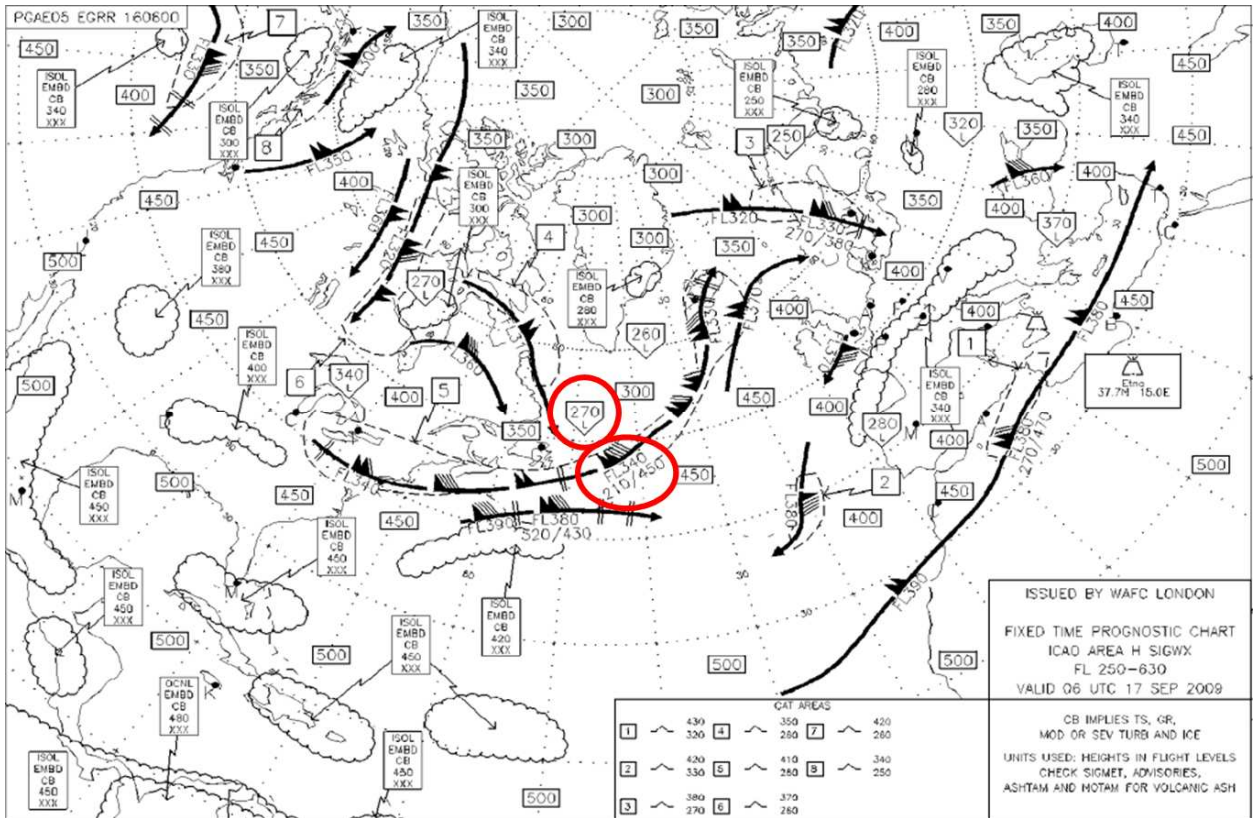
**11. REFER TO THE HIGH LEVEL WIND DIGITAL FORECAST ABOVE TO
ANSWER THE FOLLOWING QUESTION.**

Decode the wind/temperature for YVR (Vancouver) for 39,000'.



12. REFER TO THE SIGNIFICANT WEATHER PROG SURFACE-400HPA ATLANTIC REGION ABOVE VALID 00Z TUESDAY 2009/09/15 FOR THE FOLLOWING QUESTIONS

- a) What do the heavy dashed lines on the chart represent? _____
- b) Decode the hazard for the hatched area over Newfoundland to off the coast of Labrador.

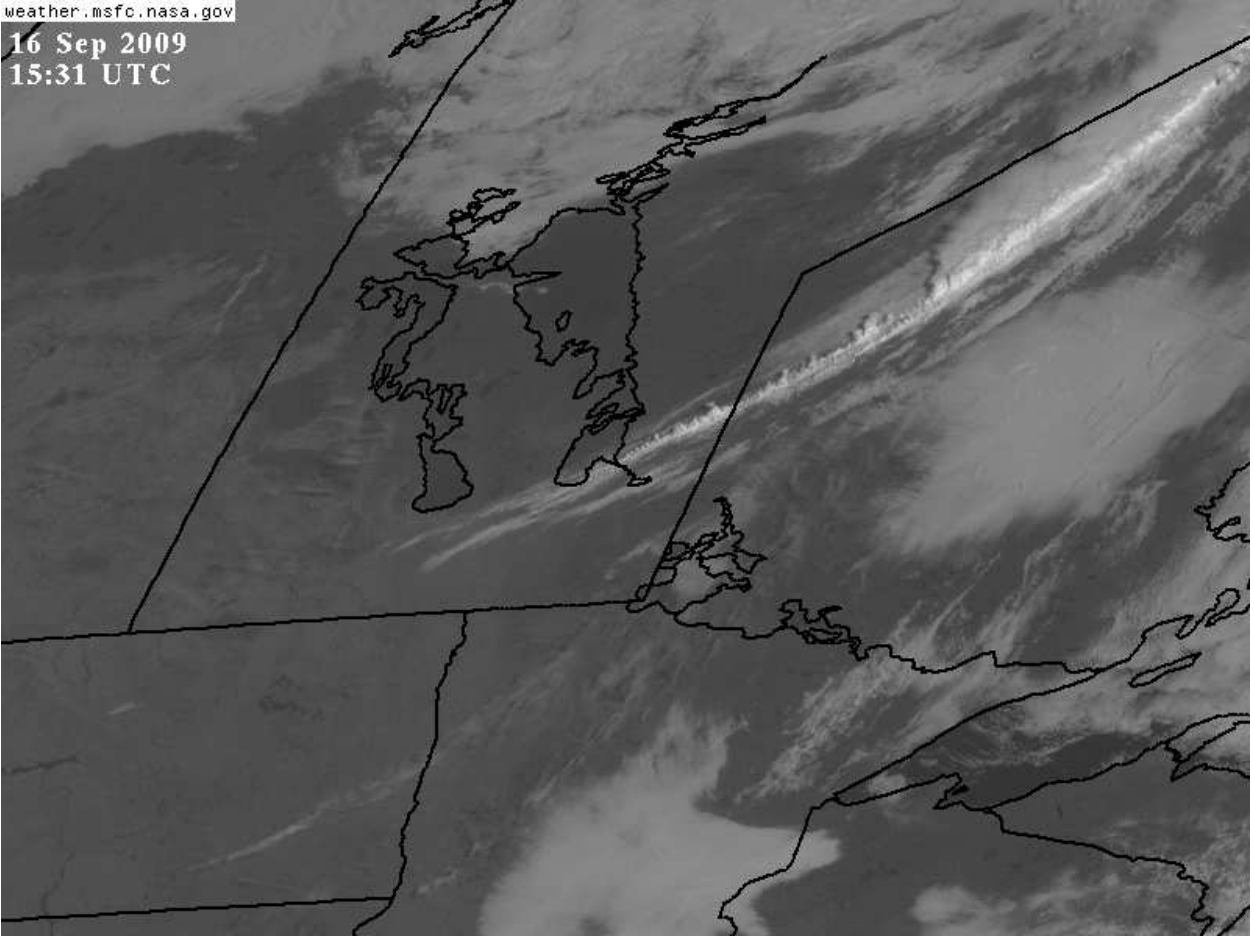


13. REFER TO THE HIGH LEVEL SIG WEATHER CHART FL250-630 ABOVE VALID 06Z 17 SEPT 2009 FOR THE FOLLOWING QUESTIONS.

- a) Decode the wind information contained within a red oval east of Newfoundland. Include speeds, direction, altitudes and what the phenomenon is.

- b) A home plate shaped pentagon is circled nearby. What does it describe and decode as? (three pieces of information)

16 Sep 2009
15:31 UTC



REFER TO THE VISUAL SATELLITE IMAGE ABOVE FROM 15:31Z 16 SEPT 2009 (MID MORNING) ABOVE FOR THE FOLLOWING QUESTION.

14. On central part of the visual image, you see a line of irregular looking elements with shadows evident on the northwest side. What are these individual elements? (several answers possible) _____.

15. On conventional infrared satellite imagery, temperature is sensed and displayed as various grey tones. State comparative differences in tone (anything from black to white) for the following.

- a) Warm earth's surface _____
- b) Low cloud _____
- c) Middle cloud _____
- d) Cumulonimbus cloud top _____.

16. Why does a high lift rotary wing blade tend to ice up less than a high performance blade?

17. List three wintertime situations in which icing often occurs.

18. True or false (within context of volcanic eruptions):

- a) Drifting volcanic ash clouds are detectable by radar_____
- b) Drifting ash clouds pose the greatest threat to aircraft_____
- c) Gaseous components do not cause long term damage to aircraft_____
- d) Within ½ hour, some volcanic cloud columns can rise to over 40,000'_____

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