SAMPLE ASSESSMENT TASKS

AVIATION
ATAR YEAR 12

Sample assessment task

Aviation – ATAR Year 12

Task 1 – Unit 3

Assessment type: Test

Conditions
Time for the task: 60 minutes

Task weighting
4% of the school mark for this pair of units

_____

Meteorology test **(30 marks)**

Multiple-choice (10 marks)

1. At which of the following levels of the atmosphere is the temperature most likely to be at approximately –57 °C?

    (a) bottom of ionosphere
    (b) top of ionosphere
    (c) top of stratosphere
    (d) top of troposphere

2. Which cloud type would best describe a 1400 feet deep layer that an aircraft encounters at a height of about 15 000 feet?

    (a) cirrostratus
    (b) altocumulus
    (c) altostratus
    (d) stratocumulus

3. When air masses of different temperatures and densities come together, their boundary is called a

    (a) trough.
    (b) cyclone.
    (c) front.
    (d) convergence zone.

4. In the southern hemisphere, the geostrophic wind flows

    (a) at 10° towards the higher pressure over land.
    (b) along curved isobars.
    (c) at 30° towards the lower pressure over land.
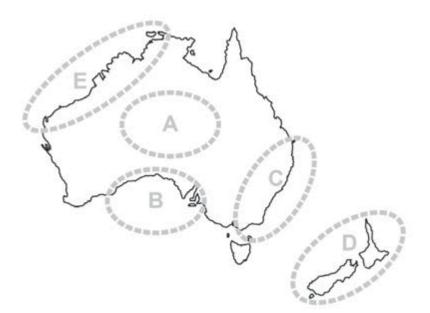   (d) along straight isobars.

5.   The common link between sea breezes, katabatic winds and anabatic winds is that they are all

    (a)   light winds.
    (b)   local winds.
    (c)   cool winds.
    (d)   dry winds.

6.   Updrafts are a feature of thunderstorms. In the 'life' of a thunderstorm, updrafts are most likely to exist in

    (a)   all stages.
    (b)   the developing stage.
    (c)   in the developing and mature stages.
    (d)   the mature and dissipating stages.

7.   If a temperature inversion occurs in the atmosphere, then the

    (a)   dry adiabatic lapse rate will be less than the saturated abiatic lapse rate.
    (b)   temperature will remain constant with an increase in altitude.
    (c)   temperature will decrease with an increase in altitude.
    (d)   temperature will increase with an increase in altitude.

8.   Which of the following statements about clouds is most accurate?

    (a)   Cirrus clouds are composed of ice crystals.
    (b)   Stratus clouds are usually present in an unstable atmosphere.
    (c)   Cumulus clouds are usually associated with an inversion layer.
    (d)   Cumulonimbus clouds usually form when fog begins to lift due to the heating effects of the sun.

9.   Cloud coverage of 1 OKTAS would be described as

    (a)   SKT.
    (b)   FEW.
    (c)   BKN.
    (d)   OVC.

10.   Which factor is **not** normally present during the formation of radiation fog?

    (a)   a clear sky
    (b)   a cold ground or water surface
    (c)   moderate wind
    (d)   a small difference between the wet and dry bulb temperatures

Short answer (20 marks)

11. Consider the weather patterns that exist during the year across the area shown below.

(5 marks)

(a) Which region is prone to cyclones between November and April? (1 mark)

_____

(b) Which region is at the centre of a series of high pressure systems in winter? (1 mark)

_____

(c) Which region is under the influence of moist south-easterly winds for most of the year?

(1 mark)

_____

(d) The west coast of Australia experiences strong summer sea breezes. List **two** factors that contribute to the strength of these breezes. (2 marks)

One:_____ _____

Two:_____

12. Use the information contained in the synoptic chart to answer the following questions.

(5 marks)

National Meteorological and Oceanographic Centre
Bureau of Meteorology
MSLP Analysis (hPa)

(a) Which feature dominates the weather along the 130° E meridian south of the Australian continent? (1 mark)

_____

(b) What meteorological feature is indicated by the dotted line stretching from the north-west region of Australia to Victoria? (1 mark)

_____

(c) Of which of the four seasons is this weather chart most typical? (1 mark)

_____

(d) An aircraft is at point A heading in the direction shown at 3000 feet. Will the aircraft experience any drift, and if so, will the drift be to the left or right? Assume that winds are the same from the surface to 5000 feet. (2 marks)

_____

_____

13. Examine the information below and extract from it the answers to the questions.   (4 marks)

MORUYA (YMRY)
TAF AMD YMRY 180646Z 1807/1820
13008KT 9999 LIGHT SHOWERS OF RAIN SCT020 BKN030
BECMG 1809/1810 VRB05KT 9999 LIGHT SHOWERS OF RAIN BKN012
PROB30 1812/1814 2000 MIST
PROB30 1814/1820 0500 FOG
T 23 22 21 20 Q 1018 1016 1017 1018

(a) For how many hours is the TAF valid?   (1 mark)

   _____

(b) What is the forecast cloud base at 1030 UTC?   (1 mark)

   _____

(c) What is the lowest visibility that has been predicted during the period of the forecast?
                                                                           (1 mark)

   _____

(d) What is the expected wind direction between 0900 UTC and 1000 UTC?   (1 mark)

   _____

14. Given the following conditions, calculate the cloud top, dew point and freezing level within the cloud. (6 marks)

- Condensation level is 4000 ft
- Initial temperature of surface air is 20 °C
- Initial temperature of rising air is 21 °C

ELR = 4 °C/1000 ft to 3000 ft
2 °C/1000 ft from 3000 ft to 6000 ft
1 °C/1000 ft from 6000 ft upward

(Calculations may be done in the space below.)

Cloud top: _____ (2 marks)

Dew point: _____ (2 marks)

Freezing level in cloud: _____ (2 marks)

Marking key for sample assessment task 1 – Unit 3

Multiple-choice **(10 marks)**

1	D
2	C
3	C
4	D
5	B
6	B
7	C
8	A
9	B
10	C

Short answer **(20 marks)**

11. Consider the weather patterns that exist during the year across the area shown below.

    (a) Which region is prone to cyclones between November and April?

Description	Marks
E	1
Total	/1

    (b) Which region is at the centre of a series of high pressure systems in winter?

Description	Marks
A	1
Total	/1

    (c) Which region is under the influence of moist south-easterly winds for most of the year?

Description	Marks
C	1
Total	/1

    (d) The west coast of Australia experiences strong summer sea breezes. List **two** factors that contribute to the strength of these breezes.

Description	Marks
Cold ocean current off coast	1
Strong heating of land along coast	1
Total	/2

12. Use the information contained in the synoptic chart to answer the following questions.

(a) Which feature dominates the weather along the 130° E meridian south of the Australian continent?

Description	Marks
Cold front	1
Total	/1

(b) What meteorological feature is indicated by the dotted line stretching from the north-west region of Australia to Victoria?

Description	Marks
Low pressure trough/trough	1
Total	/1

(c) Of which of the four seasons is this weather chart most typical?

Description	Marks
Summer	1
Total	/1

(d) An aircraft is at point A heading in the direction shown at 3000 feet. Will the aircraft experience any drift, and if so, will the drift be to the left or right? Assume that winds are the same from the surface to 5000 feet.

Description	Marks
Yes, there is drift	1
Left to right	1
Total	/2

13. Examine the information below and extract from it the answers to the questions.

MORUYA (YMRY)
TAF AMD YMRY 180646Z 1807/1820
13008KT 9999 LIGHT SHOWERS OF RAIN SCT020 BKN030
BECMG 1809/1810 VRB05KT 9999 LIGHT SHOWERS OF RAIN BKN012
PROB30 1812/1814 2000 MIST
PROB30 1814/1820 0500 FOG
T 23 22 21 20 Q 1018 1016 1017 1018

(a) For how many hours is the TAF valid?

Description	Marks
13 hours	1
Total	/1

(b) What is the forecast cloud base at 1030 UTC?

Description	Marks
1200 ft	1
Total	/1

(c) What is the lowest visibility that has been predicted during the period of the forecast?

Description	Marks
500 m	1
Total	/1

(d) What is the expected wind direction between 0900 UTC and 1000 UTC?

Description	Marks
Variable	1
Total	/1

14. Given the following conditions, calculate the cloud top, dew point and freezing level within the cloud.

- Condensation level is 4000 ft
- Initial temperature of surface air is 20 °C
- Initial temperature of rising air is 21 °C

ELR = 4°/1000 ft to 3000 ft
2°/1000 ft from 3000 ft to 6000 ft
1°/1000 ft from 6000 ft upward

Description	Marks
Cloud top: • correct process • 14 000 ft	1–2
Dew point: • correct process • 9 °C	1–2
Freezing level within cloud: • correct process • 1000 ft	1–2
Total	/6
Either process is acceptable:	

Process 1:

Altitude	ENV lapse rate	Sat/dry rate for rising air	
16 000	−8		
15 000	−7		
14 000	−6	−6 S	Cloud top
13 000	−5	−4.5 S	
12 000	−4	−3 S	
11 000	−3	−1.5 S	
10 000	−2	0 S	Freezing level
9 000	−1	1.5 S	
8 000	0	3 S	
7 000	1	4.5 S	
6 000	2	6 S	
5 000	4	7.5 S	
4 000	6	9 D	Condensation level = dew point
3 000	8	12 D	
2 000	12	15 D	
1 000	16	18 D	
0	20	21 D	

Process 2 – by formula:

Environmental temperature at Condensation level = 20 − 4 × 3 − 1 × 2 = 6
Temperature of rising air at Dew Point = 21 − 4 × 3 = 9
Freezing level = 4 + (9 − 0)/1.5 = 10 000 ft
Cloud top: 6 − ((T−2) × 1 + 2 × 2) = 9 − (T × 1.5) =>T = 10 Top = 4 + 10 = 14 000 ft

Sample assessment task

Aviation – ATAR Year 12

Task 2 – Unit 3

Assessment type: Investigation

Conditions
Period allowed for completion of the task: three weeks

Task weighting
5% of the school mark for this pair of units
_____

Aviation development **(58 marks)**

You are to research factors influencing the on-going development of unmanned aerial vehicles (UAV) and the likely impact of UAVs on industry, Australian Defence Force (ADF), Air Traffic Management, regulatory bodies, such as the Civil Aviation Safety Authority (CASA), or the community.

Write a report on your findings:
- discuss **four** major factors influencing the development of UAVs
- describe **two** likely impacts of UAVs on agriculture, industry, communications, ADF, Air Traffic Management, regulatory bodies, such as CASA, or the community.

Your report should include:

Introduction – sets the scene (17 marks)
- background information – definition/terminology/description of UAVs
- outline of the main body of the report

Main body – addresses the topic in detail (26 marks)
- use headings and sub-headings, where appropriate
- organise the sections in a logical sequence
  - major factors influencing the on-going development of UAVs
  - likely impacts of UAVs on agriculture, industry, communications, ADF, Air Traffic Management, regulatory bodies, such as the CASA, or the community

Conclusion – summarises your findings (10 marks)
- make a brief statement about the main factors influencing the on-going development of UAVs and the likely impact of UAVs on sectors, organisations or the community
- discuss the significance of your findings

References (5 marks)
Include at least five references.

Marking key for sample assessment task 2 – Unit 3

Introduction – sets the scene
- background information – definition/terminology/description of UAVs
- outline of the main body of the report

Description	Marks
Defines unmanned aerial vehicles (any three of) • powered • aerial • operate without a pilot on board • uses aerodynamic forces to provide vehicle lift	1–3
Discusses terminology used for UAVs • describes other terms commonly used for UAVs, e.g. drones, unmanned aircraft system (UAS), remote piloted aircraft system (RPAS), model aircraft	1–2
Describes UAVs (any four of) (2 marks each) • includes the unmanned aircraft and other related support equipment, e.g. control system (ground control station), control link, a specialised data link • can be pre-programmed for flight and payload operations • describes and provides examples of autonomous aircraft • describes and provides examples of remotely piloted aircraft • describes the role of small UAVs (not operated above 400 ft AGL unrestricted) • describes types according to four-tier classification and characteristics (range/altitude/endurance) and provides examples	1–8
Outlines the structure of the main body of the report • major factors influencing the on-going development • likely impact of UAVs on industry, ADF, Air Traffic Management, regulatory bodies, such as the CASA, and the community	1–4
Total	**/17**

Main body – addresses the topic in detail
- use headings and sub-headings, where appropriate

Description	Marks
Main body of the report is well-organised: • presents report with a logical structure • uses headings and sub-headings	1–2
Subtotal	**/2**

- organise the sections in a logical sequence
    - major factors influencing the on-going development of UAVs

Description	Marks
For each of the **four** major factors influencing the on-going development (4 marks each) - identifies the factor - describes the link between the factor and development - provides a description of examples/organisations - discusses the advantages	1–16
Subtotal	**/16**
Answer could include, but is not limited to:	

Example:
- requirements/demands for development
    - requirement/demand for product drives research and development
    - defence, environment control/weather watch, mineral exploration, crop monitoring, telecommunications, media, remote sensing
    - advantages – increased defence capabilities, weather warnings/climate change research, resource development
Other examples:
- availability of research facilities
- key technologies required
- capability to manufacture
- CASA support
- interest groups/organisations
- funding	

- organise the sections in a logical sequence
    - likely impacts of UAVs on agriculture, industry, communications, ADF, Air Traffic Management, regulatory bodies, such as the CASA, or the community

Description	Marks
For each of the **two** likely impacts (four marks each) - identifies the impact - states who the impact affects - describes the likely effects of the impact - provides examples of the impact	1–8
Subtotal	**/8**
Answer could include, but is not limited to:	

Examples:
- review regulations for UAVs
    - need to review existing regulations/make recommendations for changes
    - CASA regulates the organisation of Australia's airspace, airports (control tower, runways etc.), pilots, industries vying for airspace
    - affects all users of Australia's airspace/those controlling the airspace
    - implementation of regulations/licensing, liaison between aviation authorities/facilities and UAVs operations
- Community
    - invasion of privacy
    - individuals/families/home owners
    - drones flying over private property/photography
    - hobbyists accessing advanced technologies	

Total	**/26**

Conclusion – summarises your findings
- make a brief statement about the main factors influencing the on-going development of UAVs and the likely impact of UAVs on sectors, organisations or the community
- discuss the significance of your findings

Description	Marks
Provides a brief statement about each of the four major factors influencing the on-going development of UAVs	1–4
Makes a statement about each of the two impacts discussed in the report	1–2
Discusses the significance of findings • importance • applications • benefits to organisations • unintended impacts or side effects	1–4
Total	**/10**

References

Include at least five references.

Description	Marks
Includes at least five references	1–5
Total	**/5**