LUI | | | | | | | | | | | School code | | | | |

School name

Given name/s

Family name

Attach your barcode ID label here

Book of books used

External assessment 2021

Question and response book

Aerospace Systems

Time allowed

- Perusal time — 10 minutes
- Working time — 120 minutes

General instructions

- Answer all questions in this question and response book.
- QCAA-approved calculator permitted.
- QCAA-approved flight calculator permitted.
- Protractor and ruler or plotter required
- QCAA formula and data book provided.
- Planning paper will not be marked

Section 1 (10 marks)

- 10 multiple choice questions

Section 2 (70 marks)

- 13 short response questions

Clear zone — margin trimmed off after completion of assessment

Queensland Government | QCAA Queensland Curriculum & Assessment Authority

DO NOT WRITE ON THIS PAGE

THIS PAGE WILL NOT BE MARKED

Section 1

Instructions

- Choose the best answer for Questions 1–10.
- This section has 10 questions and is worth 10 marks.
- Use a 2B pencil to fill in the A, B, C or D answer bubble completely.
- If you change your mind or make a mistake, use an eraser to remove your response and fill in the new answer bubble completely.

	A	B	C	D
Example:	●	○	○	○

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

Do not write outside this box.

Section 2

Instructions

- Write using black or blue pen.
- If you need more space for a response, use the additional pages at the back of this book.
  - On the additional pages, write the question number you are responding to.
  - Cancel any incorrect response by ruling a single diagonal line through your work.
  - Write the page number of your alternative/additional response, i.e. See page …
  - If you do not do this, your original response will be marked.
- This section has 13 questions and is worth 70 marks.

QUESTION 11 (6 marks)

Sketch and label six components of a basic hydraulic system for a small airplane in the space provided.

Note: If you make a mistake in the sketch, cancel it by ruling a single diagonal line through your work and use the additional response space at the back of this question and response book.

Do not write outside this box.

QUESTION 12 (4 marks)

Identify four cognitive factors that have a direct impact on the quality of an individual's decision-making in aviation contexts.

1. _____

2. _____

3. _____

4. _____

QUESTION 13 (4 marks)

Explain how the human body reacts to the G force created as a result of an aircraft entering a high-speed coordinated turn.

_____

_____

_____

_____

_____

Do not write outside this box.

QUESTION 14 (4 marks)

Discuss the influence of leadership and teamwork on the effectiveness of crew resource management (CRM) in an aviation context.

Do not write outside this box.

QUESTION 15 (5 marks)

Explain the purpose and operation of two-bar VASIS. Include sketches to support your explanation.

Note: If you make a mistake in the sketch, cancel it by ruling a single diagonal line through your work and use the additional response space at the back of this question and response book.

Do not write outside this box.

QUESTION 16 (4 marks)

Define the airspeed limitations of Vso.

Do not write outside this box.

QUESTION 17 (5 marks)

In abnormal flight conditions, with no visual reference to the horizon and ground, a pilot becomes distracted by noise and vibrations in the cockpit. When the noise and vibrations subside, the pilot realises that they have experienced illusions that have affected their original heading.

Analyse this scenario to describe the function and reliability of the vestibular system. Explain how the conditions may have caused illusions, and identify two illusions that the pilot may have experienced.

Do not write outside this box.

QUESTION 18 (5 marks)

Explain the difference between a centrifugal flow and axial flow jet engine. Include sketches to support your explanation.

Note: If you make a mistake in the sketch, cancel it by ruling a single diagonal line through your work and use the additional response space at the back of this question and response book.

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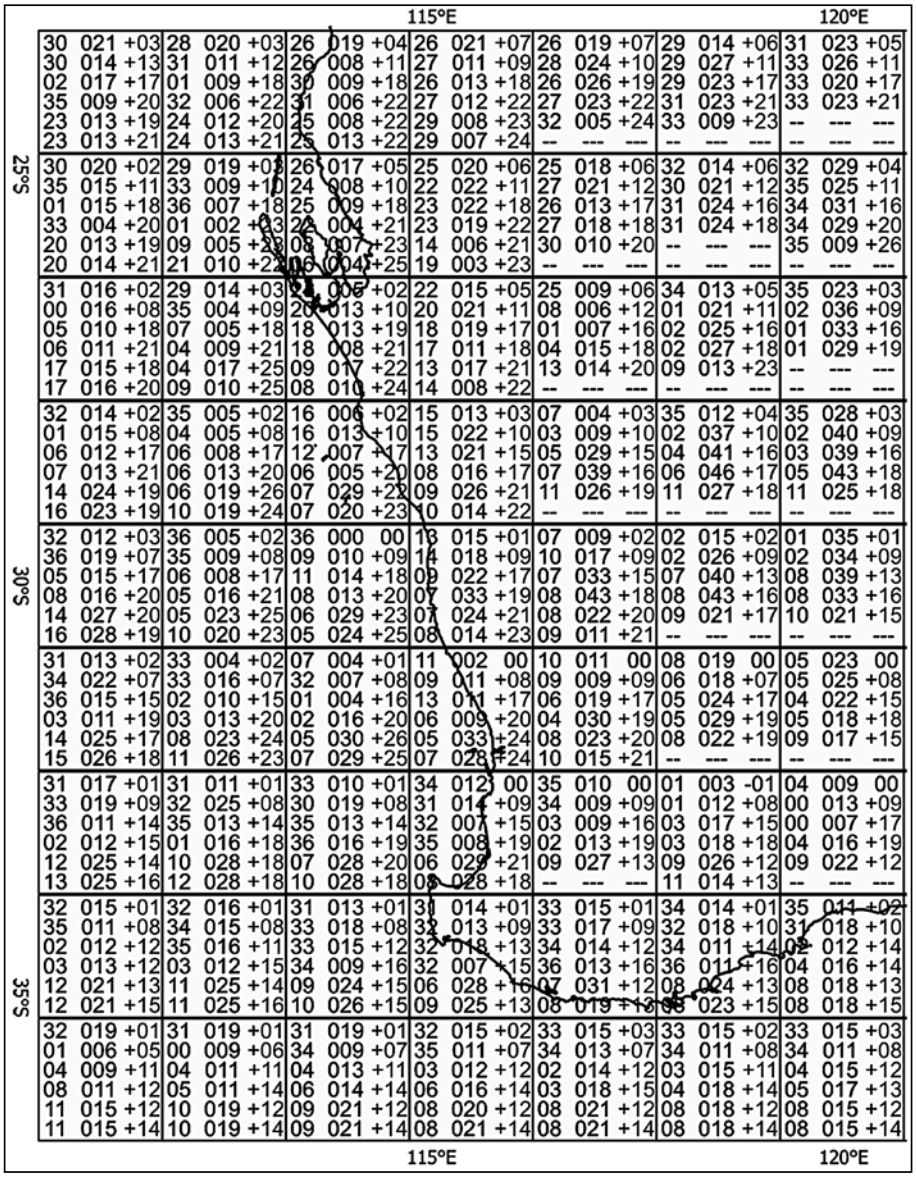
Do not write outside this box.

QUESTION 19 (5 marks)

Determine the most appropriate altitude for an aircraft en route from 30°S 113°E to 35°S 117°E. Plot the aircraft's track on the GPWT and justify your response with two examples.



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GPWT FORECASTS (1000FT - FL140) - WA-S

PROVIDED BY AUSTRALIAN BUREAU OF METEOROLOGY

VALID: **2100 UTC 10 Feb 2020**

ISSUED: 0153 UTC 10 Feb 2020

DATA FORMAT: dd fff tTT

dd: WIND DIR TENS OF DEG TRUE

fff: WIND SPEED IN KNOTS

tTT: TEMP IN DEG CELSIUS

FORECAST is valid for the centre of the box

ISA		
FL/FT	hPa	T
140	600	-13
10000	700	-05
7000	800	+01
5000	850	+05
2000	950	+11
1000	975	+13

Note: If you make a mistake in the GPWT, cancel it by ruling a single diagonal line through your work and use the additional GPWT on pages 28 of this question and response book.

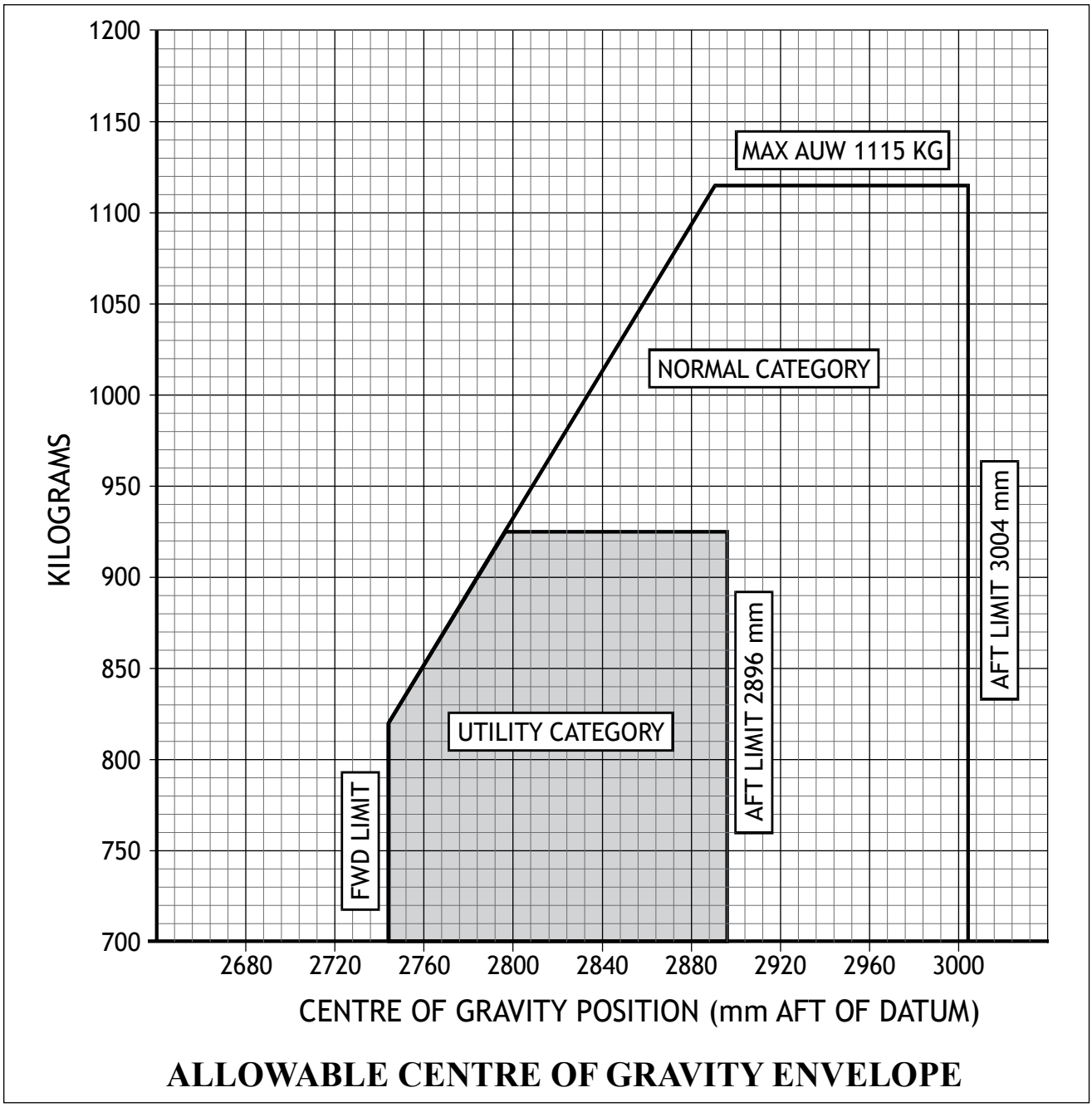
Do not write outside this box.

Do not write outside this box.

QUESTION 20 (7 marks)

A student pilot and instructor are scheduled for a navigation training flight in a four-seat aircraft. The fuel plan requires 200 L of avgas and the aircraft has full oil. The student pilot and instructor weigh 90 kg and 120 kg respectively.

Use the loading chart to demonstrate that the aircraft is not safely loaded. Determine a safe loading configuration for the flight.



Note: If you make a mistake in the loading chart, cancel it by ruling a single diagonal line through your work and use the additional loading chart on page 29 of this question and response book.

Do not write outside this box.

Do not write outside this box.

Do not write outside this box.

QUESTION 21 (6 marks)

Analyse the strengths and limitations of pilot preconceptions on situational awareness and decision-making to evaluate their influence on aircraft safety in difficult flight situations.

Do not write outside this box.

QUESTION 22 (6 marks)

A flight is scheduled to arrive at Mount Hotham at 00Z. However, its departure was delayed, resulting in an arrival time of 06Z. The airline's standard operating procedures (SOPs) state that aircraft cannot land if the density altitude is above 6500 ft.

Determine whether the airline's SOPs allow the flight to land at Mt Hotham.

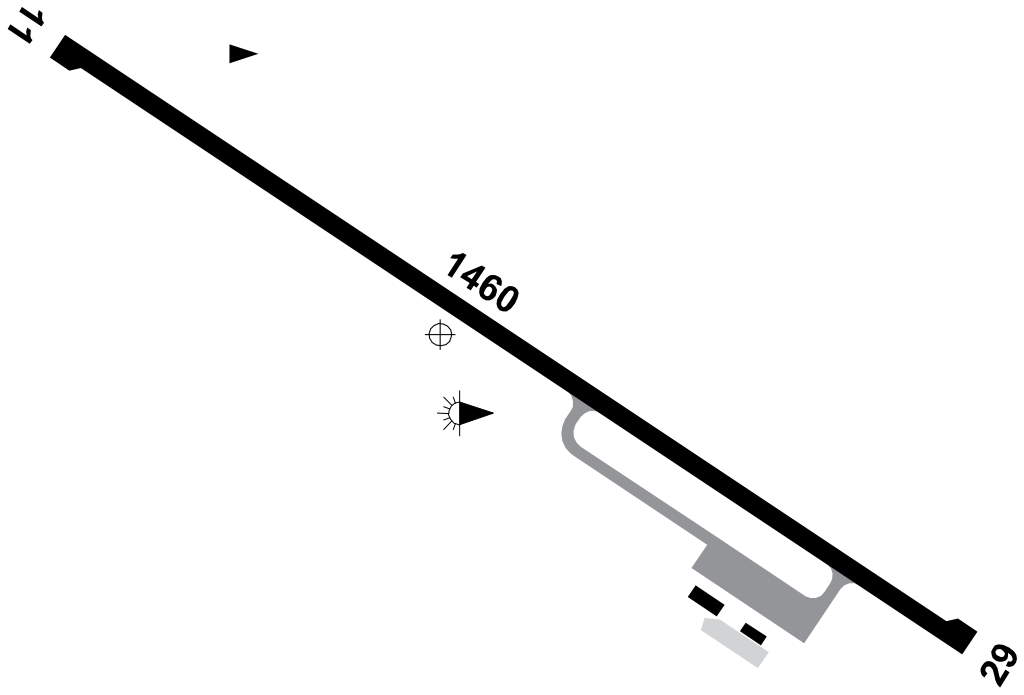
AIP Australia 27 FEB 2020 FAC YHOT - 1

MOUNT HOTHAM **ELEV 4260**

AVFAX CODE 3065

VIC		UTC +10	YHOT
370251S	1472003E	VAR 12 DEG E	CERT

AD OPR MHSC Transportation Services Pty Ltd



TAF YHOT 102319Z 1000/1020

28015KT 9999 SCT050

T 21 24 28 28 Q 1011 1010 1009 1010

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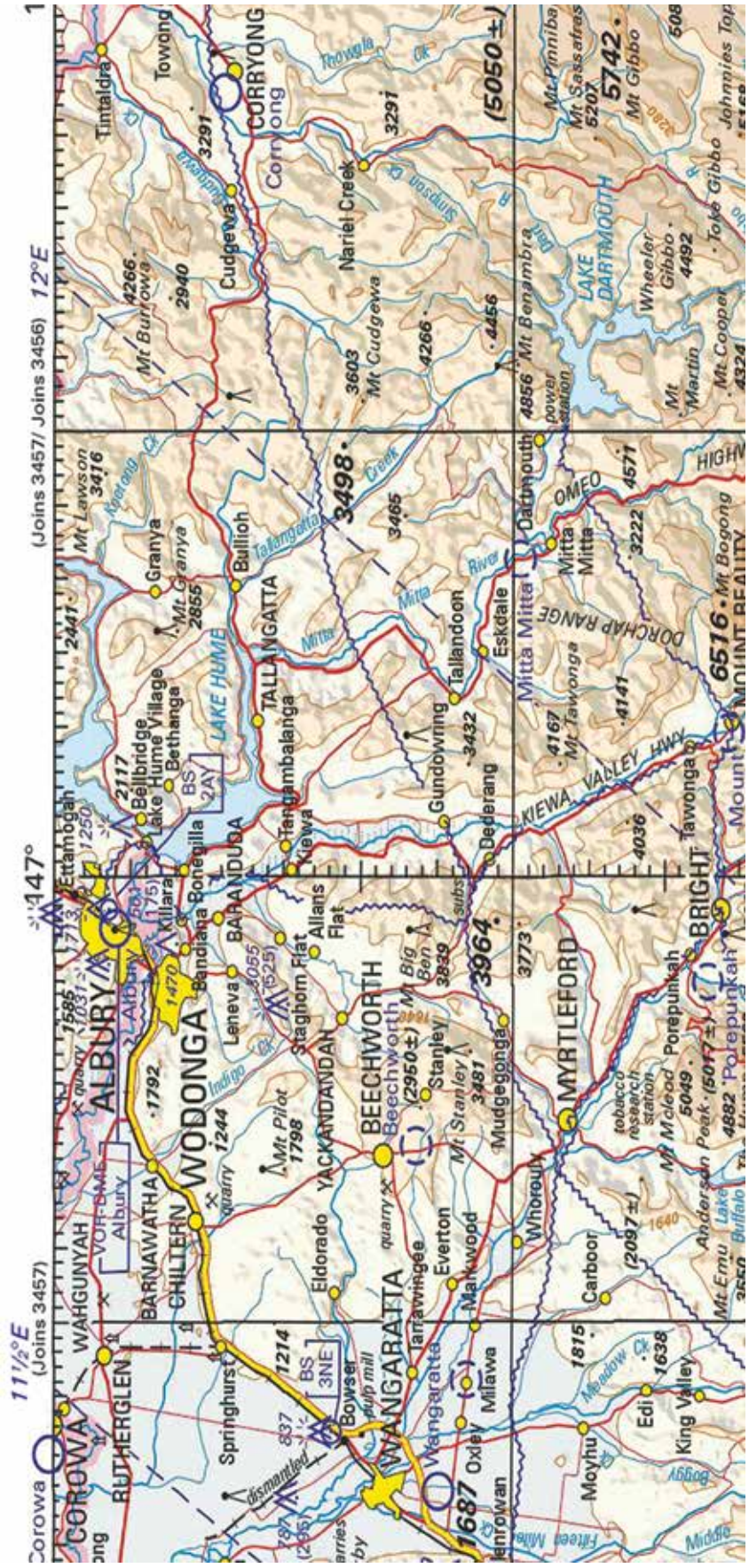
Stimulus for Question 23



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QUESTION 23 (9 marks)

A pilot, who is not night rated, is flying VFR from Corryong to Corowa. The aircraft departs Corryong at 1540 with a TAS of 105 kt. The forecast wind on the TAF is 300/15 and last light at Corryong is 1710. At 1630 the pilot notices that they are over Tallangatta.

Use the WAC on page 18 to determine the most appropriate action for the pilot in this situation. Provide an ETA and heading to a licensed airfield.

Do not write outside this box.

END OF PAPER

Do not write outside this box.

ADDITIONAL PAGE FOR STUDENT RESPONSES

Write the question number you are responding to.

Do not write outside this box.

ADDITIONAL PAGE FOR STUDENT RESPONSES

Write the question number you are responding to.

Do not write outside this box.

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Do not write outside this box.

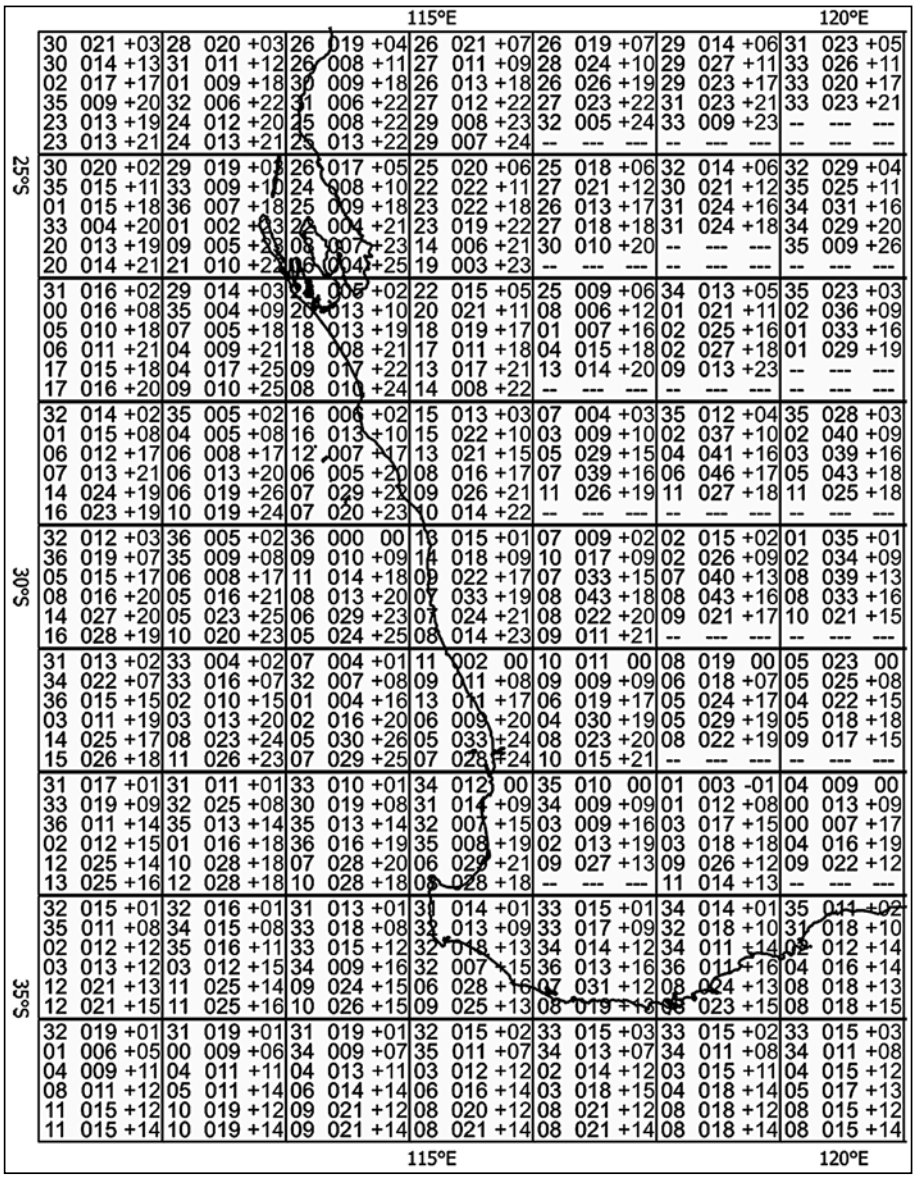
ADDITIONAL PAGE FOR STUDENT RESPONSES

Write the question number you are responding to.

Do not write outside this box.

ADDITIONAL RESPONSE SPACE FOR QUESTION 19

If you want this GPWT to be marked, rule a single diagonal line through the GPWT on page 10.



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32	019	+01	31	019	+01	31	019	+01	32	015	+02	33	015	+03	33	015	+02	33	015	+03
01	006	+05	00	009	+06	34	009	+07	35	011	+07	34	013	+07	34	011	+08	34	011	+08
04	009	+11	04	011	+11	04	013	+11	03	012	+12	02	014	+12	03	015	+11	04	015	+12
08	011	+12	05	011	+14	06	014	+14	06	016	+14	03	018	+15	04	018	+14	05	017	+13
11	015	+12	10	019	+12	09	021	+12	08	020	+12	08	021	+12	08	018	+12	08	015	+12
11	015	+14	10	019	+14	09	021	+14	08	021	+14	08	021	+14	08	018	+14	08	015	+14

GPWT FORECASTS (1000FT - FL140) - WA-S

PROVIDED BY AUSTRALIAN BUREAU OF METEOROLOGY

VALID: **2100 UTC 10 Feb 2020**

ISSUED: 0153 UTC 10 Feb 2020

DATA FORMAT: dd fff tTT

dd: WIND DIR TENS OF DEG TRUE

fff: WIND SPEED IN KNOTS

tTT: TEMP IN DEG CELSIUS

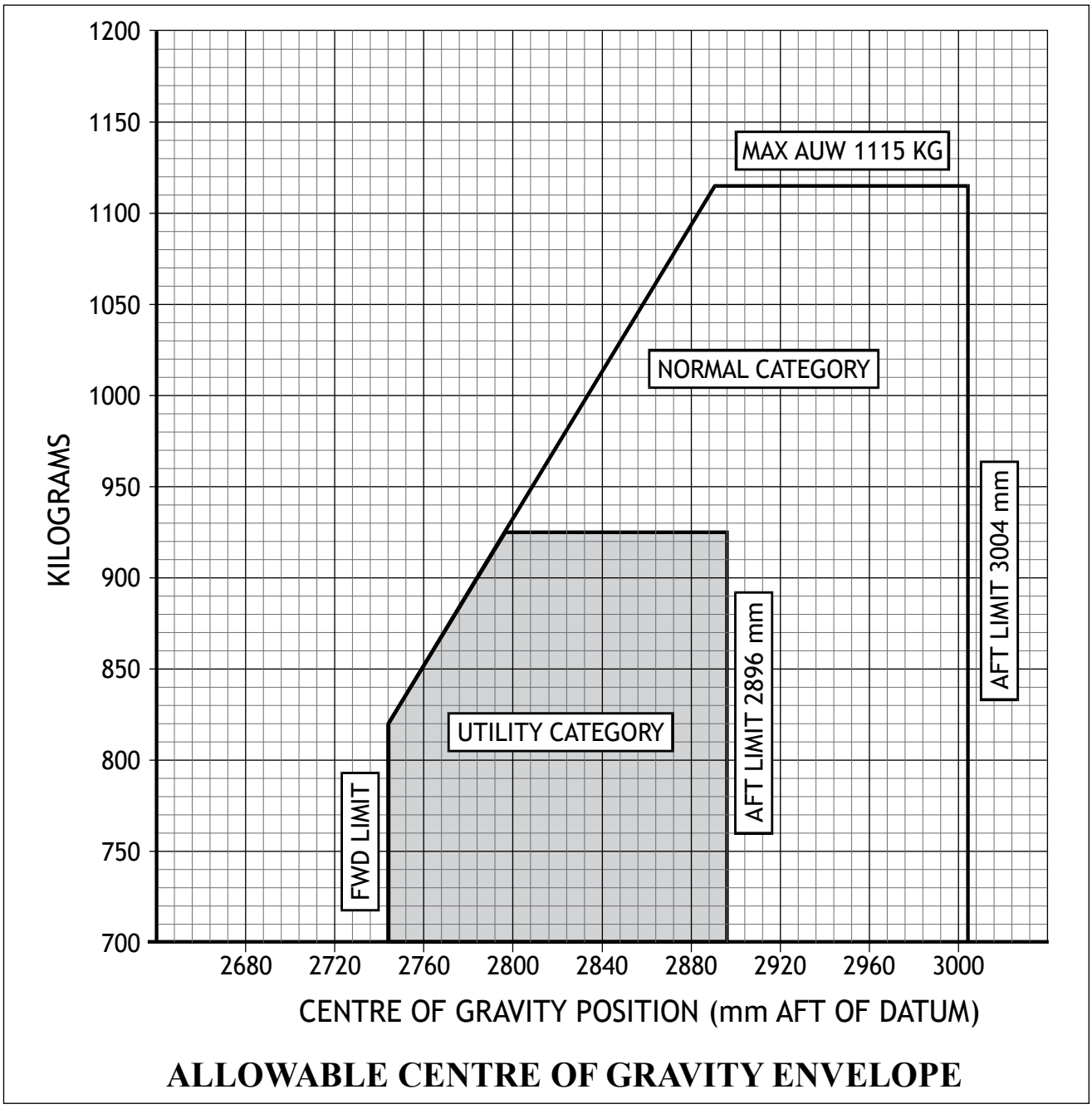
FORECAST is valid for the centre of the box

ISA FL/FT	hPa	T
140	600	-13
10000	700	-05
7000	800	+01
5000	850	+05
2000	950	+11
1000	975	+13

Do not write outside this box.

ADDITIONAL RESPONSE SPACE FOR QUESTION 20

If you want this loading chart to be marked, rule a single diagonal line through the loading chart on page 12.



ALLOWABLE CENTRE OF GRAVITY ENVELOPE

Do not write outside this box.

References

Question 19

Bureau of Meteorology 2019, *Grid Point Wind and Temperature Forecasts*, www.bom.gov.au/aviation/charts/grid-point-forecasts.

Question 20

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Question 21

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Question 22

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Question 23

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