Government of **Western Australia**
School Curriculum and Standards Authority

Western Australian Certificate of Education
ATAR course examination, 2016

Question/Answer booklet

AVIATION

Please place your student identification label in this box

Student number: In figures

In words

Time allowed for this paper

Reading time before commencing work:	ten minutes
Working time:	two and a half hours

Materials required/recommended for this paper

To be provided by the supervisor
This Question/Answer booklet
Multiple-choice answer sheet

Number of additional answer booklets used (if applicable):

To be provided by the candidate

Standard items:	pens (blue/black preferred), pencils (including coloured), sharpener, correction fluid/tape, eraser, ruler, highlighters
Special items:	non-programmable calculators approved for use in this examination, navigation plotter (or ruler and protractor), flight computer

Important note to candidates

No other items may be taken into the examination room. It is **your** responsibility to ensure that you do not have any unauthorised material. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further.

Ref: 16-008

2017/3950[v3]
Web version of 2016/59406

Structure of the examination

The Aviation ATAR course examination consists of a written component and a practical (performance) component.

Structure of this paper

Section	Number of questions available	Number of questions to be answered	Suggested working time (minutes)	Marks available	Percentage of written examination
Section One Multiple-choice	20	20	30	20	20
Section Two Short answer	25	25	120	117	80
				Total	100

Instructions to candidates

1. The rules for the conduct of the Western Australian Certificate of Education ATAR course examinations are detailed in the *Year 12 Information Handbook 2016*. Sitting this examination implies that you agree to abide by these rules.

2. Answer the questions according to the following instructions.

   Section One: Answer all questions on the separate Multiple-choice answer sheet provided. For each question, shade the box to indicate your answer. Use only a blue or black pen to shade the boxes. If you make a mistake, place a cross through that square, then shade your new answer. Do not erase or use correction fluid/tape. Marks will not be deducted for incorrect answers. No marks will be given if more than one answer is completed for any question.

   Section Two: Write your answers in this Question/Answer booklet.

3. Working or reasoning should be shown clearly when calculating or estimating answers.

4. You must be careful to confine your answers to the specific questions asked and to follow any instructions that are specific to a particular question.

5. Additional working space pages at the end of this Question/Answer booklet are for planning or continuing an answer. If you use these pages, indicate at the original answer, the page number it is planned/continued on and write the question number being planned/continued on the additional working space page.

Section One: Multiple-choice **20% (20 Marks)**

This section has **20** questions. Answer **all** questions on the separate Multiple-choice answer sheet provided. For each question, shade the box to indicate your answer. Use only a blue or black pen to shade the boxes. If you make a mistake, place a cross through that square, then shade your new answer. Do not erase or use correction fluid/tape. Marks will not be deducted for incorrect answers. No marks will be given if more than one answer is completed for any question.

Suggested working time: 30 minutes.

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1. The following diagram represents a T-VASIS as seen by the pilot on final approach.

The indications shown are that the aircraft is

(a) below approach slope, fly up.
(b) above approach slope, fly down.
(c) on correct approach slope.
(d) on gross undershoot, fly up.

2. On a helicopter, Coriolis effect will cause an

(a) upward bending of the rotor blades due to lift and centrifugal force.
(b) acceleration of the blade that flaps up and a deceleration of the blade that flaps down.
(c) outward movement of the centre of gravity (CG) of the blade that flaps up, and an inward movement of the CG of the blade that flaps down.
(d) increase in the downwash when flying in ground effect.

3. If a pilot starts to experience eyestrain, difficulty seeing in dim light and has problems focusing on small objects, the **most** likely cause is the onset of

(a) presbyopia.
(b) hyperthermia.
(c) astigmatism.
(d) hypoxia.

4. For a helicopter with a constant weight, rotor coning is greatest

(a) on the ground with a low revolutions per minute (RPM).
(b) during take-off with a low RPM.
(c) at a high RPM during take-off.
(d) in level forward flight at its maximum speed.

5. Which law guides the main operations of the turbine engine?

(a) Newton's First Law of Motion
(b) Galileo's Law of Inertia
(c) Dalton's Law of Partial Pressure
(d) Newton's Third Law of Motion

6. Angular movement around a longitudinal axis is called

(a) pitching.
(b) yawing.
(c) rolling.
(d) spinning.

7. Which of the following does **not** form an essential part of the main operational requirements for every Global Positioning System (GPS)?

(a) GPS receiver fitted to the aircraft
(b) monitoring stations
(c) master control ground based station
(d) GPS transmitter and receiver fitted to the aircraft

8. Turbulence is often said to comprise two basic types. These are

(a) thermal and windshear.
(b) clear air turbulence and thermal.
(c) thermal and mechanical.
(d) clear air high level and low level.

9. One of the effects of being subjected to excessive continual noise is

(a) argumentativeness.
(b) barotrauma.
(c) euphoria.
(d) presbyopia.

10. The horizontal movement of an air mass over the surface of the Earth is known as

(a) convection.
(b) subsidence.
(c) advection.
(d) sublimation.

See next page

11. True airspeed is

    (a) ground speed corrected for density.
    (b) calibrated airspeed corrected for density.
    (c) indicated airspeed corrected for position and instrument error.
    (d) equal to the indicated airspeed.

12. An aircraft flying at a density altitude of 5000 ft has an indicated airspeed of 145 knots. The true airspeed would be equivalent to

    (a) 134 knots.
    (b) 145 knots.
    (c) 157 knots.
    (d) 168 knots.

13. Which one of the following design features would increase lateral stability in an aircraft?

    (a) a large tail surface area
    (b) wing anhedral
    (c) a forward centre of gravity limit
    (d) wing sweepback

14. To achieve maximum endurance in a piston-engine propeller-driven aircraft, it should be flown at

    (a) the lowest safe altitude.
    (b) the altitude that corresponds to its full throttle height.
    (c) the altitude requiring minimum thrust.
    (d) any altitude, provided the fuel mixture is set correctly for that altitude.

15. To convert local mean time (LMT) into coordinated universal time (UTC), which of the following **must** be taken into account?

    (a) any designated daylight saving period that may exist
    (b) the latitude of the LMT position
    (c) the difference in longitude between the UTC and LMT positions
    (d) the current standard time zone, so it can be added or subtracted as required

16. Displaying situational awareness is of primary importance to the captain of an aircraft. Which one of the following factors would contribute **most** to that attribute?

    (a) having full crew communication
    (b) displaying good decision-making skills
    (c) working in an automated cockpit
    (d) exercising good judgment

17. On a helicopter, mast bumping is associated with which of the following rotor systems?

(a) semi-rigid
(b) rigid
(c) fully-articulated
(d) rigid and semi-rigid

18. When changing power settings in an aeroplane with a constant speed unit (CSU), which procedure results in the **least** risk of over-boosting the engine?

(a) Change manifold pressure before RPM when increasing power and change RPM before manifold pressure when decreasing power.
(b) Always change manifold pressure before RPM.
(c) Always change RPM before manifold pressure.
(d) Change RPM before manifold pressure when increasing power and change manifold pressure before RPM when decreasing power.

19. An aircraft flying beneath a cumulus-staged thunderstorm is likely to encounter

(a) rotor clouds.
(b) severe downdrafts.
(c) heavy rain, lightning and hail.
(d) convection.

20. CAVOK in an aerodrome TAF means

(a) cloud and visibility OK.
(b) ceiling and visibility OK.
(c) no cloud exists above the aerodrome surface and visibility is unlimited in all directions.
(d) ceiling and visibility are limited in some directions but are OK for departures and arrivals.

End of Section One

Section Two: Short answer 80% (117 Marks)

This section has **25** questions. Answer **all** questions. Write your answers in the spaces provided.

Additional working space pages at the end of this Question/Answer booklet are for planning or continuing an answer. If you use these pages, indicate at the original answer, the page number it is planned/continued on and write the question number being planned/continued on the additional working space page.

Suggested working time: 120 minutes.

Question 21 **(4 marks)**

Given the following data:

- airfield elevation 2015 ft
- QNH 1002
- OAT 14 °C.

(a) Calculate airfield pressure altitude. Show **all** workings. (2 marks)

(b) Calculate airfield density altitude. Show **all** workings. (2 marks)

Question 22 **(6 marks)**

Draw a labelled diagram in the space below, to show how a double wedge aerofoil creates lift in supersonic flight when it is at its optimum angle to the airflow.

Question 23 **(3 marks)**

Use your flight computer to calculate and complete the following table.

TAS	Track magnetic	Winds magnetic	Drift	Heading	GS
105 kt	225°	075/22			

Question 24 **(3 marks)**

(a) What is the name given to the inability of the eye to focus different meridians simultaneously? For example, power poles (vertical) remain in focus but the wires (horizontal) are out of focus. (1 mark)

(b) What is the cause of this condition? (2 marks)

Question 25 **(7 marks)**

(a) Draw a labelled diagram in the space below, to show the likely airflow associated with mountain waves and the associated rotor zone. (4 marks)

(b) State **two** environmental conditions required for mountain waves to form. (2 marks)

One: ______________________________

Two: ______________________________

(c) State **one** type of cloud associated with mountain waves. (1 mark)

____

Question 26 **(11 marks)**

Using the information table below together with the Take-off chart and Performance charts provided on pages 11, 12 and 13, complete the following question parts that relate to a proposed flight in a Piper PA-32RT-300T Turbo Lance from Alpha to Bravo.

Conditions	**Alpha**	**Bravo**	**En-route**	
Pressure height	180 ft	105 ft	Distance	401 nm
Runway surface	Long dry grass	Bitumen	Cruise level	Alt 8500 ft
Runway slope	2% down	Nil	Fuel flow	13.7 gph
Take-off weight	1630 kg		Headwind	Nil
Temperature	10 °C	15 °C	OAT	Minus 5 °C
Wind	Nil	Nil	TAS	170 kt

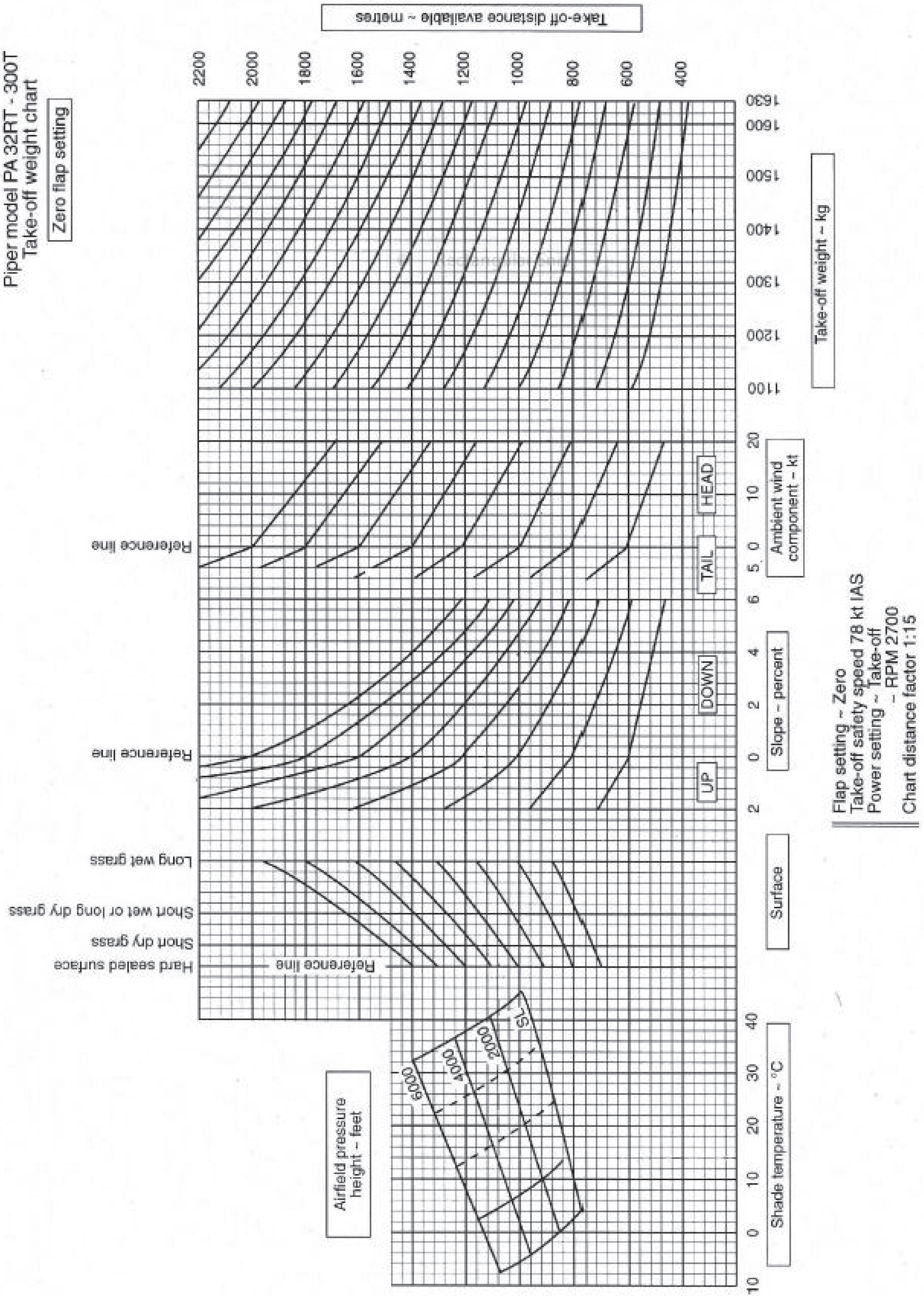
(a) Determine the minimum take-off distance required at Alpha. Show **all** workings clearly on the appropriate chart. (2 marks)

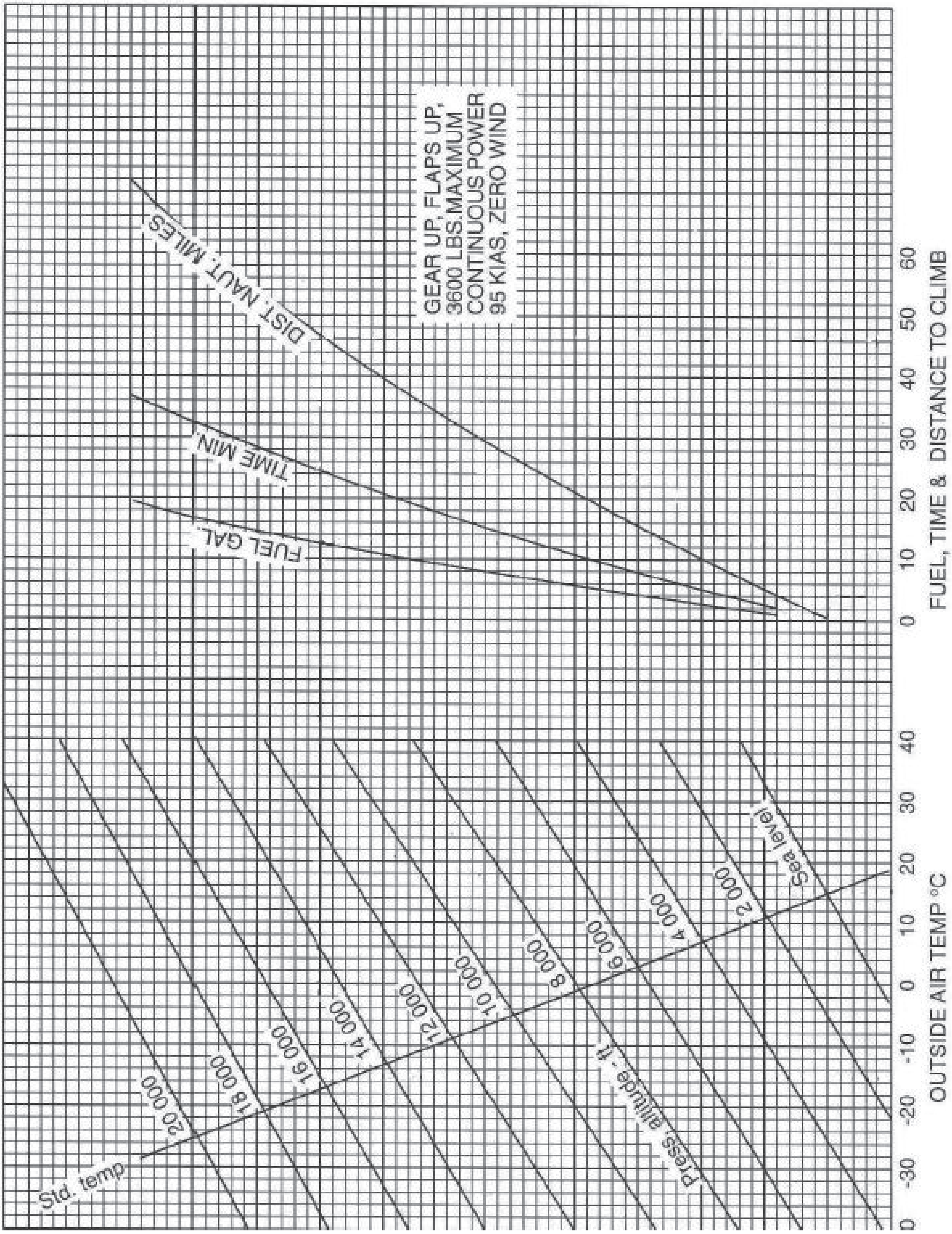
(b) Determine climb, cruise and descent data to complete the table below to find the

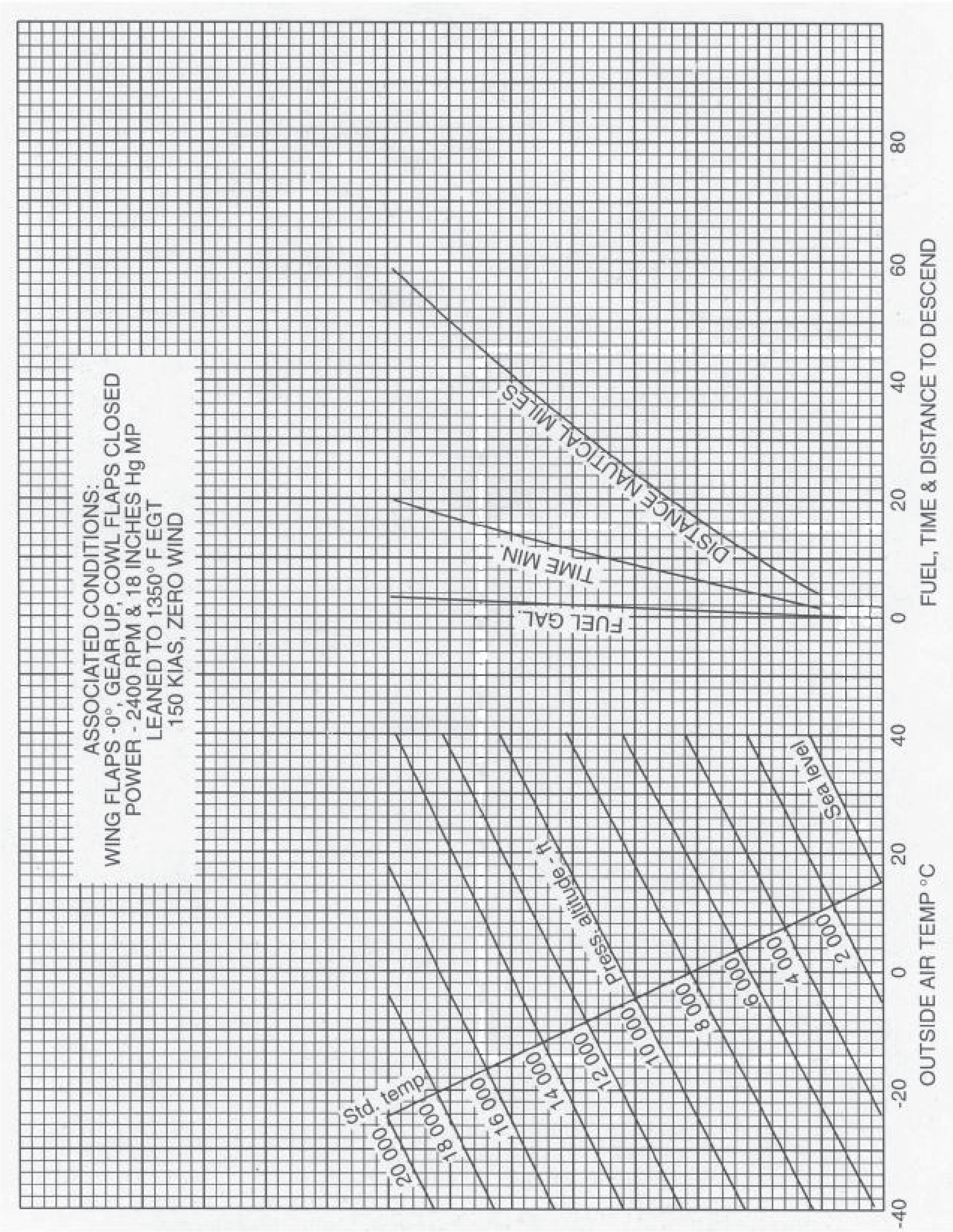
(i) total flight time
(ii) total flight fuel required, i.e. excluding reserves, taxi and unusable fuel.

Ignore all winds in the climb, cruise and descent. Show **all** workings clearly on the appropriate charts. (9 marks)

	Climb	**Cruise**	**Descent**	**Total**
Fuel (gal)				
Time (min)				
Distance (nm)				401 nm


Piper model PA 32RT - 300T
Take-off weight chart
Zero flap setting
Take-off distance available ~ metres
2200 2000 1800 1600 1400 1200 1000 800 600 400
Take-off weight ~ kg
1630 1600 1500 1400 1300 1200 1100
Reference line
Ambient wind component ~ kt
20 10 0 5
HEAD
TAIL
Reference line
Slope ~ percent
6 4 2 0 2
DOWN
UP
Long wet grass
Short wet or long dry grass
Short dry grass
Hard sealed surface
Reference line
Surface
Shade temperature ~ °C
40 30 20 10 0 10
Airfield pressure height ~ feet
6000
4000
2000
SL
Flap setting ~ Zero
Take-off safety speed 78 kt IAS
Power setting ~ Take-off
~ RPM 2700
Chart distance factor 1:15


GEAR UP, FLAPS UP,
3600 LBS.MAXIMUM
CONTINUOUS POWER
95 KIAS, ZERO WIND
DIST. NAUT. MILES
TIME MIN.
FUEL GAL.
FUEL, TIME & DISTANCE TO CLIMB
0 10 20 30 40 50 60
OUTSIDE AIR TEMP °C
-30 -20 -10 0 10 20 30 40
Std. temp
Press. altitude - ft
Sea level
2 000
4 000
6 000
8 000
10 000
12 000
14 000
16 000
18 000
20 000


ASSOCIATED CONDITIONS:
WING FLAPS -0°, GEAR UP, COWL FLAPS CLOSED
POWER - 2400 RPM & 18 INCHES Hg MP
LEANED TO 1350° F EGT
150 KIAS, ZERO WIND
DISTANCE NAUTICAL MILES
TIME MIN.
FUEL GAL.
Std. temp
Press. altitude - ft
20 000
18 000
16 000
14 000
12 000
10 000
8 000
6 000
4 000
2 000
Sea level
-40
-20
0
20
40
0
20
40
60
80
OUTSIDE AIR TEMP °C
FUEL, TIME & DISTANCE TO DESCEND

Question 27 **(6 marks)**

Given the following information, calculate the cloud top, dew point and freezing level within the cloud. Show **all** workings in the grid provided below.

- condensation level is 3000 ft
- initial temperature of surrounding surface air is 18 °C at sea level
- initial temperature of rising air is 21 °C at sea level

ELR = 4°/1000 ft to 2000 ft
2°/1000 ft from 2000 ft to 5000 ft
1°/1000 ft from 5000 ft upward

Level (ft)	ELR	DALR/SALR	
16 000			
15 000			
14 000			
13 000			
12 000			
11 000			
10 000			
9000			
8000			
7000			
6000			
5000			
4000			
3000			
2000			
1000			
Sea level			

(a) Cloud top: ________________________________ (2 marks)

(b) Dew point: ________________________________ (2 marks)

(c) Freezing level in cloud: ________________________________ (2 marks)

Question 28 **(4 marks)**

The stability of an aircraft involves the concepts of Static and Dynamic Stability.

(a) Define Positive Static Stability of an aircraft. (2 marks)

(b) Define Positive Dynamic Stability of an aircraft. (2 marks)

Question 29 **(4 marks)**

List **four** factors that affect the longitudinal stability of an aircraft in flight.

One:

Two:

Three:

Four:

Question 30 **(6 marks)**

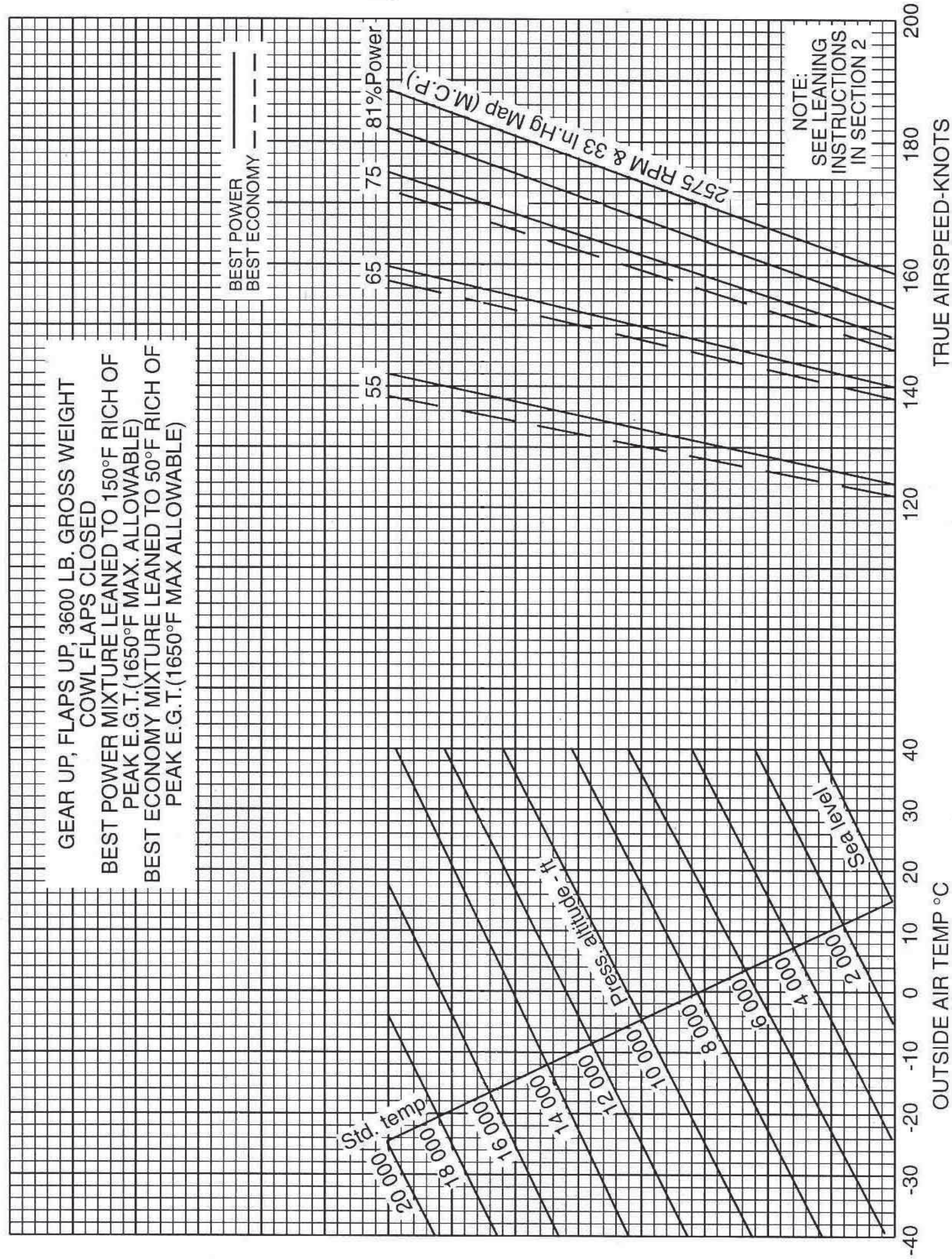
Using the PA-32RT performance chart on page 17 and the following data:

- outside air temperature 12 °C
- pressure altitude 12 000 ft
- power setting 81%.

(a) Determine the TAS for a flight conducted for best power. (2 marks)

(b) To achieve best power what should the mixture be leaned to and are there any restrictions applied to this setting? (2 marks)

(c) Determine the new TAS if the aircraft was required to descend and fly at 4000 ft pressure altitude, while still maintaining 81% power. New OAT 28 °C. (2 marks)


GEAR UP, FLAPS UP, 3600 LB. GROSS WEIGHT
COWL FLAPS CLOSED
BEST POWER MIXTURE LEANED TO 150°F RICH OF PEAK E.G.T.(1650°F MAX. ALLOWABLE)
BEST ECONOMY MIXTURE LEANED TO 50°F RICH OF PEAK E.G.T.(1650°F MAX ALLOWABLE)
BEST POWER
BEST ECONOMY
55
65
75
81%Power
2575 RPM & 33 In.Hg Map (M.C.P.)
NOTE:
SEE LEANING INSTRUCTIONS IN SECTION 2
Std. temp
Press. altitude - ft
Sea level
20 000
18 000
16 000
14 000
12 000
10 000
8 000
6 000
4 000
2 000
-40
-30
-20
-10
0
10
20
30
40
120
140
160
180
200
OUTSIDE AIR TEMP °C
TRUE AIRSPEED-KNOTS

Question 31 **(8 marks)**

Refer to the ARFOR extract shown below.

AREA FORECAST 190500 TO 191700 AREA 30/32.

OVERVIEW:
AREAS OF SMOKE BELOW 6000FT, GENERALLY IN THE E, LOCALLY THICK NEAR FIRES. ISOLATED FOG/MIST DEVELOPING S YNRC/YBDG/YSWG FROM 12Z.

WIND:

2000	5000	7000	10000	14000	18500
360/15	320/15	310/15	280/15 PS02	280/15 MS06	290/20 MS15

CLOUD:
SCT CU 8000/11000, GENERALLY LAND E OF 144E, CLEARING AFTER 14Z.
SCT AC/AS ABV 12000 DEVELOPING W OF 143E AFTER 13Z.

WEATHER:
FG, BR, FU/+FU.

VISIBILITY:
0500M FG, 2000M +FU/BR, 07KM FU.

FREEZING LEVEL:
11500FT.

ICING:
MOD IN AC/AS.

TURBULENCE:
MOD IN CU/AC.
MOD IN THERMALS LAND BLW 7000FT TILL 07Z.
ISOL MOD BLW 7000FT NEAR/LEE RANGES W OF 146E FROM 14Z.

(a) What is the visibility for this forecast if **not** flying in the specified VISIBILITY conditions shown? (1 mark)

(b) State in detail the winds and temperature forecast to be expected at 14 000 ft and 0700 h. Show **units** of measurement. (3 marks)

(c) Using plain language, what is meant by each of the abbreviations shown in the WEATHER section of this ARFOR? (4 marks)

Question 32 **(2 marks)**

A pilot is about to order fuel for her aircraft. The following data apply:

- fuel tanks capacity 210 L
- AVGAS specific gravity 0.72.

In order for the aircraft to remain within performance limitations, the **maximum** fuel that can be carried cannot exceed 135 kg.

Determine the maximum number of litres that must be ordered so as to **not** exceed these limitations. Show **all** workings.

Question 33 **(4 marks)**

An aircraft is tracking 125° M maintaining 120 kt TAS.
Use your flight computer to resolve the following:

(a) What heading would be required to fly and maintain the planned track if a constant 15 kt crosswind was being experienced from the right? (1 mark)

(b) What ground speed would the aircraft be maintaining if it was being subjected to a constant wind 125° M/25 kt? (1 mark)

(c) Use the 1 in 60 rule to determine the actual Track Made Good (TMG) if, after travelling 75 miles, the aircraft was 5 nm left of track. (2 marks)

Question 34 **(2 marks)**

Using the End of Daylight chart below, calculate last light in LMT on 20 January for Broome (17° 57’S, 122° 14’E). Show **all** workings.

Question 35 **(3 marks)**

A VFR aircraft is travelling east and passes overhead its initial way point at UTC 1535 and has estimated its next way point at UTC 1621. If the winds are forecast to remain constant and the distance between waypoints is 218 nm,

(a) determine the planned ground speed. (1 mark)

(b) determine the track error **and** direction of drift experienced if, after travelling 90 miles the aircraft is located 6 miles south of the planned track. (2 marks)

Question 36 **(6 marks)**

Draw a labelled diagram in the space below, to show the disposition of forces of an aircraft in a climb with power.

Question 37 **(3 marks)**

Given a time of 0640 LMT and a position of 26° 22'S 147° 20'E, use the Conversion of Arc to Time chart below to convert Local Mean Time (LMT) to UTC. Show **all** workings.

Question 38 **(2 marks)**

The following data apply to an aircraft:

- TAS 155 kt
- altitude 4500 ft
- fuel policy – fixed reserve 45 minutes
  – taxi fuel 5 litres
  – climb and descent requirements may be ignored.

(a) Determine the ground speed of this aircraft if it flies 615 nm in 135 minutes. (1 mark)

(b) Given a total fuel on board of 275 litres and a fuel flow of 48 litres per hour, determine the safe endurance of this aircraft (in minutes). (1 mark)

Question 39 **(6 marks)**

Unmanned Aerial Vehicles (UAVs) are now in common use throughout the world to carry out both civil and military tasks; however the ease of availability to the civilian population has raised concerns by governments and the general population in two distinct areas.

State the **two** main areas of concern and explain why each is of particular significance.

One:

Explanation:

Two:

Explanation:

Question 40 **(7 marks)**

Before and during World War II, aircraft crew routinely experienced the symptoms of insufficient oxygen in the blood.

(a) What is this condition called? (1 mark)

(b) Describe **two** major symptoms of this condition. (4 marks)

One:

Two:

(c) Outline why this condition rarely affects commercial flight crew today. (2 marks)

Question 41 **(2 marks)**

Given that an aircraft is heading 250° M on a relative bearing of 270° on the ADF (Automatic Directional Finder), determine the track to the navigational aid. Use a diagram to assist with your answer or show **all** workings.

Question 42 **(2 marks)**

Freight and passenger jet aircraft built before 1977 have been progressively banned from utilising airports in built-up areas throughout the world including Perth. Why does this ban apply to them and not to jet aircraft built after 1977?

Question 43 **(4 marks)**

State the correct name for the following airspeed limitation abbreviations:

- Va:
- Vb:
- Vne:
- Vs:

Question 44 **(6 marks)**

Describe the basic operating principles of a turbocharger fitted to a piston-engined aircraft.
(Use the space below to draw a diagram with your answer if desired).

Question 45 **(6 marks)**

Read the case study below and answer the question parts that follow.

An aerobatic aeroplane was due to be ferried to Mangalore, Victoria in preparation for an aerobatic display. The pilot assigned to operate the aircraft was licensed to operate only in Visual Meteorological Conditions (VMC).

As a result of bad weather, the flight had been delayed from earlier in the week and the pilot felt that he was under pressure to get the aircraft to Mangalore as soon as possible, so as to be ready for the display. The forecast for the route to Mangalore was for marginal visual weather, with low cloud and patches of heavy rain.

Despite this, the pilot believed that the weather was suitable for a departure and that the weather could then be reassessed in flight.

On initial departure, the aircraft was able to climb to an altitude of 3500 feet (2500 feet AGL). However, soon after reaching the top of climb, the pilot had to reduce altitude because of a lowering cloud base.

A combination of a further lowering of the cloud base and rising terrain soon meant that the aircraft was only 1000 feet above the ground.

Despite this, the pilot pushed on toward his destination until a heavy rain shower loomed into view which would have further reduced visibility to below the minimum required. It was at this point that the pilot decided to turn the aircraft around and look for somewhere to land.

As the aircraft was turned, it quickly became apparent that the weather had closed in behind and the aircraft entered heavy rain, which left the pilot without any visual reference.

The pilot then attempted to level the aircraft and conduct a steady climb. The aircraft seemed to be climbing normally for a while with only minor corrections to heading required. However, after a few minutes without visual reference, the attitude indicator appeared to malfunction. It was indicating a turn, while the pilot was sure the aircraft was straight and level. Shortly after this, the flight instruments began to indicate a descent. Realising this, the pilot pulled back on the control column in an attempt to arrest the descent. To his surprise, this had no effect and the aircraft continued to descend with increasing air noise and G force. The pilot, not having experienced anything like this before, was confused as to what was happening with the aircraft. Suddenly the aircraft descended below the cloud base, restoring visibility with the ground. The pilot immediately recognised that the aircraft was at a very steep angle of bank with a nose low attitude, dangerously low and over speeding.

The pilot quickly corrected the bank angle to zero and pulled the aircraft out of the dive. During this manoeuvre the pilot began to experience tunnel vision, but fortunately was able to successfully pull the aircraft out of the dive a few hundred feet above the ground. He then managed to conduct a precautionary search and landing in a large paddock.

(a) With regard to Threat and Error Management (TEM), state **one** of the threats that would be relevant in the case study on page 28. (1 mark)

(b) Why would this be considered a threat? (1 mark)

(c) Which sense organ do you believe was causing the illusion that the pilot was experiencing? (1 mark)

(d) Name the illusion that you believe the pilot experienced that caused the undesired aircraft state. (1 mark)

(e) What manoeuvre had the aircraft entered to cause the rapid descent? (1 mark)

(f) What was the most likely cause of the tunnel vision the pilot experienced as a result of the recovery manoeuvre of the aircraft after leaving the cloud? (1 mark)

End of questions

Additional working space

Question number: ____________

Additional working space

Question number: ______________

ACKNOWLEDGEMENTS

Question 1 Image: Nolan, M. (2005, March–April). What you see is not always what you get. *Flight Safety Australia*, *9*(2), p. 32. Retrieved May, 2016, from http://pandora.nla.gov.au/tep/140978

Question 26 PA-32RT. Take-off weight chart from: Yeo, M., Bowers, G., & Bennett K. (2001). *Handbook of flight* (2nd ed.). Perth: WestOne Services, p. 149. Not for operational purposes.

Piper PA-32RT fuel, time and distance to climb chart from: Yeo, M., Bowers, G., & Bennett, K. (2001). *Handbook of flight* (2nd ed.). Perth: WestOne Services, p. 169.
Not for operational purposes.

Piper PA-32RT fuel time and distance to descend chart from: Yeo, M., Bowers, G., & Bennett, K. (2001). *Handbook of flight* (2nd ed.). Perth: WestOne Services, p. 171.
Not for operational purposes.

Question 30 Piper PA-32RT cruise performance chart from: Yeo, M., Bowers, G., & Bennett, K. (2001). *Handbook of flight* (2nd ed.). Perth: WestOne Services, p. 170.
Not for operational purposes.

Question 34 End of daylight chart from: Airservices Australia. (2016). *Aeronautical information package (AIP): AIP book* (General: GEN 2.7 – 5: 25 Nov 04: End of daylight). Canberra: Airservices Australia. Retrieved May, 2016, from www.airservicesaustralia.com/aip/aip.asp?pg=20&vdate=26-May-2016&ver=2
No part of this work may be reproduced in any form without the prior written consent of Airservices Australia.

Question 37 Conversion of ARC to time chart from: Airservices Australia. (2016). *Aeronautical information package (AIP): AIP book* (General: GEN 2.7 – 7: 25 Nov 04: Conversion of ARC to time). Canberra: Airservices Australia. Retrieved May, 2016, from www.airservicesaustralia.com/aip/aip.asp?pg=20&vdate=26-May-2016&ver=2
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