Australian Government
Civil Aviation Safety Authority



The Australian ATPL(A) examination information book

October 2026



Acknowledgement of Country

The Civil Aviation Safety Authority (CASA) respectfully acknowledges the Traditional Custodians of the lands on which our offices are located and the places to which we travel for work. We also acknowledge the Traditional Custodians' continuing connection to land, water and community. We pay our respects to Elders, past and present.

Artwork: James Baban.

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Acronyms

The acronyms and abbreviations used in this manual are listed in the table below.

Table 1. Acronyms

Acronym and abbreviation	Description
AALW	Air law examination
AASA	Aerodynamics and aircraft systems examination (Aeroplane)
AFPA	Flight planning examination
AHUF	Human factors examination
AIP	Aeronautical Information Publication
AMET	Meteorology examination
ANAV	Navigation examination
anm	Air nautical mile(s)
APLA	Performance and loading examination (Aeroplane)
ARN	Aviation Reference number
ASIC	Aviation security identification card
ATIS	Automatic terminal information service
ALTN	Alternate
ATPL(A)	Australian Air Transport Pilot (Aeroplane) Licence
AVID	Aviation identification
CAA	*Civil Aviation Act 1988*
CAAF	Civil Aviation Authority of Fiji
CAAP	Civil Aviation Advisory Publication
CAO	Civil Aviation Order
CAR	*Civil Aviation Regulations 1988*
CAS	Calibrated airspeed
CASA	Civil Aviation Safety Authority
CASA	Civil Aviation Safety Authority
CASR	*Civil Aviation Safety Regulations 1998*
CPL	Commercial pilot licence
CR	Contingency reserve
DAPs	Departure & approach procedures

Acronym and abbreviation	Description
EFIS	Electronic flight instrument systems
EICAS	Engine indicating and crew alerting system
ERC	En route chart
ERSA	En route supplement Australia
ETP	Equi-time point
FMS	Flight management system
FR	Final reserve
ft	feet
GNSS	Global navigation satellite systems
GPWS	Ground proximity warning system
GPWT	Grid point wind and temperature
HEAD	Head wind
IAS	Indicated airspeed
IFR	Instrument flight rules
KT	Knot
lb	pound
LPSD	Latest point of safe diversion
LSALT	Lowest safe altitude
M	Magnetic North
METAR	Meteorological aerodrome report
MLG	Main landing gear
MOS	Manual of standards
NM	Nautical mile(s)
OEI	One engine inoperative
PEXO	Pilot examination office
PNR	Point of no return
PPL	Private pilot licence
PSD	Point of safe diversion
ROC	Rate of climb
RSWT	Route sector wind and temperature
RVSM	Reduced Vertical Separation Minimum
SPECI	Special weather report issued when there is significant deterioration or improvement in airport weather conditions

Acronym and abbreviation	Description
T	True North
TAC	Terminal area charts
TAF	Terminal area forecast
TAIL	Tail wind
TCAS	Traffic collision avoidance systems
TMN/TAS	True Mach Number/True Airspeed
TOC	Top of climb
VFR	Visual flight rules

Revision history

Revisions to this manual are recorded below in order of most recent first.

Table 2. Revision history

Version number	Date	Parts and sections	Details
2.9	October 2026	Section 4.2.9.11	Fixed typo in table
2.8	September 2025	All	

Explanatory note on version 2.8

Version 2.8 of this ATPL(A) Information Book makes a number of minor changes, e.g. links to Aspeq and some of the abbreviations used.

In the ATPL(A) Flight Planning and Performance & Loading section, the ‘examination aircraft’ has been clarified as NOT RVSM-approved, but ‘permitted to operate in RVSM airspace’ in accordance with IFR cruising levels, as follows:

Table 3. IFR cruising levels for NON RVSM aircraft approved to operate in RVSM airspace

WEST Magnetic Tracks from 180° through WEST to 359°	**EAST** Magnetic Tracks from 000° through EAST to 179°
FL390 FL350 FL310 EVEN thousands to FL280	FL410 FL370 FL330 ODD thousands to FL290

The term “Critical Point” (CP) which in the past, has been equated to an “Equi-time Point” (ETP) will no longer be used in this context. Questions will use the term “Equi-time Point” or its abbreviation “ETP”.

1 General advice to candidates

1.1 Introduction

The Civil Aviation Safety Authority (CASA) is entrusted with the responsibility of ensuring Australian Air Transport Pilot (Aeroplane) Licence [ATPL(A)] holders are properly qualified to uphold the high standards of safety due to the Australian travelling public.

As an ATPL(A) authorises the holder to act as pilot in command of complex, high capacity, multi-crew aeroplane engaged in passenger carrying operations, it is essential that the holder has demonstrated that they have, amongst other requirements, the aeronautical knowledge to exercise this privilege. CASR Part 61 Manual of Standards – Schedule 3 prescribes the necessary areas of knowledge, and the CASA examination is designed to ensure that an applicant for this licence has been trained to the manual of standards and has attained the required standard for safe operations.

1.2 Commitment

Before deciding to attempt the examination for the ATPL(A), candidates should appreciate the importance of acquiring the aeronautical knowledge that will provide them with a sound foundation to successfully undertake endorsement training, and to safely operate high-capacity aeroplanes in air transport operations. Consequently, the course of study that candidates adopt will have a very important impact on the standard of their aeronautical knowledge.

Candidates must bear in mind that the ATPL(A) examination is set to a standard based on their undergoing a properly structured course of adequate duration, with appropriate study material, and under qualified instruction and supervision. Such courses are available, and may be by classroom attendance at training institutions, or by distance learning. CASA is of the view that the average candidate would need a minimum ten to fifteen weeks of full-time tuition or the equivalent of at least 350 hours of study, depending on the structure of the course, to fully cover the material contained in CASR Part 61 Manual of Standards, and to reach the standard necessary to pass the associated examination.

The time taken is not nearly as great as that required of other professional occupations involving such similarly great responsibility. CASA is absolutely committed to ensuring that holders of the Australian ATPL(A) are amongst the most competently qualified in the international aviation industry.

1.3 Selecting a course

Intending candidates should be aware that, unlike *flying* training schools, *aeronautical knowledge* training organisations are not legally required to be licensed, hence CASA does ***not*** regulate or supervise them. Therefore, it would be prudent for candidates to carry out very careful assessment of these aeronautical knowledge training organisations (or instructors) before selecting one to conduct their training.

CASR Part 61 Manual of Standards covers the training requirements for every flight crew licence and rating. The manual of standards is the determinant of topic areas by which candidates would have to study to; how well a course subscribes to the manual of standards will serve as an indicator of its standard and quality.

1.4 Recommended checks

CASA recommends that candidates check the following when selecting a course:

1. First and foremost, obtain the CASR Part 61 Manual of Standards, and familiarise themselves with the aeronautical knowledge standards specified in it; have a general idea of the scope and depth of the knowledge required of a licence holder.
    a. Unless candidates have a good idea of what will be involved in the study, they will not be aware of what an ATPL course should properly teach, and therefore not know whether they are receiving value-for-money for their course fees.
2. Candidates attending a course that does not adhere to the Part 61 MOS may face difficulties in passing the examination.

3. Check whether the training organisation being considered offers a structured study plan that ***covers the Part 61 MOS*** in an ***adequate period of time*** (or, if only a few selected subjects are being contemplated for study, the relevant portions of the Part 61 MOS).

   a. The phrase “structured study plan” means that the course is so constructed that it will enable the average candidate to acquire/assimilate the required knowledge, and to the required standard, in a logical ‘step-by-step’ method.

   b. Common sense will tell that the duration of the course must enable adequate coverage of the Part 61 MOS (or where applicable, the relevant portions) in a manner that permits the knowledge to be assimilated comprehensively, and to the required standard. As mentioned earlier, for the average student, this will be about ten to fifteen weeks of full-time tuition or the equivalent of 350 hours of study for all the subjects.

   c. Courses that promote short cut methods only enable memorisation of the provided materials, but not real acquisition of the aeronautical knowledge required of an ATPL holder.

4. Check the progress and evaluation system the training organisation uses to assess the student’s readiness to sit the examination.

   Is this designed to regularly assess the student's progress in the structured course so that appropriate ***remedial*** training may be programmed to ensure the student acquires the required knowledge? This would be one of the indicators of a well-structured course.

   Or does it merely consist of exposing the student to imitations of CASA's examinations for the purpose of ‘recognising’ questions and associating these with ‘prepared answers’? This method does not prepare the students to acquire the aeronautical knowledge demanded of an ATPL pilot, but merely to memorise/recognise certain items.

5. Avoid those training organisations (or instructors) that make promises which appear not to require the candidate to study.

6. Assess the aviation and teaching experience of the instructors - do they have the operational background and qualifications to deliver high quality instructions?

7. Check that the instructor or training organisation is registered with CASA The phrase “registered with CASA” does not mean that the organisation is approved by CASA. As a reminder, CASA does not regulate nor supervise aeronautical knowledge training organisations (or ground theory instructors).

   What it means is that the organisation is voluntarily listed with CASA, so that they may receive essential updates on flight crew training and examination matters, as well as the important feedback on their students’ performances. Thus, a registered training organisation is more likely to have up-to-date information to assist the students than would a non-registered organisation.

8. Ask/shop around, but do not base a decision solely on cost or convenience.

9. Finally, if you are a working person and unable to afford time off to do a full-time course covering all the 7 subjects, it will be more practical to attempt the ATPL examination subject by subject, or a manageable number of subjects. CASA has designed the system for working people to achieve incremental accumulation of subject passes towards a full ATPL credit within a prescribed period of time or ‘window’ of 2 years.

   There are distance learning courses for those who wish to study without taking leave from their occupations. This situation is no different from other professions who achieve their degrees or diplomas through this method.

   Candidates will not only derive the best value for their money with a well-structured course but also enjoy a better prospect of passing the examination.

2 Examination structure

2.1 Introduction

This Book aims to assist candidates in their preparation for the Australian ATPL (A) examination by providing relevant basic information.

The examination tests items of the ATPL (Aeroplane) Aeronautical Knowledge Standards as per CASR Part 61, Manual of Standards, Schedule 3.

2.2 Examination structure

The ATPL(A) examination consists of a seven separate subject-parts (hereafter called parts), that may be attempted singly or in any number at a sitting.

Overseas candidates sitting the ATPL(A) under the approved arrangements of their respective national aviation regulatory Authority, which has examination agreements with CASA, are only required to sit for six Parts of this examination, minus the Australian ATPL Air Law Part. Under this system the Australian ATPL(A) examination credit will not be issued for the successful candidate. Instead, the results will be forwarded to the respective national authority for its own processing, after the candidate has passed the Air Law paper for the country's ATPL(A).

Table 4. Structure of the examination

Exam paper	Subject part(s)	Time allowed	Code
1	Flight planning	3.0 hours	AFPA
2	Navigation	1.5 hours	ANAV
3	Performance & loading	2.5 hours	APLA
4	Aerodynamics & aircraft systems	1.5 hours	AASA
5	Human factors	1.25 hours	AHUF
6	Meteorology	1.5 hours	AMET
7	Air law	1.5 hours	AALW

2.3 Examination questions

2.3.1 Multi-Choice Format

Examination questions are generally in multi-choice format, the number of alternative answers varying from three to a maximum of five. Candidates are to select the correct or nearest correct answer for the question asked and denote this selection on the computer by clicking on the radio button next to their choice of answer. Alternatively, a short answer may be required to be entered into a 'box' on the computer screen. These short answers are restricted to numerical values only, e.g.

The distance to the ETP is "_____" NM from YBAS.

For more details about 'fill-in-the-box' answers, see page

Practice using the PEXO exam system | Civil Aviation Safety Authority (casa.gov.au)

2.3.2 'Stand-alone'

All questions are 'stand-alone', that is, they are not linked to any other question and therefore will neither affect nor be dependent upon the answers of other questions.

2.3.3 Marks

Each question carries a number of mark(s) to be awarded for its successful solution. In some Parts, the questions may each be allocated different mark(s). The marks awarded to the individual question will be based on the degree of complexity (time involved in answering it) and may range from 1 to 5 marks. This allocation will be denoted against the individual question. The candidate is advised to take note of the marks allocated to each question.

2.3.4 Total marks per examination part

The total number of marks each examination Part carries will be the same for every candidate at the same sitting. However, the importance of ensuring that both the relevancy and quality of the examination does not diminish in the face of known accident and incident trends, emerging aviation technology and/or new operational practices, the examination structure and content will be reviewed regularly. This may result in a new Part content, with a revised total amount of marks for that Part.

2.3.5 Working calculations and assessment

While working calculations in some questions may be necessary, these are not assessed. The scoring of the attempt is based solely on the selection of correct answers. Therefore, a candidate should exercise the utmost care when selecting or entering their answers on the computer.

2.3.6 Re-assessment

All workings are destroyed shortly after the examination. In the event of an application for a re-assessment, a review of the associated workings will not constitute part of the process. The sole criterion for deciding whether a question has been answered correctly or not is by determining what has been selected or entered on the computer.

2.3.7 Removal of questions from a Paper

CASA reserves the right to strike out any questions from any examination Part it sets, where there are valid reasons for doing so.

2.3.8 Adjusted score

When a question is deleted from an examination Part, its marks are neither awarded nor subtracted from a candidate's overall result. The total possible score is reduced by the number of marks associated with the deleted question. However, the total time allocated for the Part remains unchanged.

2.4 Minimum standard

To obtain a Pass in the ATPL(A) examination the candidate must attain the following requirements:

1. achieve '**not less than 70%**' of the total possible marks that may be obtained from each paper, with the exception of the Air Law paper (see following sub-paragraph).
2. achieve '**not less than 80%**' of the total possible marks in the Air Law Part.

2.5 Award of the ATPL(A) examination credit

2.5.1 Time-Limited Credit for Examination Parts

An examination part, once passed, may be held in credit for a defined period of time. All seven examination parts must be passed within a permitted period, called a 'window', a rolling period of 2 years. If all subject-parts are not passed within a 'window', individual subject passes will be lost. The candidates will have to continue to pass subject-part examinations, until all seven subject-parts have been passed within one 'window'.

2.5.2 Air law part

A pass in ATPL Air Law (AALW) must be achieved in the same 'window' as any other subject. The only difference with AALW is it has a pass mark of not less than 80%, whereas all other ATPL subjects have a pass mark of not less than 70%.

2.5.3 ATPL(A) credit

Once all seven subject parts are passed within a 'window', an Australian **ATP(A)L Theory Examination Credit** will be awarded.

3 Administrative information

3.1 Introduction

An important factor in the successful and stress free sitting of an examination is a thorough understanding of the procedures and processes involved. Adherence to these procedures will ensure that CASA is aware of the candidate's requirements, and that the candidate in turn will know what to expect at the examination.

Part III details the administrative procedures to be followed to successfully apply for an examination sitting and offers advice about the material supplied with the examination, conduct to be followed during the examination and important guidance about question answering techniques.

The information is contained in this section, and familiarity with it will provide the best opportunity for a successful examination result.

3.2 Examination schedule and application to sit

3.2.1 Professional exams

CASA has delegated an independent company, Aspeq (http://aslau.aspeqexams.com) to supervise the professional (and PPL) exams in a number of cities and towns throughout Australia. Professional exams are those for the CPL, ATPL, Flight Engineer licence and various ratings.

More on bookings for professional exams may be found on the Aspeq website.

CASA recommends that the submission of an examination application is not left until the 'last minute', as a position at that venue may not be available.

If a candidate is unsure of the administrative requirements of the examination process, they may obtain information and advice from the CASA web site, commencing on page https://www.casa.gov.au/licences-and-certification/individual-licensing/exams or by telephoning 131-757.

3.3 Material required for examination

3.3.1 Material supplied by ASPEQ or candidate for each examination

Candidates should refer to the CASA web site, on page Materials allowed in exams | Civil Aviation Safety Authority (casa.gov.au) for information about what 'Permitted material' they are allowed to take into each exam and what material the Aspeq invigilator will supply to them This link also includes information about:

- 'self-printed copies' of documents, such as CASRs, CARs, AIP and CAOs; and
- Marking and tagging of documents; and
- 'Not Permitted materials'.

The candidate is responsible for ensuring all documents are up to date. Where reference to an Australian AIP document is made, this permits the alternative use of the Jeppesen equivalent document, should the candidate prefer the latter. This option for alternative usage ONLY applies to documents that are 'to be supplied by candidates' and does NOT extend to material that will be 'supplied by Aspeq'.

Candidates are advised that if any difference between the AIP and Jeppesen documents results in the selection of an incorrect answer, CASA will NOT accept this consequence as a basis for re-mark. Candidates should also be aware that the area of coverage and scale of Jeppesen maps/charts differs from those published by Airservices Australia. Where questions refer a candidate to a specific map or chart, the reference will be to the Airservices map/chart, not the Jeppesen equivalent.

Other than the mentioned material for the respective examination Parts, all other references and/or equipment are NOT permitted.

3.4 Location, conduct and security of the examination

3.4.1 Location

3.4.1.1 Australian sittings

The Australian ATPL(A) examination is available only in Australia. All examination sittings are conducted and invigilated by Aspeq officers/employees at official venues, which are listed on the Aspeq website.

3.4.1.2 Overseas sittings

Sitting of Australian pilot theory exams at an overseas location is not possible nor permitted.

Overseas sittings for Fijian candidates are available only under a special arrangement between the Australian CASA and the aviation regulatory Authorities of Fiji (CAAF), who use CASA examinations for their own licensing requirements. These sittings will be conducted and invigilated by CAAF.

3.4.1.3 Conduct and security

The integrity of the Australian ATPL examination is contingent upon its proper and fair conduct. In turn the quality of the conduct is to a large extent dependent upon good understanding of examination rules and procedures, and the correct behaviour of every candidate. Section 3.5 provides guidelines for good conduct, and contains advice for the candidate on question answering techniques to help achieve a stress-free sitting. Ultimately there is no substitute for the commonsense, timely preparation, decency and integrity of the individual.

3.5 Conduct of candidates for the examination

3.5.1 Introduction

3.5.1.1 Role of the Invigilating Officer

The Invigilating Officer's main role is to enable the examination to be conducted properly and fairly. They ensure that the relevant rules and procedures are complied with. The Invigilating Officer acts on behalf of CASA in assisting the candidate to resolve ***administrative problems*** that may arise immediately before and during the examination, and in recording observations and complaints made by the candidate.

3.5.1.2 Authority of Invigilating Officer

The candidate **MUST** comply with **ALL** instructions and orders issued by the Invigilating Officer.

3.5.1.3 What the Invigilating Officer is NOT

The Invigilating Officer is **NOT** an examiner, nor an instructor. Therefore, they are **NOT** permitted to discuss **NOR** interpret any aspects of a question, including any alleged error contained within the question; they may **NOT** provide any additional information, unless Flight Crew Licensing Section has directly authorised such an action; they may **NOT** assist in the working or calculation process.

3.5.2 Pre-examination

3.5.2.1 Proof of identity

Prior to sitting the examination, the candidate must provide to the Invigilating Officer proof of identity. The **ONLY** acceptable form of identification is a photographic document, such as an Australian driver's licence, current International Passport, or ASIC/AVID. See Acceptable photo ID page for details.

3.5.2.2 Information/instructions

Candidates are advised to read and understand the instructions on the introductory pages of PEXO prior to commencing their examination, particularly the "Examination Rules" and the list of "Permitted Material". When ready, the candidate can click on the "**Start Examination**" button. Only after the first exam question appears on the screen, will the timer commence its countdown.

3.5.2.3 Material permitted

Other than the material permitted for the respective examination Part, the candidate must not have at, or near, his/her sitting position personal items such as documents, files, bag, briefcase, coats etc. These items may be left at the front or rear of the examination room in accordance with the direction of the Invigilating Officer.

3.5.3 During the examination

3.5.3.1 Seating

During the examination the candidate must sit and remain seated at the position assigned by the Invigilating Officer.

3.5.3.2 Timing

Each candidate will be provided with a **Place card** which includes their:

- Name
- Exam date
- Username (which is their ARN)
- The exam code, e.g. ANAV and
- Booking No.

When instructed by the Invigilator, each candidate uses the place card details to log into PEXO and may commence their exam by clicking on the "**Start Examination**" button. When PEXO determines that the allocated time has been used, no further entries can be made, and the exam will be submitted automatically.

3.5.3.3 Communication

Silence shall be observed at all times; from the moment the candidate enters the examination room until they leave the place on completion of the examination period. The candidate must **NOT** engage in any form of communication with anyone other than the Invigilating Officer.

The candidate shall address a query or report an alleged examination error **ONLY** to the Invigilating Officer, and in a quiet and non-disruptive manner; where possible, this should be done after the examination sitting is completed.

Rights of Other Candidates

Do respect the rights of other candidates. They are entitled to a quiet environment to sit the examination. The operative word is SILENCE. When a candidate has completed the examination, and has been allowed to leave the room, they should do so quietly.

A candidate who insists on disruptive behaviour to demonstrate a perceived dissatisfaction will be asked to leave the examination room immediately.

3.5.3.4 Examination material

The examination paper and all materials provided are only for the sitting of the examination itself and must **NOT** be copied or taken out of the examination room for any purpose. This rule covers all calculations, writings, drawings or scribbling done on working paper and/or the scribble pad.

Unauthorised Reference Material

Only 'Permitted material to be supplied by the candidate' may be taken into the exam room. Any unauthorised or 'Not Permitted' material must **NOT** be taken into the examination room, **NOR** should such material be referred to or used during the examination period, whether in or outside the examination room.

3.5.3.5 Sharing of materials

Candidates are **NOT** permitted to share materials.

If a candidate does not have an item of required material, they shall inform the Invigilating Officer of the problem. The Invigilating Officer is **NOT** responsible for procuring material that should have been supplied by the candidate. However, the Invigilating Officer may volunteer to obtain the material, but this must **NOT** be from another candidate sitting the same examination. If the material is not available, the candidate is ultimately responsible for the deficiency.

3.5.3.6 General behaviour

There shall be no eating, drinking, smoking, listening to any electronic devices, or engaging in improper activity during the examination.

3.5.3.7 Proper conduct

Failure to comply with any of the above rules will disqualify the candidate from the sitting. The candidate may also be barred from any CASA examinations for 12 months.

3.5.4 Post examination

3.5.4.1 Candidate comment

CASA does not accept telephone or email request for post-exam discussion or debrief.

Candidates may apply for a re-assessment of their marked exam. The scheduled fee for this service is $130. For more information, refer to the Request a reassessment of your exam result | Civil Aviation Safety Authority (casa.gov.au) page.

There is also a cost-free facility for candidates to submit observations, comments or suggestions to assist CASA improve the exam system. For more information, refer to the Provide feedback after an exam | Civil Aviation Safety Authority (casa.gov.au) page.

3.5.5 When answering the questions

1. The examination does not contain any trick question. Each statement means exactly what it says. Do not look for hidden meanings.
2. First, **read the question stem very carefully**, and where possible, preferably without looking at the alternative answers. Be sure that you understand what is asked of you.
3. Where required, select the relevant map, chart, diagram or document to support your workings. Where possible, without reference to the alternative answers, decide what the correct answer should be, or work out the problem to obtain the answer. Check your selection or calculations to ensure that you have answered the actual question - **NOT** what you **THINK** the question may be.
4. Look at the alternative answers and select the one that is the same as, or closest to, your answer. Only one alternative answer will be correct.
5. If you cannot find an alternative answer that matches your own answer, go back and **read the question again very carefully**. Make sure that you understand what is required, then re-check your calculations or document references.
6. It is **VERY** important that you register your answer choice by 'clicking' on the C**ORRECT** radio button.
7. If you find that you have considerable difficulty with a particular question, do not spend too much time on it. Move on to the other questions and answer those of lesser difficulty. Then go back and reconsider the unanswered questions.
8. Remember, you are responsible for your own time management. Use the allocated time fruitfully to answer all or as many questions as possible. Do not waste time during the examination period on disruptive activities such as complaining to, or arguing with, the Invigilating Officer.

4 Technical information

4.1 Introduction

The ATPL (Aeroplane) Aeronautical Knowledge Manual of standards is essentially a training manual of standards, while the ATPL(A) examination is a regulatory audit tool to assess whether such training has been completed, and that the candidate meets the required standard. Hence the examination may test any item within that manual of standards, including those carrying the annotation *'brief discussion only'*.

4.2 General

4.2.1 Appendices

The following appendices contain basic information on all the subject Parts, recommended reading list, the standardised methods of calculations for flight planning, commonly used abbreviations in the examination, and some specimen questions.

4.2.2 Specimen Questions

The specimen questions are representative of the style and layout that candidates will see in the examination papers. These are provided to give candidates an idea of what to expect and not meant to be training exercises in themselves. Any such training should be from a proper course.

Specimen questions based on charts/documents are valid at time of writing.

Subsequent chart/document changes may render these questions obsolete. However, this would not diminish their usefulness as specimen questions.

4.2.3 Standardised Methods of Calculation

The standardised methods of calculation for flight planning cover rules of interpolation, 'rounding out' and other common assumptions. The objective is to ensure that the numerical values derived by the candidates through correct techniques of calculation are similar, or reasonably close, to the values provided by the correct answer to the question.

For ATPL(A) Flight Planning and Performance & Loading, candidates may use either the "Before-Flight Tables" (also called Integrated Range Tables) or "In-Flight Tables". CASA's calculations are based on the "In-Flight Tables".

4.2.4 'Practical'

The use of the word 'practical' to describe a question implies that it is one involving calculations, plotting and/or graphical work.

4.2.5 Use of the *'Non-Electronic'* navigation computer

A competent standard is expected of the candidate in the use of a modern, non-electronic 'aviation wind triangle and circular slide rule' pilot computer, including employment of its TMN/TAS conversion facility.

Candidates should be aware of any limitations of the navigation computer that they choose to use in all examinations. Where a wind is put onto the navigation computer to determine the ground speed, CASA's solutions are based on the exact 'triangle of velocities'.

If a candidate uses a 'circular' navigation computer, such as a Jeppesen CR-2 or similar, they need to be aware that this type of computer requires the use of 'Effective TAS' for large drift angles. For drift angles of 5 degrees or less, Effective TAS can be ignored, and will not result in a significant difference in the resultant ground speed. For drift angles greater than 5 degrees, candidates should make allowance for Effective TAS to ensure that there is no significant difference between their calculated ground speed and that of the CASA's solution.

4.2.6 Abbreviations

The following abbreviations, besides than those listed in the AIP and examination documents, may be employed in the examination:

anm	air nautical mile(s)
BW	basic weight
GW	gross weight
BRW	brake(s) release weight
BR	brake(s) release
LW	landing weight
ZFW	zero fuel weight MZW mid-zone weight
EMZW	estimated mid-zone weight
CG	centre of gravity
MAC	mean aerodynamic chord
IU	index units
Adj	adjusted
Frt	freight
Comp	compartment
Fwd	forward
1-INOP	one engine inoperative operations
DP	depressurised operations
ETP	equi-time point, previously referred to as a CP
ETP/1-INOP	equi-time point, one engine inoperative on and back
ETP/DP	equi-time point, pressurised operations on and back
FBO	fuel burn off
FOB	fuel on board
PNR	point of no return
PNR/1-INOP	normal operations out to the PNR and one engine inoperative back
PNR/DP	normal operations out to the PNR and depressurised operations back
PSD (or LPSD)	point of safe diversion (or Latest Point of Safe Diversion)
PSD/1-INOP	normal operations out to the PSD and 1-engine inoperative operations from the PSD to an alternate aerodrome.
PSD/DP	normal operations out to the PSD and depressurised operations from the PSD to an alternate aerodrome
PIC	pilot in command
CR	Contingency reserve
FR	Final reserve
KG/gnm	kilograms per ground nautical mile(s)
NM	nautical mile(s)
nam	nautical air mile(s)
gnm	ground nautical mile(s)

pax	passengers
FPM	feet per minute
TOC (TOPC)	Top of Climb
TOD/DSPT	Top of Descent/Descent Point

4.2.7 Suggested list of study references

4.2.7.1 Introduction

In setting questions for the ATPL(A) examination, and as for any other flight crew examination, CASA questions are based on the aeronautical knowledge requirements stated in CASR Part 61 Manual of Standards, Schedule 3. Candidates must bear in mind that the ATPL(A) examination is set to a standard based on their attending a properly structured course of adequate duration, with appropriate study material, and under qualified instruction and supervision.

4.2.7.2 Approaches to selecting study references

Until recently, very few books have been written specifically for the CASR Part 61 MOS. Local publishers have now produced a number of books to meet this requirement. Nonetheless, in some cases more than one book may be required to cover a subject area adequately. Candidates should expect their training organisations to provide course notes (perhaps as a supplement to a nominated publication) so that a topic may be accorded comprehensive study references.

To further assist candidates' source good study material, a list of study references been compiled. This list will be revised at regular intervals and include recommendations from the industry.

Inclusion in this list does not necessarily mean that questions will be based specifically on, or limited to, the publications. Equally, a candidate must not expect the correct answers to questions to be direct 'quotes' from any specific text of these publications. The list merely indicates that training organisations have found the publications as satisfactory references for studying to the manual of standards.

However, in testing knowledge of some manual of standards topics, certain situations, dictated mainly by the requirement for standardisation, demand referencing to specific books. The following examples represent these situations:

- where generic books differ markedly on certain topic areas, such as in terminology or procedures, a 'master' publication shall be nominated *e.g. Rolls-Royce "The Jet Engine" for gas turbine topic in Aircraft Systems.*
- where the use of generic book is not available, adequate or practical, a 'type- specific' book (usually a Flight or Operations Manual) shall be nominated *e.g. B727 Performance & Operating Handbook for Flight Planning and Performance & Loading subjects.*

4.2.7.3 Selecting from the list

Books marked with an asterisk (*) are those that CASA nominates as the 'master' reference for purpose of standardisation, particularly of terminology and procedures. These will be subjected to periodic review, as new books come into the market.

CASA does not have the resource to conduct thorough evaluation of all the books on the list and therefore cannot guarantee their suitability for study of the ATPL(A) exam requirements. A large number of these have been added to the list on the recommendations of members of the training industry. The list provides guidance to candidates to source study materials.

The list may contain more than one reference text on a particular subject, and candidates must personally decide for themselves which would be appropriate. When making a purchase selection, candidates are advised to consult experienced instructors for the optimal choice. Generally, candidates attending a structured course may expect the schools to provide supplementary précis and notes, in addition to a publication, to adequately cover a manual of standards topic.

Candidate will find that a large number of books on this list may already be in their possession. These could include CASR, CAR, CAO, AIP, DAPs, Aeronautical Circulars, Manual of Aviation Meteorology, the (old) CAA Operational Notes, and a couple of Human Factors books used in the CPL examination.

4.2.8 ATPL(A) examination suggested list of study references

Flight planning

- Boeing 727 Performance & Operating Handbook*
- Aeroplane Performance, Planning & Loading for the Air Transport Pilot by Aviation Theory Centre

Performance & loading

- Boeing 727 Performance & Operating Handbook*
- CASR Part 121 and Part 121 MOS
- Aeroplane Performance, Planning & Loading for the Air Transport Pilot by Aviation Theory Centre

  https://www.casa.gov.au/content-search/manuals-and-handbooks/atpl-apla-workbook

Navigation

- CASA Operational notes (NDB, VOR, ILS, DME, INS, RNAV, GPS)*

  Most of these are available from page Additional pilot exam study materials | Civil Aviation Safety Authority (casa.gov.au)
- The Global Positioning System and Australian Aviation Navigation*
- The NAVSTAR GPS by Tom Logsdon
- Aviator's Guide to GPS by Bill Clarke
- Avionics & Flight Management Systems for the Air Transport Pilot by Aviation Theory Centre

The Ground Studies for Pilots series by Underdown

- Vol 1 - Radio Aids
- Vol 3 - Navigation General & Instruments
- Aircraft Instruments & Integrated Systems by Pallett
- Manual of Avionics by B Kendall

Aerodynamics & aircraft systems

- Handling The Big Jets by DP Davies*
- Aerodynamics for Naval Aviators by HH Hurt Jr* Aerodynamics - General Aerodynamics by AW Dole Mechanics of Flight by AC Kermode (10th Ed)
- The Jet Engine by Rolls-Royce*
- Aircraft gas Turbine Engine Technology by Irwin Treager
- Airframe & Powerplant Mechanics by FAA (2 volumes)*
- The Aircraft Gas Turbine Engine & Its Operation by Pratt & Whitney
- B767-300ER Operations Manual extract* *(obtainable from FCL Section)*
- Avionics & Flight Management Systems for the Air Transport Pilot by Aviation Theory Centre *(also under Navigation)*
- Aerodynamics, Engines & Airframe Systems for the Air Transport Pilot by Aviation Theory Centre

- Flying Glass by Rob Avery
- Pallettt's Aircraft Instruments & Integrated Systems *(also under Navigation)*

The Professional Pilot Study Guide Series by Mike Burton
(also printed as The Commercial Pilot's Study Manual Series - 1997 - in 4 volumes)

- Vol. 2 - Gas Turbine Engines
- Vol. 3 - Propellers* Vol. 4 - Electrics* Vol. 5 - Hydraulics*
- Vol. 6 - Cabin Pressurisation* Vol. 7 - Pneumatics*
- Vol. 8 - Advanced Flying Systems

- Aircraft - Electricity & Electronics (5th Ed) by Eismin
- Aircraft Systems by Ian Moir & Allan Seabridge
- Automatic Flight Controls by Pallett
- Modern Airmanship by Van Sickle

Meteorology

- Manual of Aviation Meteorology, by Bureau of Meteorology (BOM)*
- BOM Knowledge Centre
  http://www.bom.gov.au/aviation/knowledge-centre/
- AIP Book* with particular emphasis on GEN 3.5

Air law

- CASR, CAR, CAO, AIP*
- Flight Rules and Air Law for the Air Transport Pilot by Aviation Theory Centre

Human factors

- Human Being Pilot by Aviation Theory Centre, in particular, Chapter 11*
- Human Factors for Pilots by Roger Green et al*
- Human Factors in Flight by Frank Hawkins*
- Air Craft - Human Performance & Limitations by Tony Wilson
- https://www.casa.gov.au/teaching-and-assessing-non-technical-skills-single-pilot-operations

4.2.9 Flight planning

4.2.9.1 Introduction

The Flight Planning examination tests Unit 1.10.2 of Schedule 3 of the MOS, but may include items from earlier Units, including the following items:

- Practical application - climb, cruise and descent.
- Practical Flight Planning and Flight Monitoring.

Questions are, in the main, 'practical' types based on the Boeing 727 aeroplane, and in general will require the use of the *Boeing 727 Performance and Operating Handbook (Abbreviated)**. Questions may be based on any section of the Handbook.

* Hereafter referred to as the *Handbook.*

4.2.9.2 Availability of Data for Questions

All data required to solve the question, besides than those to be found in the Handbook and navigational charts, will be provided in each individual question.

The relevant data may be in the form of one or more of the following:

- Route forecast.
- ATIS, TAF, METAR or SPECI.
- In-flight data provided by INS, IRS or GNSS navigation systems.
- Distance and track of route sector.

Distance and track of route sector may be obtained from chart printed information or by measurement.

In most questions candidates will be required to refer to a specific route on an En Route Chart (ERC) High.

The availability of aerodromes may be indicated by the use of the terms *'suitable'* and *'acceptable'* as defined in the Handbook; this may be in reference to a forecast or simply a statement of the aerodrome status. The aerodromes status will generally be for the period of possible use.

4.2.9.3 Calculations

In general, the guidelines for working calculations are balanced between simplicity, conservative planning and recognition of the greater accuracy that can be achieved by the use of the electronic calculator.

4.2.9.4 Selection of flight levels

IFR levels.

All questions relate to operations under the IFR. Unless otherwise stated in a question, all operations, with the exception of depressurised cruise, will cruise at altitudes* in accordance with the AIP ENR 1.7 (6) Table of Cruising Levels ENR 1.7 (6) South of 80° S for IFR flights, as per the table of Cruise Levels on page 1 of this book. Candidates are expected to recall and apply the appropriate levels for different sectors.

* Hereafter referred to as *IFR Levels.*

RVSM

Candidates are to assume that the B727 used is *not* RVSM-approved but has been cleared to operate in all RVSM airspace in accordance with conventional IFR cruising levels as defined in paragraph 2.1 above.

Highest level

Use of the phrase 'highest appropriate level' means the highest available flight level, in accordance with IFR Levels, based on thrust limited gross weight at the start of a cruise sector (or zone).

Optimum Level

Reference to 'optimum level' means the optimum flight level listed in the Altitude Capability Table of the Handbook (page 2-14, Table 2.5) for the estimated mid-zone weight of a cruise sector. Relevant thrust limits and the IFR Levels must be considered when selecting optimum level.

4.2.9.5 Required accuracy limits

Use of Forecast Wind and Temperature Data

Climb

Candidates should use the met data, wind and temperature deviation, closest to 2/3^{rds} of the height of the initial cruise level; also refer to the Handbook, page 2-2, paragraph 9 et seq. For a climb from one level to another, e.g. FL220 to FL310, then the winds and temperatures should be used from the height 2/3^{rds} between the two levels. In this case FL280.

Descent

For descents to landing, use the wind closest to 1/2 the height of the final cruise level. If the descent is from one level to another level, e.g. from FL330 to FL210, then the wind should be used from the height halfway between the two levels. In this case FL270. Also refer to the Handbook, page 4-1, Note 1.

Operations Below FL185

Use data at FL185 [that is, assume the FL185 wind applies at all levels below FL185, and the temperature deviation from ISA (not the temperature itself) is constant below FL185]. Extract wind from the forecast to the nearest 10 degrees and 5 knots, then apply variation as appropriate for the situation.

Cruise above FL185

Extract wind from the forecast to the nearest 10 degrees and 5 knots, then apply variation as appropriate for the situation. Interpolation of met data between levels is not necessary. Wind direction should be adjusted for magnetic variation as appropriate for the sector under consideration. The winds and temperatures presented, in general, do not represent the actual levels at which the B727 is operating, but are standard levels for upper level charts. Candidates are to select the wind and ISA DEViation from the level closest to that at which the B727 is operating. If the B727 is cruising at either FL330 or FL350, then the meteorological data from FL340 should be used (if it is ISA+5 at FL340, then assume it is also ISA+5 at both FL330 and FL350). For climbs and descents, the candidate should use the met data closest to the 2/3rd height for the climb, and 1/2 height for a descent, as per paragraphs 3.1.1 and 3.1.2 above.

4.2.9.6 Extraction & Interpolation of Data from Handbook - normal operations

Climb

The time and distance in the climb should be used as it is in the B727 Handbook without any rounding. If interpolation is required, and as a result a time interval or a distance value is determined that is not a whole minute or whole anm, then the fraction(s) of minutes and/or anm, should be used to determine the climb performance. The TAS for the climb should be determined using a combination of the exact time in the climb with the exact anm in the climb.

The fuel burn in a climb may be rounded to the nearest whole KG, if the fuel burn ends with 0.5 KG, then it should be rounded up to the next whole KG.

For climbs, the candidate should use the met data closest to the 2/3rd height for the climb, as per paragraph 3.1.1.

Cruise

For ATPL Flight Planning and in Performance & Loading, candidates may use either the "Before-Flight Tables" (also called Integrated Range Tables) or "In-Flight Tables". CASA's calculations are based on the "In-Flight Tables".

In-flight

When making temperature adjustment to fuel-burn, round out the deviation from ISA to the nearest (multiples of) 3 degrees, that is, for ISA+10 assume ISA+9, and for ISA+14 assume ISA+15.

Cruise - Fuel Flow Tables

The fuel flow tables should be entered with gross weight to the nearest 1000 KG, as follows:

- enter for 72000 KG when EMZW is 71500 to 72499 KG
- enter for 73000 KG when EMZW is 72500 to 73499 KG
- enter for 74000 KG when EMZW is 73500 to 74499 KG

Interpolation

Interpolate cruise data as required, e.g. for gross weight 73000 KG, average the figures for 72000 and 74000 KG

While it is appreciated that change of fuel flow is not necessarily linear with a change of weight, this approach has been adopted in the interest of simplicity for the examination and will also give a degree of accuracy compatible with the 'spread' of alternatives in multi-choice questions. For temperature deviation from STD TAT, use temperature to the nearest multiple of 3 degrees, that is, use; 6 degrees when deviation is 5, and 9 degrees when deviation is 10.

Round out

With the use of the electronic calculator, it is not considered necessary that either the fuel flow or zone fuel be rounded out.

Descent

The 'standard profile' of 0.80M/280/250 KIAS should be used for all operations unless otherwise specified in the question (refer to Handbook, page 4-1).

Landing Weight

There is no requirement to interpolate for values of landing weight. Use the appropriate landing weight column by rounding out to the nearest '10000 KG', that is, for 64999 KG use 60000 KG, and for 65000 KG use 70000 KG.

Descent Distance

While the descent data in Table 4.1 of the Handbook (page 4-3) is based on a straight-in approach at the destination, the before-flight fuel planning requirement in Table 1.1 (refer page 1-17) for a flight where an alternate aerodrome is involved is based on a descent to 1500 feet above destination aerodrome [refer Handbook, page 1-17, Note: (3)]; this implies that the descent distance will be shorter in order for the aeroplane to arrive overhead destination at 1500 feet.

For descents, the candidate should use the met data closest to the 1/2 height for a descent, as per paragraph 3.1.2 above.

Holding

Refer to Handbook, page 4-4, Table 4.2. Enter the table with an EMZW to the nearest 1000 KG and the appropriate flight level, and interpolate data as required. Temperature deviation from ISA may be taken to the nearest 5 degrees for fuel flow adjustments, that is, for ISA + 8 assume ISA + 10, and for ISA + 7 assume ISA + 5.

4.2.9.7 Extraction of data from the Handbook - abnormal operations

Cruise Tables

For the use of Abnormal Operations Cruise Tables, the guidelines in paragraphs 3.2.3 to 3.2.7 above apply.

Air-conditioning Pack Inoperative

In the event of an air-conditioning pack failure, a descent to a lower level may be required. Where a descent to a lower level is required, a 'normal descent' as per the B727 Handbook on page 4-3 is to be planned.

4.2.9.8 1-engine inoperative (1-INOP)

Where does 1-INOP cruise start?

1-INOP cruise may be considered to commence at the gross weight and time that engine failure occurred, that is, the candidate may assume an “instantaneous descent” to the appropriate 1- INOP level.

Selection of Cruise Level and Speed

Cruise level should be selected at the gross weight and temperature at the point of engine failure. Speed should be selected at the estimated mid-zone weight of a cruise sector.

Altitude Capability

Refer to Handbook, page 5-6, Table 5.2. Enter the table with gross weight to the nearest 1000 KG and temperature to the nearest 5 degrees deviation from ISA.

1-INOP Holding

Refer to Handbook, page 5-14, Table 5.9. The guidelines in paragraph 3.2.5 above apply.

Landing Gear Extended operations

Altitude Capability

Refer to Handbook, page 5-27, Table 5.20. Enter the table with gross weight to the nearest 1000 KG and temperature to the nearest 5 degrees deviation from ISA.

4.2.9.9 Equi-time point (ETP) and point of no return (PNR)

Equi-Time Point (ETP). An ETP is that point along track where it will take the same time to fly to either of two locations.

ETP calculations may involve any flight condition, both normal and abnormal operations. Descent to an aerodrome may be ignored for determination of the ETP position. However, descent/approach is to be included when determining the fuel required to cover an ETP situation.

PNR calculations are based on normal to the PNR position, and normal or abnormal operations from the PNR. Descent and approach to the diversion aerodrome must be considered when determining a PNR.

4.2.9.10 Average data

Average data may be used where appropriate. Candidates should use their discretion as to the use of average data or whether a more detailed calculation should be made.

Generally, in calculations which cover more than one zone of a flight, as in ETP and/or PNR problems, or when determining fuel burn from a given point to landing, the use of average data may be appropriate. Any of the common methods of averaging data such as winds and temperatures are suitable for examination purposes. Average fuel flows and speeds should be extracted at the estimated mid-zone weight of the flight zone(s).

4.2.9.11 Worked sample PNR/DP

Refer ERC H5

You are flying from BRISBANE, QLD (YBBN) to AUCKLAND, NZ (NZAA) along the route A464.

Your current situation is:

Position DEBUD

FL330

Cruise technique 0.82 mach

GW 77140 KG

FOB 18640 KG

NZAA is suitable throughout the period of possible operations.

YBBN is suitable with INTER holding but remains acceptable throughout the period of possible operations.

TAC details:

YBBN to DEBUD = 214 NM @ 102M average.

EXTRACT FROM RSWT FORECAST

FL ISA	YBBN - RIGMI - NZAA	
385 -56	2604052	2406060
340 -52	2504050	2305555
300 -45	2503538	2304050
235 -32	2402028	2204040
185 -21	2302018	2003530

Determine the position of the PNR/DP based on a return to YBBN.

The distance from YBBN to the PNR/DP is –

[ ] NM.

Solution next page

Solution

Determine FF/DP available

18,640 = FF/DP + 0% (CR) + 2250 (FR) + Hold (= 0, 'Acceptable' is good enough for DP operations) + Taxi (= 0 as a/c is in flight)

FF/DP = 18,640 – 2250

= 16,390 KG

Planned LW/DP = 77,140 – 16,390

= 60,750 KG

Use this LW/DP to start the backward portion of the plan from YBBN to RIGMI.



Segment	FL	Temp	MN	TAS	Av TR	W/V	HDG	GS	Dist	ETI (mins)	Air Dist	Fuel flow	Zone fuel	Start Zone Wt	EMZW	End Zone Wt	SGR
1 Work forward from DUBUD to RIGMI																	
DUBUD																77140	
DUBUD to RIGMI	330	ISA+2 = -48	0.82	479	107	236/40		503	378	45.09		1531.5 x 3 x 1.01=4640.445	3487	77140	75.0	73653	
3 Once you have the two weights at RIGMI, then determine the SGRs																	
RIGMI to PNR/DP	330	ISA-3 = -53	0.82	474	104	214/55		490				1490 x 3 x 0.99 = 4425.3		73653	73.0		9.031
PNR/DP to RIGMI	130	ISA-9 = -20	0.59	366	284	184/35		370				1569 x 3 x 0.97 =4565.79			70.0	68523	12.340
2 Work backward from LW/DP to RIGMI																	
RIGMI to DUBUD	130	ISA+3 = -8	0.59	375	287	216/20		368	378	61.63		1537 x 3 x 1.01 =4657.11	4784	68523	66.0	63739	
DUBUD to DSPT	130	ISA+3 = -8	0.59	375	282	218/20		366	165	27.05		1514.5 x 3 x 1.01=4588.935	2069	63739	63.0	61670	
DSPT to YBBN	Des		-	235	282	219/20		225	49	13	51		520 +400	61670		60750	

Dist. to PNR/DP = (73653 – 68523)/(9.031 + 12.340)

= 5130 / 21.371

= 240.0 NM after RIGMI or

= 214 + 378 + 240

= **832 NM from YBBN answer**

Notes:

- Minor variations in TAS and G/Ss, will not significantly alter your answer.
- The line "DEBUD to DSPT" could be avoided in most instances by planning from RIGMI through to DSPT in one line. This is possible where the track, W/V and G/S do not change significantly.
- Where there are significant changes in the track and/or RSWTs, then it is best NOT to attempt to average the data, but to put an extra line in the flight plan. As there was a change in conditions at RIGMI, RIGMI was included in the plan both getting to the PNR/DP and on the return segment.

Specimen questions

(Correct answers in **BOLD**)

Question 1 - Manual of standards item 2.1.1 (e)

Refer ERC H3*

Planned B727 flight	MELBOURNE (YMML) - ADELAIDE (YPAD)
Route	H345*
Level	FL310
BRW	74500 KG

Conditions for the climb:

Mean W/V	240M/30
Mean temperature	ISA+15.

The gross weight and distance from YMML at top of climb are closest to -

A. 71390 KG, 158 NM.

B. 71390 KG, 169 NM.

C. 71850 KG, 115 NM.

D. 71850 KG, 131 NM.

E. 71700 KG, 127 NM.

* The ERC High and the associated routes may change from time to time. While the current chart and route designation have been updated here, candidates should be aware that changes to a route may affect their calculations. The question structure, however, remains the same, and provides candidates and instructors with sufficient information for training purposes. This qualification also applies to the other questions in this section.

Question 2 - Manual of standards Item 2.1.1(f)

ERC H3 refers.

Flight	ADELAIDE (YPAD) - SYDNEY (YSSY)
Route	H247 – CULIN – Y59

Inflight data:

Position	90 NM East of TOBOB on track
Cruise data	FL330, 0.80 M
GW	72700 KG
Wind	300M/50 kts
OAT	-38C

ATC requirement

Hold CULIN at F270 for 20 minutes

Other data:

Forecast temperature at FL270 is -27C

Intermediate descent from FL330 to FL270 may be ignored

The expected average fuel flow and TAS while in the holding pattern are closest to -

A. 3859 KG/hr, 380 KTAS
B. 3880 KG/hr, 360 KTAS
C. 3750 KG/hr, 370 KTAS
D. 3935 KG/hr, 362 KTAS
E. 3805 KG/hr, 362 KTAS.

Question 3 - Manual of standards item 2.1.1(i)

ERC H3 refers.

Planned flight from ADELAIDE, SA (YPAD) to PERTH, WA (YPPH)

Route Q33 – ESP – Q158

Planned cruise profile FL310, 0.80M

TAC details

YPAD to GILES = 36NM @ 256M

MALUP to YPPH = 90NM @ 287M

Extract from RSWT forecast:

FL	ISA	YPAD - LODGE - YPPH	
445	-56	2405053	2610060
385	-56	2405550	2611053
340	-52	2404050	2611048
300	-45	2403547	2609042
235	-32	2402538	2605030
185	-21	2402026	2402519

Determine the position of the ETP/DP for proceeding to YPPH or returning to YPAD along Q33.

The distance of the ETP/DP from YPAD is closest to –

A. 535 NM

B. 550 NM

C. 570 NM

D. 595 NM.

E. 615 NM.

4.2.10 Performance & loading

4.2.10.1 Introduction

The Performance and Loading examination tests primarily Unit 1.11.2 of Schedule 3 of the MOS but may include items from earlier Units. The exam tests these two topic areas, with a mixture of questions on both 'general knowledge' and 'practical' problems.

Performance questions examines the standards with reference to the following items:

- Item 2 Take-off and Landing Performance.
- Item 3 Climb, Cruise and Descent Performance

'Practical' performance questions are based on the Boeing 727 Aeroplane and will usually require the use of the Handbook.

Loading (Weight & Balance) questions examine the manual of standards with reference to Weight and Balance.

'Practical' loading questions are based on the ATPL APLA Workbook during the examination. The workbook contains a number of A3-size trim sheets printed back-to-back. For load and balance questions, these trim sheets are best used when removed from the Workbook. A copy of the ATPL APLA Workbook may be downloaded from the CASA web site at https://www.casa.gov.au/content-search/manuals-and-handbooks/atpl-apla-workbook.

4.2.10.2 Extraction of data, selection of Flight Levels, required accuracy and use of the B727 Performance & Operating Handbook

As for Flight Planning

4.2.10.3 Specimen questions

Question 1 - Manual of standards Item 2.2.2(d)

What are the gross climb gradient requirements, in the take-off configuration with the critical engine inoperative and the landing gear fully retracted for two, three and four-engined aeroplanes respectively?

A. 2.1%; 2.7%; 2.8%

B. 2.4%; 2.7%; 3.0%

C. 2.4%; 3.0%; 3.5%

D. 2.5%; 3.0%; 3.5%

E. 1.6%; 1.8%; 2.0%.

Ref. CASR Part 121 MOS 9.05

Question 2 - Manual of standards Item 2.3(a)

A take-off is planned from PERTH (YPPH) on RWY06 in a B727-200 aeroplane.

YPPH aerodrome data:

Elevation 67 feet

ATIS RWY 06, wind 030/25 kt, QNH 1005, temperature +10 degrees C

RWY	TORA	TODA	ASDA	LDA
06	2163	2224 (1.75%)	2163	2163
24	2163	2224 (1.75%)	2163	2163

Slope = Nil

SUPPLEMENTARY TKOF DIST:

RWY 06 2060 (1.6%)

RWY 24 2130 (1.6%)

The maximum performance limited BRW for take-off on RWY 06 is closest to -

A. 82000 KG

B. 84000 KG

C. 86000 KG

D. 89350 KG.

Question 3 - Manual of standards item 4.3.1(a)

You are planning a flight in a B727-200 aeroplane for 'Blue Sky Airlines'.

The B727-200 is loaded as follows:

Adjusted BW:	47210 KG
Index:	180 IU

Passengers:

Zone A	adult = 20
Zone B	adult = 15
Zone C	adult = 20, adolescent = 10
Zone D	adult = 25, infant = 3
Zone E	adult = 27

Freight:

Fwd. Comp 1	1620 KG
Fwd. Comp 2	1210 KG
Rear Comp 4	813 KG
Rear Comp 5	620 KG

Crew: standard

Fuel Load: ..... 12200 KG

The CG position at ZFW is closest to -

A. 19% MAC.
B. 21% MAC.
C. 23% MAC.
D. 24% MAC.
E. 25.5% MAC.

4.2.11 Aerodynamics and aircraft systems

4.2.11.1 Introduction

The Aerodynamic and Aircraft Systems examination tests Units 1.4.1 and 1.4.2 of Schedule 3, but may include items from earlier Units with reference to the following items:

- Advanced Aerodynamics.
- Airframe and Systems.
- Power Plants - Turbine Engine.
- Engine Instruments.
- Flight Instrumentation Systems.
- Automatic Flight Control System.
- Warning and Recording Equipment.

4.2.11.2 The use of 'Type specific' references for training

Generally, questions in this examination will test items of the manual of standards with a generic approach, except for certain topic areas where there is a lack of readily available or suitable reference material. In such cases, the reference material nominated for the study of such items may be that of an aircraft Pilot or Operations Manual. *e.g. Boeing 767-300ER Operations Manual extract for certain aircraft systems*

This approach ensures both a reliable source of reading material and a degree of standardisation. The latter is necessary in a multi-choice type of examination.

Another area where some form of standardisation is required, is when generic books differ markedly on certain areas (e.g. terminology or procedures). In such a situation, a book shall be nominated as the 'master' reference. *e.g. Rolls-Royce "The Jet Engine" for gas turbine subject.*

Notwithstanding the use of 'type specific' references in the training of some manual of standards areas of the Aerodynamics and Aircraft Systems subject, the testing philosophy/concept for this topic, as represented by the examination questions, is still generic in nature. This approach is no more different than that for the Flight Planning or Performance subjects, where training to learn the subjects' fundamentals, principles and application of principles, in accordance with the manual of standards, requires the use of a nominated 'type specific' reference material, such as the Boeing 727 Performance and Operations Handbook. The training objectives to support the attainment of required knowledge and standards may still be achieved through this way.

4.2.12 Specimen questions

Question 1 - Manual of standards Item 4.1.1

Which RPM range will produce the greatest variation in thrust for a given movement of the power lever?

A. Lower end of the RPM range.

B. Middle of the RPM range.

C. **Top end of the RPM range**.

D. No particular RPM range.

Question 2 - Manual of standards Item 3.1.2(b)

On a certain aircraft the leading and trailing edge flaps can be selected independently. Compared to a normal approach using both types of flaps, how would a landing approach with only trailing edge flaps extended affect the nose attitude and approach speed?

A. Higher nose attitude and a higher approach speed.

B. Higher nose attitude and a lower approach speed.

C. **Lower nose attitude and a higher approach speed**.

D. Lower nose attitude and a lower approach speed.

4.2.13 Navigation

4.2.13.1 Introduction

The Navigation examination tests primarily Unit 1.7.3 of Schedule 3 of the MOS, but may include items from earlier Units, which are common to both the Helicopter and Aeroplane. In particular the following items:

- Item 2.1 Navigation Charts.
- Item 2.2 Time Zones.
- Item 2.3 Flight Instruments.
- Item 2.4 Compasses
- Item 2.5 Radio Wave propagation
- Item 2.6 Radio Navigation Aids.
- Item 2.7 Route Navigation.
- Item 2.8 Basic Radar Principles.
- Additional Items from PPL & CPL Navigation may be included, e.g. Unit 1.7.1, Item 2.7 Area Navigation

The examination will have a mixture of questions on general knowledge and 'practical' problems.

'Practical' questions may be based on any appropriate item of the manual of standards.

Questions are typical of those involving high altitude, high speed aircraft on domestic and international flights.

4.2.13.2 Practical navigation

Candidates may be required to refer to a specific route on an En Route Chart (ERC) Low and Terminal Area Charts (TAC). Candidates are to supply these charts.

Practical navigation questions may contain a reference to Route Sector Wind and Temperature (RSWT), or Grid Point Wind and Temperature (GPWT) forecasts.

Winds, other than those presented in a recognised forecast format, will be annotated T (true) or M (magnetic).

4.2.13.3 Equi-time point (ETP), point of no return (PNR) and point of safe diversion (PSD)

Equi-Time Point (ETP). An ETP is that point along track where it will take the same time to fly to either of two locations. An ETP may be calculated for either normal or abnormal operations, e.g. ETP/1-INOP.

The term PNR is used for situations where the return flight is to an on-track aerodrome, either the departure point or an alternate aerodrome.

The term PSD or LPSD is used for situations where flight from the PSD is to an off-track alternate aerodrome.

The term '*safe endurance'* used in a PNR or PSD problem means endurance remaining excluding reserves of fuel (or equivalent time). The term **'total endurance'** means endurance remaining including reserves of fuel (or equivalent time).

When total endurance is specified in a question the required reserves to be allowed will be specified [e.g. Contingency Reserve (VR), e.g. 10% of safe endurance and Final Reserve (FR) 30 minutes].

ETP, PNR and PSD calculations may involve normal and abnormal operations.

Descent to an aerodrome may be ignored when determining the position of a ETP, PNR or PSD.

4.2.13.4 Average data

Average data may be used where appropriate. Candidates should exercise their discretion as to whether the use of average data would be appropriate, or a more detailed calculation should be made.

Generally, in calculations which cover more than one zone of a flight, as in ETP, PNR and PSD problems, the use of average data may be appropriate. Any of the common methods of averaging data such as winds and temperatures are suitable for examinations purposes.

4.2.13.5 Specimen questions

Question 1 - Item 2.6.3 (e)

When using DME to determine your G/S, the maximum G/S error will occur when -

A. tracking directly towards or directly away from the DME site.

B. tracking obliquely towards or obliquely away from the DME site.

C. tracking abeam the DME site.

D. within 10 NM of the DME site, regardless of your track and/or altitude.

Question 2 - Item 2.7.2(a)

Using a forecast average wind component of 30 kt HEAD, the top-of-climb position for an aircraft is determined to be 115 NM from departure point. Climb time is 19 min. If the average wind component actually experienced during the climb was 20 kt TAIL, the distance from departure point to the actual top-of- climb position would be closest to -

A. 120 NM.

B. **131 NM.**

C. 145 NM.

D. 165 NM.

E. 99 NM.

Question 3 - Item 2.7.4 (a)

ERC L8 refers.

Flight from PORT HEDLAND, WA (YPPD) to ADELAIDE, SA (YPAD) along A585

Inflight position:

0437 UTC:	PD VOR/DME	radial 133 @ 90 DME
0525 UTC:	NEWMAN VOR /DME	radial 093 @120 DME

If the HDG and TAS between these two positions have been held constant at 141M and 280 kt.

Then the average wind between the 0437 UTC and 0525 UTC positions is closest to –

A. 170M/75 kt.

B. 340M/75 kt.

C. 290M/65 kt.

D. 110M/65 kt.

E. **160M/65 kt.**

4.2.14 Meteorology

4.2.14.1 Introduction

The Meteorology examination tests Unit 1.8.4 and Unit 1.8.5 of Schedule 3 of the MOS, but may include items from earlier Units, which are common to both the Helicopter and Aeroplane. In particular the following items:

- The Atmosphere.
- Clouds and Precipitation.
- Motion of the Atmosphere.
- Visibility.
- Ice Accretion.
- Airmasses and Fronts.
- Airmasses and Frontal Analysis.
- Synoptic Charts.
- Upper Level Weather.
- Upper Level Charts.
- Climatology.
- Met Observations.
- Reports & Forecasts.

The examination will have a mixture of questions on general knowledge and ‘practical’ problems.

‘Practical’ questions may be based on any appropriate item of the manual of standards, and involves pilot interpretation of charts, satellite photographs, and weather forecasts and reports. These will be provided during the examination.

Questions are typical of those involving high-altitude, high-speed aircraft on domestic and international flights.

4.2.14.2 Specimen questions

Question 1 - Item 2.12.5

TAF YBTL 270448Z 2706/2806 33010G25KT 5000 RA BKN030 OVC120
FM271400 16020KT 8000 SH SCT035 OVC120
INTER2710/2714 3000 +TSRA BKN020 SCT030CB

The visibility expected for arrival at TOWNSVILLE (YBTL) at 1100 UTC is -

A. 5000 metres.

B. 5000 metres reducing to 3000 meters for periods of 30 minutes or less.

C. 8000 metres.

D. 8000 metres reducing to 3000 meters for periods of 30 minutes or less.

Question 2 – Unit 1.8.5 Item 2.3.4

Prior to departure, you observe that there are towering cumulus clouds with base 5000 feet in the vicinity of your take-off flight path. Light rain is seen beneath the clouds though the precipitation does not reach the ground.

You delay your departure to avoid severe turbulence and down draft on take-off, as you anticipate the hazards associated with a -

A. thunderstorm gust front.

B. mountain wave.

C. microburst.

D. radiation inversion.

4.2.15 Human factors

4.2.15.1 Introduction

The Human Factors examination tests Unit 1.6.3 of Schedule 3 of the MOS, but may include items from earlier Units, which are common to both the Helicopter and Aeroplane. In particular the following items:

- Item 2 Aviation Medicine.
- Item 3 Human Information Processing.
- Item 4 Human Behaviour.
- Item 5 Flying and Health.
- Item 6 Threat & Error Management.

Questions are typical of those involving multi-crew, turbine powered, high-altitude, high-speed aircraft on domestic and international flights.

4.2.15.2 Reference material

The wide range of reading material available on this topic, with their rich variety of terminology and information, has made standardisation a fairly important consideration. CASA has therefore nominated the following reference material for the study of this manual of standards topic:

a. Human Being Pilot by Aviation Theory Centre
b. Human Factors for Pilots by Roger G Green et al
c. Human Factors in Flight by Frank H Hawkins
d. AC 61-08 Teaching and Assessing Single Pilot Human Factors and Threat and Error Management
e. https://www.casa.gov.au/teaching-and-assessing-non-technical-skills-single-pilot-operations
f. Air Craft - Human Factors & Limitations by Tony Wilson

The use of these textbooks as training material builds up logically, and consolidates firmly, on the aeronautical knowledge training attained during the training to the PPL/CPL manual of standards.

4.2.15.3 Specimen questions

Question 1 - Manual of standards Item 2.2.6

While in flight, you notice the other pilot is breathing heavily, her speech is slurred, and she complains of feeling dizzy. You also notice her lips and fingertips are blue-tinged. She is probably suffering from -

A. hyperventilation.

B. CO poisoning.

C. hypoxia.

D. food poisoning.

Question 2 - Manual of standards Item 3 2.1(h)

How should a pilot look at a visual object in poor light conditions, so that her night vision may be optimised?

A. In the most direct manner.

B. A little from the side of the eye.

C. Directly, and one eye closed.

D. A little from the side of the eye, and with the other eye closed.

Question 3 - Manual of standards Item 4.2.3(e)

In a multi-crew cockpit environment, a captain is more likely to heed any crucial information provided by the co-pilot if it is delivered in a communication style that is both -

A. assertive and submissive.

B. **assertive and supportive.**

C. aggressive and submissive.

D. aggressive and supportive.

4.2.16 Air law

4.2.16.1 Introduction

The Air Law examination tests Unit 1.5.14 and 1.5.15 of Schedule 3 of the MOS, but may include items from earlier Units, which are common to both the Helicopter and Aeroplane. In particular the following items:

- Item 2.2 Aircraft Nationality and Registration.
- Item 2.3 Airworthiness of Aircraft.
- Item 2.4 Personnel Licensing.
- Item 2.5 Rules of the Air.
- Item 2.6 Procedures for Air Navigation.
- Item 2.7 Air Traffic Services.
- Item 2.8 Rules of the Air and Air Traffic Services
- Item 2.9 Aeronautical Information Service
- Item 2.10 Aerodromes.
- Item 2.11 Facilitation.
- Item 2.12 Search and Rescue.
- Item 2.13 Security.
- Item 2.14 Aircraft Accidents and Incidents.
- Item 2.15 Air Service Operations.

Generally, questions are based on multi-crew, turbine powered, high-altitude, high-speed aircraft, with emphasis being placed on the knowledge required of the pilot in command.

These questions will mainly test rules and procedures pertaining to IFR air transport operations, both domestic and internationally. However, candidates are expected to possess a very sound foundation of Private and VFR operations.

The examination is organised along an '*open book*' format, but candidates will be required in some questions to exercise a high level of competency in 'factual recall' on the basic rules and procedures in order to answer the questions within the time permitted.

4.2.16.2 Specimen questions

Question 1 – CASR Part 61 MOS, Schedule 3 Unit 1.5.14, Item 2.1.5 (j)

A passenger boarding a twin engine turbojet aeroplane via the rear door stairs is seen to be using a mobile phone while the aeroplane is being refuelled.

The minimum distance this passenger must remain from a critical fuelling point is

A. No specified minimum distance.

B. 15 meters.

C. 6 meters.

D. 25 meters.

E. 3 meters.

Ref: CASR Part 91.490

Question 2 – CASR Part 61 MOS, Schedule 3 Unit 1.5.14, Item 2.8.6 (b)

Which statement correctly describes the conditions under which LAHSO operations are permitted?

A. Simultaneous take-offs are permitted both by day and by night.

B. Simultaneous take-off and landing is permitted both by day and by night.

C. Simultaneous take-off and landings are permitted by day only.

D. Simultaneous landings may be conducted by day only.

Ref: AIP ENR 1.1 (paragraph 7.5.1 b.)

Question 3 – CASR Part 61 MOS, Schedule 3 Unit 1.5.14, Item 2.1.5 (g)

A modern twin jet pressurised aeroplane is being flown on a passenger-carrying air transport flight. Quick-donning oxygen masks are NOT available to the pilots.

In such a situation, at least one of the pilots seated at the controls must be wearing a sealed oxygen mask at all times that the aircraft is operating above:

A. A100.

B. FL140.

C. FL250.

D. FL450.

Ref. Part 121 MOS, 11.42

References valid at time of writing.