

The EASA ATPL Theory Compendium

How the theory exams actually work, how questions are built,
and thirteen worked examples — one from every subject.

1 The exam you are preparing for

Professional theory exams for the ATPL, CPL and IR are sat with a national aviation authority, in English, in all 30 EASA member states — France alone also offers French. Thirteen subjects, multiple-choice, four options with exactly one correct answer, a 75% pass mark and no negative marking: an unanswered question and a wrong answer cost exactly the same, so you always answer.

The questions themselves are drawn from the **European Central Question Bank (ECQB)**, a confidential database maintained by EASA and distributed only to the authorities. Nobody can legally sell you its content — whoever claims to have the “real questions” is describing something they should not possess. What is public is the syllabus: the **Learning Objectives**, published in AMC1 FCL.310 (ED Decision 2020/018/R), which state — in 4,667 numbered entries — exactly what you can be examined on. Everything in this compendium, and everything on ecqbtest.com, is built from there.

2 The thirteen subjects

Code	Subject	Learning Objectives
010	Air Law	507
021	AGK — Airframe, Systems, Power Plant	668
022	AGK — Instrumentation	460
031	Mass and Balance	86
032	Performance — Aeroplanes	243
033	Flight Planning and Monitoring	118
040	Human Performance and Limitations	363
050	Meteorology	465
061	General Navigation	119
062	Radio Navigation	328
070	Operational Procedures	388
081	Principles of Flight — Aeroplanes	497
090	Radio Communications	79

A practical note on weight: the subject with the fewest objectives (Radio Communications, 79) and the one with the most (Airframe and Systems, 668) carry the same pass mark. Study time should follow the syllabus, not the exam order your school happens to use.

3 How a good question is built

Every question on ecqbtest.com is written against one Learning Objective and attacks it through one of **eight archetypes**, across three difficulty levels:

Level	Archetype	What it trains
Easy	conceptual	the fundamental relationship
Easy	terminology	the exact meaning of a term
Medium	scenario	a concrete operational situation
Medium	calculation	one computational step
Medium	misconception	the classic error on the topic
Hard	multi-step	chained calculations
Hard	edge case	limits and exceptions
Hard	reverse	from the outcome back to the cause

The three wrong options are not filler. One is *obviously* wrong to anyone who studied; one embodies the documented *misconception* on that topic; one is *plausible* and fails on a single detail. Which wrong answer you pick is diagnostic: it tells you — and the app — what kind of mistake you make, which is worth far more than knowing *that* you made one.

4 Four checks before you ever see a question

A question that fails any step goes back and does not ship.

1. **Deterministic checks.** Code, not judgement: schema, four options, the key pointing at the right answer, stem length, no reference to a figure that is not there.
2. **The fact checker.** Recomputes every calculation from scratch and verifies the claim against the cited regulation — which must exist, be relevant, and not be repealed.
3. **The adversary.** A reviewer whose only job is to *break* the question: find a second defensible answer, a missing assumption, wording that reads two ways. When in doubt, the adversary wins.
4. **Exam-standard conformity.** One concept per question, ICAO terminology, homogeneous options, no grammatical tells.

On the first batches through this chain, 29% of drafts were rejected. Then — and only then — a qualified instructor signs off what you study.

5 Thirteen worked examples

One question from every subject, exactly as they appear in the bank: the correct answer in **green bold**, the reasoning, and the public source it rests on.

Air Law

LO 010 01 01 02 (03)

A pilot believes that, because Article 5 allows non-scheduled flights to cross a Contracting State without prior permission, a scheduled international air service may do the same over the same route. Which statement corrects this belief?

- A) A scheduled international air service requires no permission at all, because the operator already holds an air operator certificate.
- B) A scheduled international air service may be operated over or into the territory of a Contracting State only with its special permission or authorisation.**
- C) A scheduled international air service requires permission only where the route crosses a controlled airspace of that State.
- D) A scheduled international air service enjoys the same freedom as a non-scheduled flight provided it makes no stop in that territory.

Why — Correct: Article 6 provides that no scheduled international air service may be operated over or into the territory of a Contracting State except with its special permission or other authorisation, and in accordance with the terms of that authorisation. The answer "A scheduled international air service requires no..." is the misconception itself, since it is the Transit Agreement and not Article 5 that grants overflight rights to scheduled services, and then only between its own parties. The answer "A scheduled international air service requires permission..." invents a link to controlled airspace, which is an air traffic services concept and irrelevant here. The fourth confuses an operator's certificate, which concerns safety approval, with traffic rights, which are granted by States.

Source: Convention on International Civil Aviation (Chicago, 1944), Articles 5 and 6; International Air Services Transit Agreement (Chicago, 1944)

AGK — Airframe, Systems, Power Plant

LO 021 01 03 01 (01)

A pilot sees blistered and lifting paint on a lower fuselage panel and assumes that only the finish is affected. Why is that assumption dangerous?

- A) Because corrosion products forming under the paint swell and lift it, so the metal below is already attacked.**
- B) Because blistering is caused by moisture trapped during painting and never involves the metal beneath.
- C) Because paint blisters are a normal consequence of pressurisation cycles and require no reporting at all.
- D) Because the blistered paint may detach in flight and be ingested by an engine, which is the main hazard.

Why — Corrosion products occupy a greater volume than the metal consumed, so they push the coating outwards; visible blistering is therefore a sign that material has already been lost underneath, and the true

extent is only known once the paint is removed. Trapped solvent can occasionally blister a fresh finish, but assuming that explanation on a service aircraft is precisely the dangerous inference. Blistering is not a normal result of pressurisation, and although detached paint is undesirable, the structural loss is the real concern.

Source: CS 25.609; corrosion prevention and control programme guidance in the maintenance programme; EASA LO 021 01 03 01 (01)

AGK — Instrumentation

LO 022 01 01 01 (01)

A pressure instrument uses a sealed capsule from which all air has been evacuated. The capsule is mounted inside a case fed with the pressure to be measured, and the deflection of the capsule drives the pointer. Which pressure does this instrument indicate?

- A) Absolute pressure, because the evacuated capsule provides a vacuum reference against which the applied pressure acts.**
- B) Differential pressure, because the capsule compares the applied pressure with the residual pressure trapped inside it.
- C) No pressure at all, because an evacuated capsule cannot respond to a pressure applied to its outside.
- D) Gauge pressure, because the case of such an instrument is always vented to the surrounding atmosphere.

Why — An evacuated and sealed capsule holds a fixed vacuum reference, so the deflection depends only on the applied pressure: the instrument reads absolute pressure, as 'the evacuated capsule provides a vacuum reference' states. 'No pressure at all' ignores that the capsule is compressed from outside. 'Gauge pressure, because the case ... is always vented' describes a different construction, where the case pressure is the reference. 'Compares the applied pressure with the residual pressure trapped inside it' would be true only of an unevacuated sealed capsule, and even then the reference would not be a vacuum.

Source: EASA LO 022 01 01 01 (01) and (04); aneroid capsule principle

Mass and Balance

LO 031 02 01 02 (02)

Which statement correctly describes the relationship between the ramp mass, the take-off mass and the landing mass for a normal flight?

- A) Ramp mass = take-off mass + block fuel, and landing mass = take-off mass - trip fuel.
- B) Ramp mass = take-off mass = landing mass, because the mass of the aeroplane does not change.
- C) Ramp mass = take-off mass + taxi fuel, and landing mass = take-off mass - trip fuel.**
- D) Ramp mass = take-off mass - taxi fuel, and landing mass = take-off mass - block fuel.

Why — The ramp mass exceeds the take-off mass by the taxi fuel burned on the ground, and the landing mass is the take-off mass reduced by the trip fuel consumed en route. The answer beginning "Ramp mass = take-off mass -" reverses the taxi fuel relationship and subtracts the whole block fuel. The answer beginning "Ramp mass = take-off mass =" ignores fuel consumption. The answer beginning "Ramp mass = take-off mass + block" adds the entire block fuel to the take-off mass, although most of that fuel is already on board at take-off.

Performance

LO 032 01 02 02 (09)

An aeroplane is instructed to hold at a fix for as long as its fuel allows before diverting. Which speed should the crew fly, and what quantity are they maximising?

- A) The speed giving the lowest fuel flow, since the objective is maximum endurance, that is maximum time airborne.**
- B) The lowest speed at which the aeroplane can safely be flown, since a lower speed always means a lower fuel flow.
- C) The speed giving the greatest specific range, since the aeroplane that flies furthest also stays airborne longest.
- D) The maximum operating speed, since a higher speed keeps the aeroplane airborne over a greater distance.

Why — Holding is an endurance problem, so the crew wants the lowest fuel flow per hour and the distance flown is irrelevant. Maximum specific range is a different and higher speed, because optimising distance per kilogram does not optimise time per kilogram, and the maximum operating speed is the opposite of what is wanted. The answer beginning 'The lowest speed at which the aeroplane' fails on a real detail: fuel flow does not fall indefinitely with speed. Below the endurance speed, which is the minimum drag speed for a jet and the lower minimum power speed for a propeller aeroplane, induced drag rises steeply and the fuel flow increases again. Reference: standard endurance and range relationships.

Source: CS-25 Subpart B; Air OPS CAT.OP.MPA.150 (fuel policy); standard definitions of range and endurance.

Flight Planning and Monitoring

LO 033 01 01 03 (03)

The directory entry for the planned destination reads "AD hours 0700-1700 (summer 0600-1600), PPR 24 h by telephone, no fuel available Sundays". Planned arrival is 1615 on a Sunday in summer. What does the entry require?

- A) Prior permission only, since the summer hours quoted in brackets extend the closing time to 1700 in that season.
- B) No action, because prior permission requirements apply to commercial traffic only and fuel is always obtainable on request.
- C) A change of destination, since an arrival 15 minutes before closing time is prohibited when no fuel is available.
- D) Prior permission obtained at least 24 hours ahead, and a fuel plan that does not depend on uplift at the destination.**

Why — Arrival at 1615 falls inside the summer hours of 0600 to 1600 only if those hours are misread; the flight must in any case obtain "prior permission ... at least 24 hours ahead" and carry fuel to leave without uplift. The bracketed times replace the standard hours rather than extending them, which is the misreading in "the summer hours quoted in brackets extend the closing time". Prior permission is not restricted to commercial traffic. No rule forbids arriving shortly before closing time as such.

Source: ICAO Annex 15, Appendix 1, AD 2.3 and AD 2.20; Regulation (EU) No 965/2012, CAT.OP.MPA.150

On a night approach in moderate turbulence the crew is given a late runway change, sets the wrong final approach course in the flight guidance panel, and the aircraft subsequently drifts through the extended centreline. In TEM terminology, how are these three events classified in order?

- A) Latent threat, procedural error, error chain
- B) Error, threat, accident precursor
- C) Threat, undesired aircraft state, error
- D) Threat, error, undesired aircraft state**

Why — The late runway change in turbulence lies outside crew influence and raises complexity, hence a threat; the incorrect course selection is crew action, hence an error; the resulting lateral deviation places the aircraft in a position that reduces the margin of safety, hence an undesired aircraft state. Reversing the first two ignores the source of each event. Placing the undesired state before the error inverts the sequence and is the most frequent student error. The answer "Latent threat, procedural error, error chain" mislabels an operationally obvious threat as latent and substitutes error chain for undesired aircraft state. Reference: ICAO Doc 9683 Part II Chapter 2; EASA LO 040 01 03 01 (01).

Source: ICAO Doc 9683, Human Factors Training Manual, Part II Chapter 2; EASA Learning Objective 040 01 03 01 (01)

Meteorology

LO 050 01 02 03 (11)

A student asserts that convection over the open sea must be strongest in midsummer, when the sea surface reaches its highest temperature. Which statement correctly describes when marine convection is normally most vigorous?

- A) In winter, when cold continental or polar air is carried over a relatively warm sea surface.**
- B) In late spring, when the sea has warmed while the air aloft is still comparatively cold.
- C) In midsummer, because convection depends on the absolute temperature of the sea surface.
- D) At midday in every season, because solar heating always acts most strongly at that hour.

Why — Convection depends on the temperature difference between the surface and the overlying air, not on the absolute sea temperature, so it is strongest 'in winter, when cold continental or polar air is carried over a relatively warm sea surface'. The statement that it depends on 'the absolute temperature of the sea surface' is the classic error: in summer the air is warm as well, so the contrast is small. 'At midday in every season' applies over land, because the sea surface has almost no diurnal temperature variation. 'In late spring' sounds credible but is in fact the season of greatest sea-air stability, the sea still being cold relative to the air.

Source: EASA Part-FCL LO 050 01 02 03 (11); ICAO Doc 8896, Manual of Aeronautical Meteorological Practice.

General Navigation

LO 061 02 02 01 (01)

On a leg over well-charted farmland a pilot is confident of the DR position and wishes to confirm it at the next checkpoint. Which sequence should be used, and for what reason?

- A) Ground to chart at all times, because what is seen outside is always more reliable than the chart
- B) Chart to ground only once the position is in doubt, and ground to chart while the position is known
- C) Ground to chart, selecting the most conspicuous feature in sight and then finding it somewhere on the chart
- D) Chart to ground: predict from the chart what should appear, then look for it outside at the expected time**

Why — When the DR position is trusted the efficient and safest method is “chart to ground: predict from the chart what should appear, then look for it outside at the expected time”, because a prediction that fails is itself information. “Ground to chart, selecting the most conspicuous feature in sight” wastes the DR information and invites a wrong match. “Ground to chart at all times” treats a single sighting as more reliable than the accumulated DR evidence. “Chart to ground only once the position is in doubt” inverts the two techniques: it is precisely when position is doubtful that ground-to-chart identification is needed. Reference: EASA Learning Objective 061 02 02 01 (01).

Source: EASA Part-FCL Learning Objective 061 02 02 01 (01), AMC1 FCL.310 (ED Decision 2018/001/R)

Radio Navigation

LO 062 01 01 02 (01)

A crew tunes the VHF communication box to 121.500 MHz for a distress watch. Expressed in the basic unit from which the definition of frequency is built, what oscillation rate has been selected?

- A) 121.5 cycles per second
- B) 121 500 000 cycles per second**
- C) 121 500 cycles per second
- D) 121 500 000 000 cycles per second

Why — Correct: frequency is the number of cycles occurring in one second, expressed in hertz, and the prefix mega denotes one million, so 121.500 MHz corresponds to 121 500 000 cycles per second, the international aeronautical emergency frequency in the VHF band. The option giving “121 500 cycles per second” reads megahertz as kilohertz, losing a factor of one thousand and placing the frequency in the LF band. The option giving “121.5 cycles per second” ignores the prefix altogether and describes an audio-frequency oscillation. The option giving “121 500 000 000 cycles per second” is one thousand times too high and corresponds to 121.5 GHz in the EHF band, where propagation and equipment bear no relation to VHF voice communication.

Source: EASA LO 062 01 01 02 (01); ICAO Annex 10 Volume V

Operational Procedures

LO 071 01 01 01 (01)

A twin-engined jet is prepared for departure from an aerodrome where the reported and forecast conditions are above the applicable take-off minima but below the operator’s landing minima for that aerodrome. What must the flight preparation include?

- A) A take-off alternate, which becomes necessary only when the departure aerodrome has no published instrument approach procedure available.

- B) Nothing additional, because the take-off minima are satisfied and the forecast conditions at the destination are above the applicable landing minima.
- C) A second destination alternate aerodrome, added to the operational flight plan to compensate for the poor conditions prevailing at departure.
- D) A take-off alternate aerodrome, selected within one hour of flight time at the one-engine-inoperative cruising speed and specified in the operational flight plan.**

Why — A take-off alternate is required when the conditions at the departure aerodrome are below the operator's applicable landing minima, because an immediate return after take-off could not be made. For two-engined aeroplanes it must lie within one hour at the one-engine-inoperative cruising speed in still air and standard conditions. Take-off minima being met does not remove the requirement, and the trigger is the landing minima, not the presence of an instrument approach. A second destination alternate the answer "A second destination alternate aerodrome, added to..." destination weather problem, not a departure one. Reference: Regulation (EU) No 965/2012, Annex IV (Part-CAT), Subpart B — take-off alternate aerodrome.

Source: Regulation (EU) No 965/2012, Annex IV (Part-CAT), Subpart B — selection of aerodromes, take-off alternate aerodrome

Principles of Flight

LO 081 01 01 01 (01)

A student states that in the SI system temperature is expressed in degrees Celsius and pressure in hectopascals, and that both are therefore SI units. How should this statement be corrected?

- A) Both statements are correct because Celsius and hectopascal are used on every meteorological report
- B) The SI unit of temperature is the kelvin; the SI unit of pressure is the pascal, the hectopascal being a decimal multiple**
- C) The SI unit of temperature is degrees Celsius; only the pressure unit needs changing to the pascal
- D) The SI unit of temperature is the kelvin; the SI unit of pressure is the millibar, the pascal being derived

Why — The SI base unit of thermodynamic temperature is the kelvin and the SI derived unit of pressure is the pascal, equal to one newton per square metre; the hectopascal is an accepted decimal multiple of it. Operational use of Celsius and hectopascals does not make them base SI units. The answer beginning "The SI unit of temperature is degrees" keeps the common belief that Celsius is the SI unit, which matters because gas law calculations only work in kelvin. The answer beginning "The SI unit of temperature is the kelvin; the SI unit of pressure is the millibar, the pascal being derived" reverses the relationship: the millibar is a legacy unit numerically equal to the hectopascal, not the SI unit.

Source: EASA Learning Objective 081 01 01 01 (01); ISO 80000-5

Radio Communications

LO 090 01 01 01 (01)

A crew planning an IFR flight must know which unit will be working them in each phase of flight. Which statement correctly distinguishes an area control centre from an approach control unit?

- A) The area control centre issues the landing clearance, while approach control passes meteorological reports only.

- B) The area control centre handles flights above flight level 245 only, and approach control handles everything below.
- C) The area control centre serves controlled flights in control areas, approach control serves arriving and departing controlled flights.**
- D) The area control centre works only aircraft on the ground, while approach control works every aircraft that is airborne.

Why — The division is by the phase and the airspace served, not by an altitude figure: an area control centre provides control to controlled flights in the control areas under its jurisdiction, while approach control handles the arriving and departing phases. The answer "The area control centre works only aircraft on the ground" inverts the whole structure, since ground movement is a tower function. "The area control centre issues the landing clearance" is wrong because landing clearance is issued by aerodrome control. "The area control centre handles flights above flight level 245 only" quotes a level that is a local airspace division, not part of the definition of the unit. Reference: ICAO Annex 11, 3.2; ICAO Doc 4444, Chapter 1.

Source: ICAO Annex 11, 3.2; ICAO Doc 4444 (PANS-ATM), Chapter 1

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