Wizz ATPL

1. During a drift down procedure, what is the vertical separation for obstacles? (325410)

2000ft
CAT.POL.A.215 En-route – one-engine-inoperative (OEI)

The meaning:

- **Step 1:**
  Check if with **one engine inoperative** the aircraft can still maintain *level flight* at least **1000 ft above the highest obstacle/terrain** within the 5 NM corridor.
  → If yes, no special drift-down needed.

- **Step 2:**
  If that's **not possible**, or if the payload penalties are too high (i.e. you'd have to restrict weight too much), then you design a **drift-down procedure**.

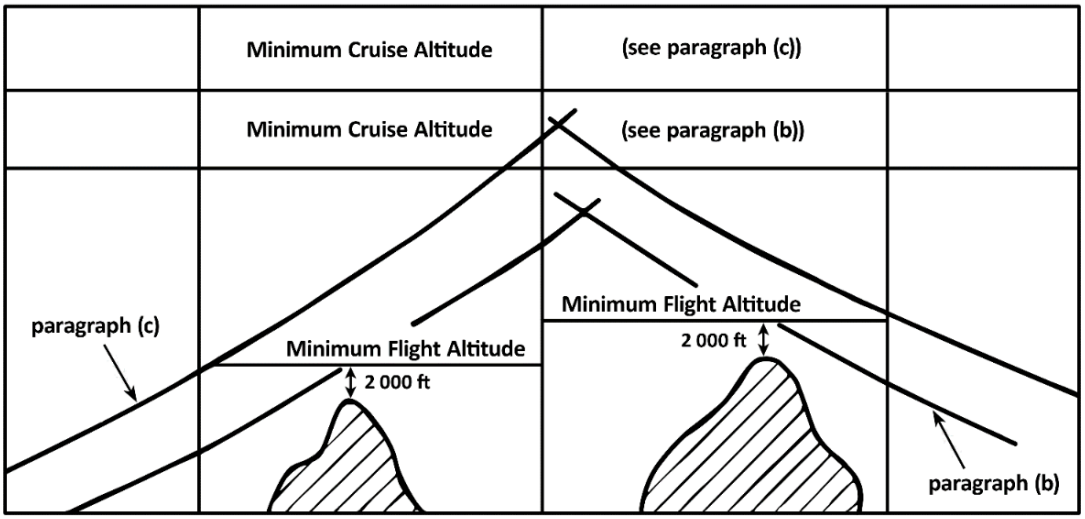
  - In this case, during the drift-down profile you must clear **critical obstacles by at least 2000 ft**.

  - That's why drift-down escape routes are usually defined in mountainous areas.

- **Step 3:**
  The **minimum en-route (cruise) altitude** is then defined by where your drift-down profile intersects with terrain/obstacle clearance.

Figure 1

Intersection of the two drift down paths



Note: MEA or MORA normally provide the required 2 000 ft obstacle clearance for drift down. However, at and below 6 000 ft altitude, MEA and MORA cannot be used directly as only 1 000 ft clearance is ensured.

2. Why do you keep your map pointing up during VFR flights?
To simplify navigation (observe visual points, roads, etc…), enhance SA and reduce the risk of disorientation

3. Temporarily displaced threshold image

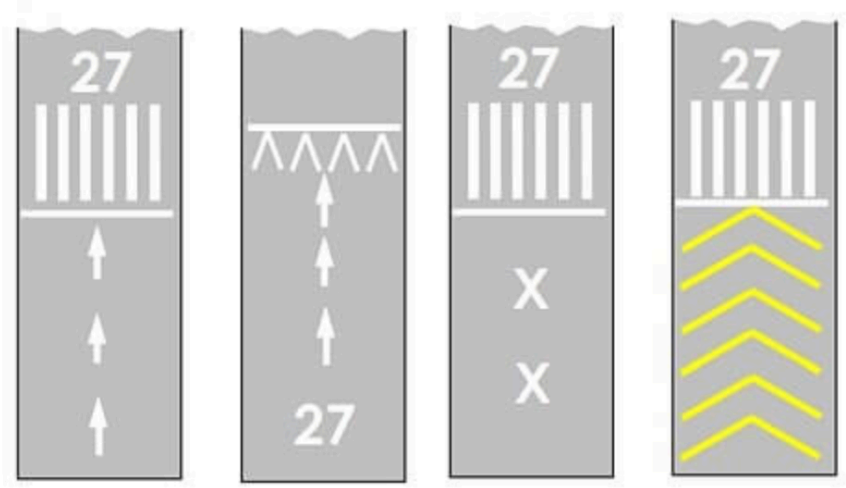


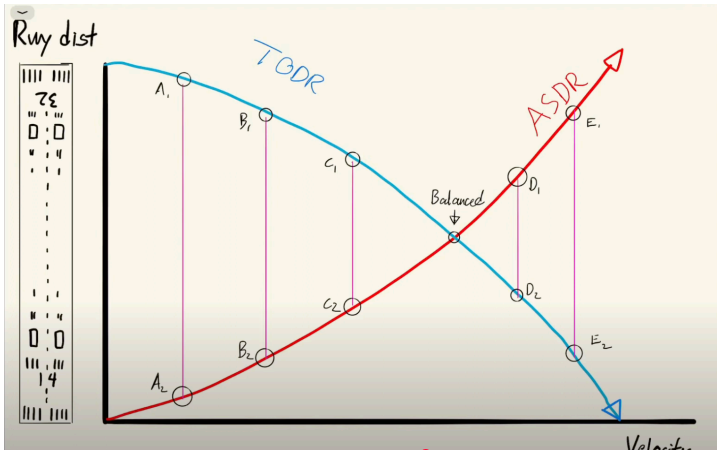
Fig. 1 Fig. 2 Fig 3 Fig 4

4. What is a balanced field? (329934)

A **balanced field** is the runway length where the decision point (V1) is placed such that continuing or aborting the takeoff after an engine failure will require the same distance.

OEI ASDR = OEI TODR

5. Balanced V1 is selected if?
The accelerate stop distance is equal to the one engine out take-off distance.



6. When compared to a balanced condition, taking into account a stopway leads to a?

Higher T/O mass and increased V_1

7. What is the minimum climb gradient for all engines operative?
3.3% default

What this means in practice

- **Default assumption:** When ICAO/EASA design a Standard Instrument Departure (SID), they assume the aircraft can climb at **≥ 3.3% (≈ 200 ft/NM) with all engines operative**.
- **If higher gradient is required** (e.g. obstacles, terrain), the chart will state it explicitly — e.g. "Climb gradient 5.0% required to 4000 ft."
- **If only 3.3% is published (or nothing at all),** the pilot knows that's the minimum to clear obstacles.

Required net gradients OEI

After lift-off and gear retraction, the take-off flight path is split into segments:

- **First segment**: from lift-off to gear retraction complete → positive net gradient required.
- **Second segment**: from gear up to 400 ft AGL, at V2 and take-off power:
  - **2.4%** minimum net gradient for **two-engined** aeroplanes.
  - **2.7%** for **three-engined**.
  - **3.0%** for **four-engined**.
- **Third segment (acceleration segment):** usually a level or slightly climbing segment, used to accelerate and clean up flaps/slats.
- **Final segment**: from the end of acceleration/clean-up to at least 1500 ft AGL at climb thrust, with:
  - **1.2%** for twins,
  - **1.5%** for tri-jets,
  - **1.7%** for quads.

8. Which type of aeroplane and situation will experience a larger decrease in induced drag at heights between ground level and a wingspan? (813857)

Low wing aircraft during landing

youtu.be/GHQvAQiIcoE?si=g7AjoIqSSS090IHf

9. What are the clouds encountered in a cold front? (504225)

Broken to overcast (base low, but rising) -> Cb and sometimes Ns and after passes Cu

10. What is GBAS and how does it work? (622255)

Ground based augmentation system provides data which defines the final approach segment -> transmitted on VHF to arriving aircraft, together with differential position corrections and integrity information for each satellite

11. Does GBAS use VHF or UHF?

VHF

12. By volume, what percentage of the air in the lower troposphere consists of water vapour (Humidity)? (501284)

0-5%

13. How is the artificial feel system in a FBW aircraft linked?

The pilot inputs and the control surfaces are linked via a computer (FCC / FCU), so the control surfaces are moved **indirectly** by the pilot inputs (irreversible) -> linked in parallel

14. If you are flying using a DI (with no wind and precession), what are you flying?

A magnetic track (DI indicates magnetic heading)

15. When is an airplane considered to be in the heavy category? (109379)

When the aircraft is 136.000kg or more
Light-> 7.000kg or more
Medium -> more than 7.000kg but less than 136.000kg

16. What is the time displayed in the Almanac?

UTC

17. The centre of gravity is placed far aft in flight. What is the effect on the elevator trim? (312664)

Nose down trim force is increased

18. What is the main factor which contributes to the formation of very low clouds ahead of a warm front? (504572)

Saturation of the cold air by rain falling into it and evaporating

19. An aeroplane, which is scheduled to fly an oceanic sector, is due to depart from a high-altitude airport in the tropics at 1400 local time. The airport has an exceptionally long runway. Which of the following is most likely to be the limiting factor(s) in determining the take-off mass? (322642)

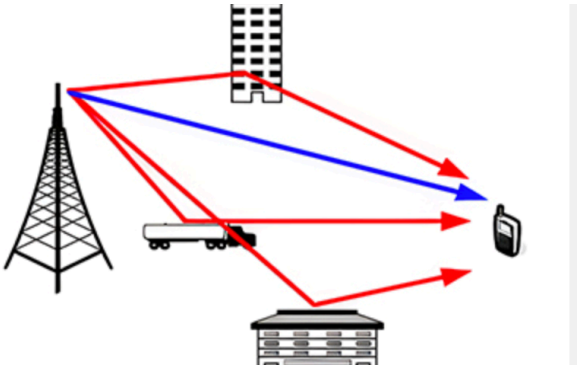
Altitude and temperature of the departure airfield.

19-1. The Cost Index (CI) can be defined as the...

Cost index is determined by dividing:
The aircraft operating cost (time) / fuel cost

20. What is meant by the term 'fading'? (629289)

The interference of the ground and sky wave



21. Which one of the following is a prohibited combination in aircraft registration letters?

TTT, SOS, XXX, PAN

22. Why is icing dangerous on the ground? (709459)

It can occur in places that would normally remain free of icing such as in wheel wells during taxiing
(unprotected areas)

Icing in flight forms on the leading edges of the wings, tail, engine nacelles, pitot tubes etc. Modern commercial airliners are equipped with systems for icing in these areas, eg hot bleed air, boot devices etc.

On the ground, contamination can form anywhere on the airframe. For example, consider taxiing on a contaminated taxiway, the wheels will be throwing contamination up onto the underside of the aircraft. Ground icing will form in areas that are unprotected by the aircraft's own systems.

ICAO Doc 9640 'Manual of Aircraft Ground De-icing/Anti-icing Operations', Part I, Chapter 1.

'Ice, frost and snow formed on these surfaces on the ground can have a totally different effect on aeroplane flight characteristics than ice formed in flight. Exposure on the ground to weather conditions that are conducive to ice formation can cause accumulation of frost, snow or ice on areas of the aeroplane where the ice protection provided is designed for in-flight use only.'

23. When is a runway considered contaminated with ice? (326796)

When the ice/snow covers more than 25%

EASA AIR OPS
Regulation (EU) No 965/2012
Annex I / Definitions for terms used in Annexes II-VII
'Contaminated runway' means a runway of which more than 25% of the runway surface area within the required length and width being used is covered by the following:
(a) surface water more than 3 mm (0.125 in) deep, or by slush, or loose snow, equivalent to more than 3 mm (0.125 in) of water;
(b) snow which has been compressed into a solid mass which resists further compression and will hold together or break into lumps if picked up (compacted snow); or
(c) ice, including wet ice;

'Damp runway' means a runway where the surface is not dry, but when the moisture on it does not give it a shiny appearance;

'Dry runway' means a runway which is neither wet nor contaminated, and includes those paved runways which have been specially prepared with grooves or porous pavement and maintained to retain 'effectively dry' braking action even when moisture is present;

'Wet runway' means a runway of which the surface is covered with water, or equivalent, less than specified by the 'contaminated runway' definition or when there is sufficient moisture on the runway surface to cause it to appear reflective, but without significant areas of standing water.

Previous legislation: EU-OPS 1.480

24. When do you use an abbreviated callsign?

Typically, after initial contact. ATC must do it first (D-EHLB = D-LB)

25. Due to what can hyperventilation happen? (405927)

Fear, anxiety and distress

26. What is basic empty mass? (319209)

Basic Empty Mass (BEM) is the mass of an aeroplane plus standard items such as: unusable fuel and other unusable fluids; lubricating oil in engine and auxiliary units; fire extinguishers; pyrotechnics; emergency oxygen equipment; supplementary electronic equipment.
Dry Operating Mass (DOM) is the total mass of the aeroplane ready for a specific type of operation excluding usable fuel and traffic load. The mass includes items such as:
i) Crew and crew baggage.
ii) Catering and removable passenger service equipment.
iii) Potable water and lavatory chemicals.
iv) Food and beverages.

27. What are the O2 requirements?

(Supplemental oxygen is required above 12.500ft for crew members and above 14.000ft for passengers)
Unpressurized Aircraft:
From 10000 to 13000ft oxygen must be provided to flight crew and 10% of pax. For flight durations over

30mins.
From 13000ft oxygen must be provided to all occupants.

NON-Pressurised

SUPPLY FOR:	DURATION AND PRESSURE ALTITUDE
All occupants of flight deck seats on flight deck duty	Entire flight time at pressure altitudes above 10 000 ft
All required cabin crew members	Entire flight time at pressure altitudes above 13 000 ft and for any period exceeding 30 minutes at pressure altitudes above 10 000 ft but not exceeding 13 000 ft.
100 % of passengers	Entire flight time at pressure altitudes above 13 000 ft.
10 % of passengers	Entire flight time after 30 minutes at pressure altitudes greater than 10 000 ft but not exceeding 13 000 ft

Pressurised

Annex 710330-A-1

SUPPLY FOR:	DURATION AND CABIN PRESSURE ALTITUDE
All occupants of flight deck seats on flight deck duty AND All required cabin crew members	Entire flight time when the cabin pressure altitude exceeds 13 000 ft and entire flight time when the cabin pressure altitude exceeds 10 000 ft but does not exeed 13 000 ft after the first 30 minutes at those altitudes
100 % of passengers	Entire flight time when the cabin pressure altitude exceeds 15 000 ft
30 % of passengers	Entire flight time when the cabin pressure altitude exceeds 14 000 ft but does not exced 15 000 ft
10 % of passengers	Entire flight time when the cabin pressure altitude exceeds 10 000 ft but does not exced 14 000 ft after the first 30 minutes at these altitudes

28. What are the weather radar colours?
These can vary, but in general:
Green -> light rain
Yellow -> moderate rain
Orange -> heavy rain
Red -> very heavy rain

Airborne Weather Radar displays increasing intensity of return in colour, with green indicating the weakest returns, then amber, then red.

More modern radar sets indicate the strongest returns using a fourth colour, magenta.

Dry snow will produce a weak return and will not display magenta. As the snowflakes descend through the freezing level, they might start sticking together and becoming water-covered. This will increase their reflectivity and the radar may display amber.

29. What do you do when you know well in advance that you'll have to hold?

Reduce cruise speed to reduce fuel consumption by flying at an optimal altitude and hold at the minimum clean speed

29-1. Point of equal time (PET) is based on…

The Point of Equal Time (PET), or sometimes is referred to as Critical Point (CP), is a point on a track, in relation to two suitable airfields, from which it is the same time for an aircraft to fly to either.
Distance to PET = (GS home x Distance) / (GS out + GS home)
Time to PET = Distance to PET / GS out

- **Ground speed** is used on both as the effect of wind will change the PET.

Ground Speed -> PET (dist.) = TotalDist. x GS(H)/ (GS(O)+GS(H))
PSR (time) = SafeEnd. x GS(H)/ (GS(O)+GS(H))

30. Of what change does NANU inform users and why are they released 72h in advance? (336612)

The GPS constellation and for planned maintenance

Learning Objective 033.04.01.04.02: Define receiver autonomous integrity monitoring (RAIM), NOTAM and notice advisory to NavStar users (NANU) messages.

It is important before flight to check that there will be enough satellites visible for an accurate position at all stages of the flight but especially for the destination airfield and alternate.
This GNSS achievability can be verified by checking NOTAMs and the **Notice Advisory to Navstar Users (NANU) messages** which is issued jointly by the United States Coast Guard and the GPS Operations Centre in Colorado and **provides updates on the GPS constellation**.
NANUs are issued **72 hours (3 days) before** any change of a GPS satellite regarding **a change in orbit or a planned maintenance**.

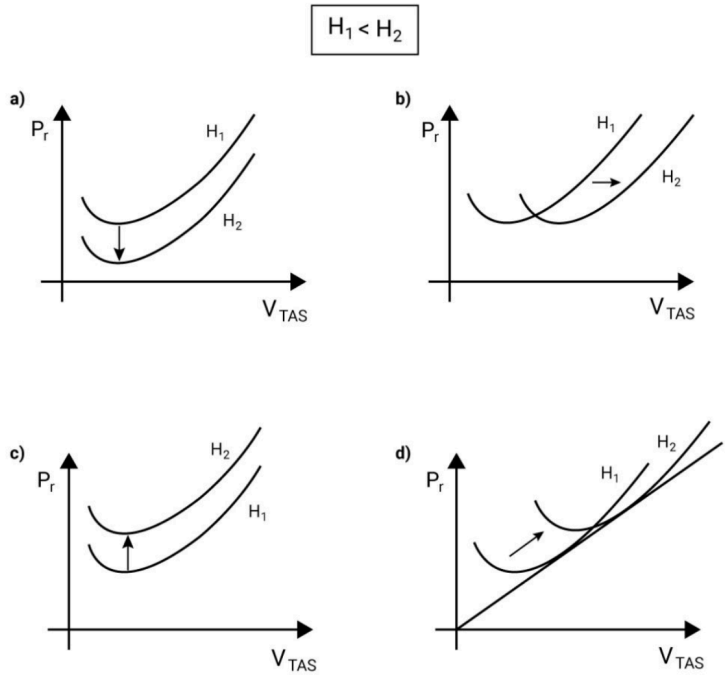
31. From the following list of stressors, which are psychological? (401995)

1. Noise
2. **Loss of a spouse or partner**
3. Heat
4. **Loss of one's job**
5. Vibrations
6. **Credit card debt**

32. What happens to the blade pitch of a constant speed propeller on ground roll during take-off?
(815345)

It increases

33. Which of the following diagrams correctly shows the change in the position of the power required curve with altitude, given that H2 is at a greater altitude than H1? (323083)



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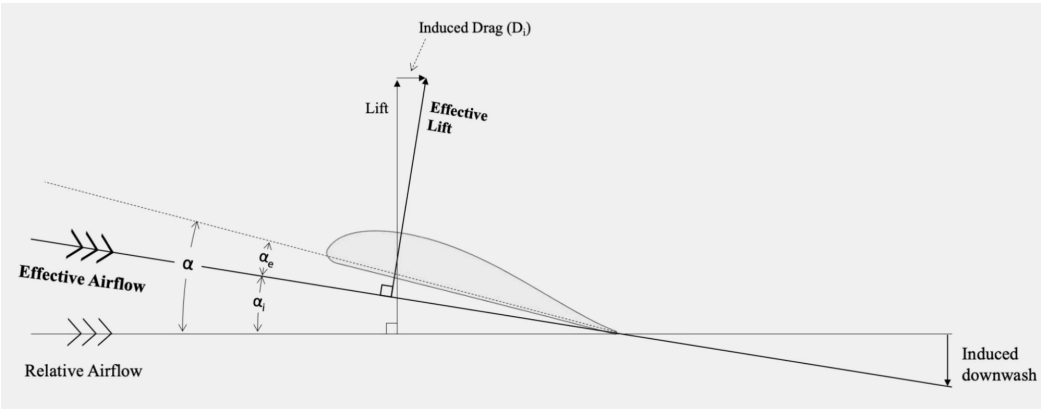
34. Which statements about an aeroplane entering ground effect are correct or incorrect?
(818582)

The downwash angle reduces, and the induced AoA decreases



Refer to figure.
The question is asking what will happen to the downwash angle and the induced angle of attack when entering ground effect.

- Downwash angle: When entering ground effect, the proximity to the ground reduces the effect of downwash, and therefore the induced drag. Meaning our downwash angle will reduce when entering ground effect.
- Induced angle of attack: As you can see in figure 1, when entering ground effect the induced downwash will decrease, this leads to a decrease in the induced angle of attack (αi).

35. If u set 7600 in the transponder what does that mean? (914552)

Comms/Radio failure.

36. If an SSR transponder failure occurs after departure of an IFR flight, the pilot should.. (927742)

Inform the ATC unit immediately

37. An aircraft experiencing radio communication failure on an IFR flight in VMC should: (923228)

Continue to fly in VMC, land at the nearest suitable aerodrome, and report its arrival.

A controlled flight suffering a communication failure in VMC shall:

1. Set transponder to Code 7600
2. Continue fly in VMC
3. Land at the nearest suitable aerodrome
4. Report its arrival time by the most expeditious means to the appropriate ATS unit.

38. An aircraft experiencing radio communication failure on an IFR flight in IMC should: (921658)

Proceed in accordance with the current flight plan to the designated navigation aid serving the destination aerodrome.

39. For the flight crew, what is one of the most important attributes for positive leadership?

Cohesion

40. What are the tire brakes limitations?

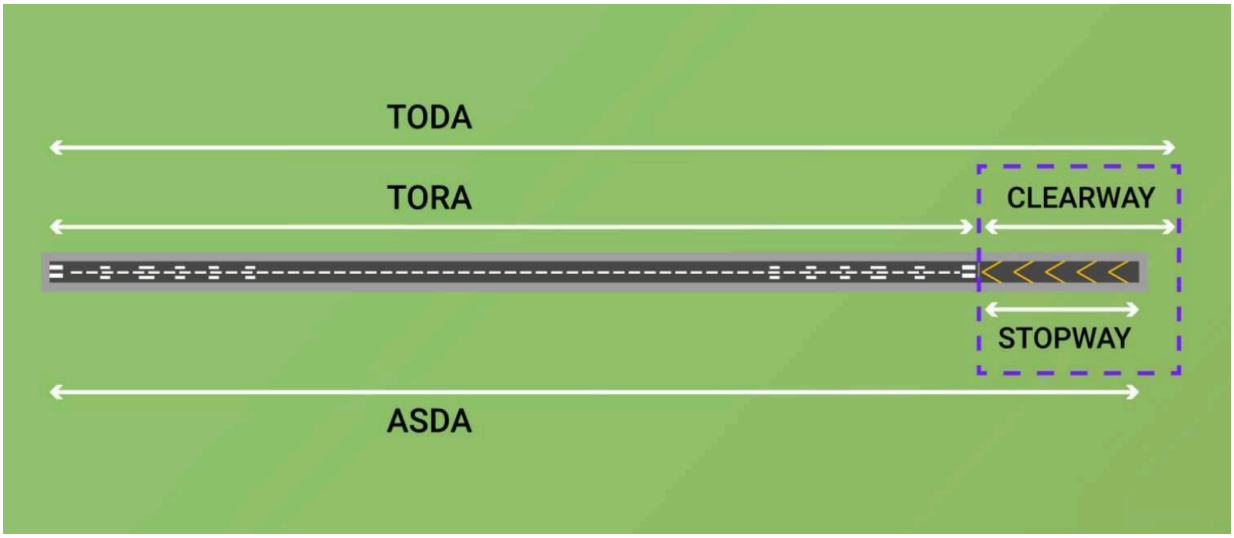
Turnaround rate and VMBE (Maximum Brake Energy Speed)

41. What does ... mean when talking about braking action? (707721)

Brakes 2 (0.26-0.29) -> medium/poor
Brakes 3 (0.35-0.30) -> medium
Brakes 4 (0.39-0.36) -> medium/good
Brakes 5 (≥ 0.40) -> good

42. What is ASDA?

Length of the TORA plus the stopway (if provided)



43. What is TODA?

Length of the TORA plus the clearway (if provided)

44. What is LDA?

The usable length for landing

Ref: ICAO Annex 14 Declared distances.
a) ***Take-off run available (TORA)***. The length of runway declared available and suitable for the ground run of an aeroplane taking off.
b) ***Take-off distance available (TODA)***. The length of the take-off run available plus the length of the clearway, if provided.
c) ***Accelerate-stop distance available (ASDA)***. The length of the take-off run available plus the length of the stopway, if provided.
d) ***Landing distance available (LDA)***. The length of runway which is declared available and suitable for the ground run of an aeroplane landing.

A displaced threshold is not located at the extremity of a runway.

45. What is the definition of a wet runway? (326149)

There is sufficient moisture on the runway surface to cause it to appear reflective, but without significant areas of standing water

EASA AIR OPS
Annex I to VIII
"Contaminated runway". A runway is considered to be contaminated when more than 25% of the runway surface area (whether in isolated areas or not) within the required length and width being used is covered by the following:
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"Wet runway." A runway is considered wet when the runway surface is covered with water, or equivalent, less than specified in subparagraph (a)(2) above or when **there is sufficient moisture on the runway surface to cause it to appear reflective, but without significant areas of standing water**.

46. What is the correction factor for landing on a wet runway? (321358)

The landing distance must be increased by 15%

47. How should a station address a general call to all aircraft in its area? (922560)

Starts with 'all stations'

48. In straight flight, as speed is increased, whilst trimming to keep stick forces zero, what happens?(811630)

The elevator is deflected further downwards and the trim tab further upwards

49. Last minute extra cargo is being loaded in the aircraft (FWD of the CG), how should the trim setting adjustment be?

Nose- up (Trim aft) - lowering the leading edge of the stabilizer

50. What is the effect on the stall speed when the weight is increased?

Stall speed increases

51. Regarding CG limits, which one of the following statements is true?

CG limit from an aircraft operator can be more restrictive than the manufacturer's CG limit

52. Why are high latitude flights in Polar regions subject to specific problems with the use of a gyro magnetic compass? (704200)

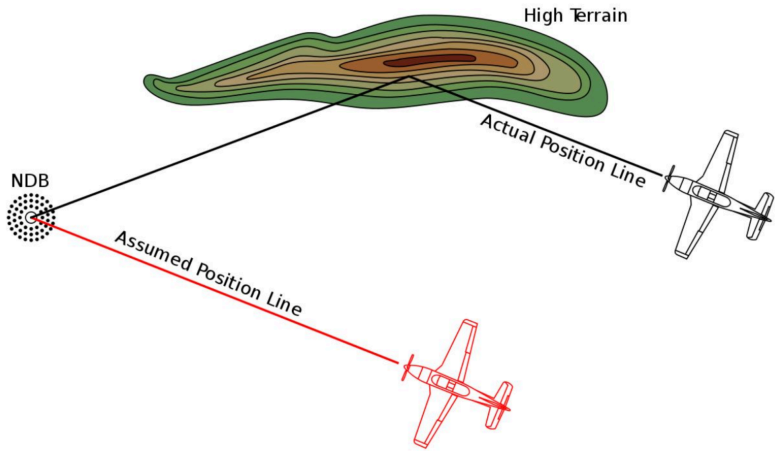
the meridians

52-1. Why do small navigation mistakes lead to larger errors in the polar region?(716289)

The convergence of the meridians

53. What is mountain effect and which instrument does it affect? (628046)

It can be caused by diffraction of an NDB signal bending the path of the radio waves



Refer to figure.
MOUNTAIN EFFECT (Multipath Effect)
Mountainous areas can cause both reflections and diffraction of the transmitted radio waves to produce errors in ADF systems. Radio waves will bounce off high ground or other irregularities causing the direction of the received signal to be different from the actual direction of the NDB. This can result in a false indication of the ADF needle. Such errors increase at low altitude and can be minimized by flying higher.

54. What is the minimum separation time for a departing light/medium behind a heavy aircraft?

2 min (full length T/O); 3 min (intermediate T/O)

Annex 710368-A-1

Table 1 – Cruise

Leading Aircraft	Following Aircraft / Crossing Behind	Minimum Separation Distance
Heavy	Heavy	4 NM
	Medium	5 NM
	Light	6 NM
Medium	Light	5 NM

Table 2 – Arriving Aircraft

Leading Aircraft	Following Aircraft	Minimum Time
Heavy	Heavy	2 minutes
	Medium	2 minutes
	Light	3 minutes
Medium	Light	3 minutes

Table 3 – Departing Aircraft

Leading Aircraft	Following Aircraft	Minimum Spacing at Time Aircraft are Airborne	
		Departing From	
		Same Take-Off Position	Intermediate Take–Off Postion
Heavy	Heavy	2 minutes	3 minutes
	Medium		
	Light		
Medium	Light	2 minutes	3 minutes

55. What is the minimum separation between a light/medium aircraft and a heavy aircraft, or between a light aircraft and a medium aircraft when the heavier one is making a low/ missed approach on an opposite runway?

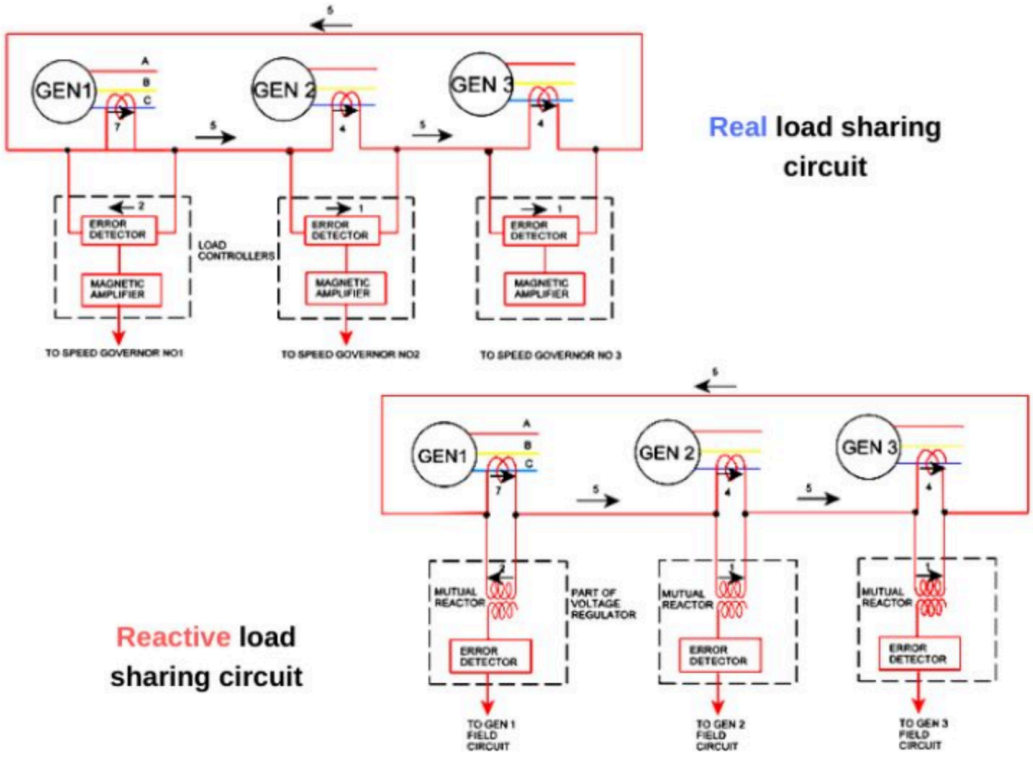
2 min

56. When the AC generators are connected in parallel, the reactive loads are balanced by means of the? (216705)

Excitation current

57. Safety is often improved by applying the principles of CRM, being? (409442)

Expression of doubts or of a different opinion



Refer to figure.
Paralleling generators is when two generators supply one bus bar. This allows the load to be shared between the two generators and has the added advantage of maintaining power on the busbar in the event of one of the generators failing. Both real and reactive loads must be matched to ensure correct load sharing between AC generators operating in parallel. When they are connected in parallel, the **reactive loads** are balanced by regulating the energizing current (**exciter field current**). On the other side, real load sharing is achieved by increasing the torque input to the lower speed alternator and vice versa.

Real Loads – actual working load directly related to the mechanical power (torque) supplied to the alternator (the engine or the CSDU). It is called "real" because it is dependent on the torque at its output shaft available for supplying aircraft's electrical equipment.
Reactive Loads – vector sum of inductive and capacitive currents and voltages (in KVAR).

58. If windshear due to microbursts is expected to occur during T/O, the best solution is to? (503343)

Delay departure

59. What is ICAO Annex 2 about? (101349)

Rules of the air

60. Above 10.000ft AMSL, the VMC minima for flights under VFR in all classes of airspace are?(105759)

Visibility of 8km (5km below 10.000ft) and distance from clouds 1500m horizontally and 1000ft vertically -
> for class F and G only (below 3000ft) visibility of 5km and clear of clouds

61. Primary DC system

Critical back-up to the main AC electrical system providing stable power to essential and emergency systems, ensuring safe operation of the aircraft even in abnormal electrical conditions

62. The outbound time for a holding pattern above 14.000ft in still air conditions is? (108458)

1min 30sec (1min when below)

63. How would you describe VHF propagation? (918104)

It can be modelled as line-of-sight propagation

64. Find the next word: happy, frustrated and exhilarated?

Melancholic (options: depressing, polluted, laughable)

65. What is FANS? (221295)

Future Air Navigation System -> means to connect pilots and ATC to communicate via datalink (satellite) -> for smoother traffic flows (Used in limited radar and VHF coverage regions – remote areas)

66. The ICAO procedure to collect and disseminate information on bird strike hazard to aircraft is called?(708634)

IBIS (ICAO Bird Strike Information System)

67. What is correct for path definition error (PDE)? (625350)

Path defined by RNAV system does not correspond to the desired path

68. How does the FMS ETA change with headwind?

Headwind reduces groundspeed, FMS responds to this by increasing the ETA

Performance-based Navigation (PBN)
The inability to achieve the required lateral navigation accuracy may be due to navigation errors related to aircraft tracking and positioning. The three main errors in the context of on-board performance monitoring and alerting are path definition error (PDE), flight technical error (FTE), and navigation system error (NSE).

- Path Definition Error (PDE) occurs when the path defined in the RNAV system does not correspond to the desired path, i.e. the path expected to be flown over the ground. **RNAV system is unable to accurately define the desired path.**
- Flight Technical Error (FTE) relates to the air crew or autopilot's ability to follow the defined path or track, including any display error (e.g. course deviation indicator (CDI) centring error).
- Navigation System Error (NSE) refers to the difference between the aircraft's estimated position and actual position. It is the error in the accuracy in determining actual aircraft coordinates.

69. When crossing the international date line (on a westerly heading), what happens? (616666)

The date will increase when crossing on a westerly heading

70. RNP approach GNSS with APV can be?

Baro-VNAV (vertical guidance from barometer) and SBAS (highly accurate GPS)

RNAL/LNAV, LPV

71. What type of drift would instrument error cause in a conventional gyroscope? (229981)

Real wander (actual movement of the spin axis caused by engineering imperfections such as friction and unbalance)

Any departure of a gyro axis from its original orientation is called wander. Wander may be either real or apparent (the difference is explained below) or a combination of both. Wander is subdivided into drift and topple. **If the gyro axis wanders in the horizontal plane, it is called drift, either real or apparent.**
REAL WANDER
In real wander, the axis of the gyro moves with respect to inertial space. This departure from the original orientation is caused by manufacturing imperfections, such as uneven rotor bearing friction, gimbal friction, imbalance in the mass of the rotor and unbalanced gimbals. Real wander can be reduced by higher quality engineering and manufacturing. Depending on the application, the cost of reducing real wander may not be justified by the level of accuracy required.
As with instrument error, gyros need to be as accurate as the need of the application in use, but over-engineering costs extra money. Real wander can also be known as 'random' wander.

72. What do you know about the FMS calculated altitude?

It helps optimize the flight -> incorporates a wide range of inputs to provide the most efficient and safe altitude for each phase of flight

73. Symmetrical aerofoil and its coefficient of lift?

When the AoA is 0 -> no lift is produced

74. What is a Pan Pan call? (924356)

The aircraft has an urgent message to transmit concerning the safety of any vehicle, but there is no immediate assistance required (urgency message)

75. Separation between heavy and light upon landing?

3 min

76. An airplane has declared distress on the frequency that takes priority over all messages, it is a?

MAYDAY

A distress message uses MAYDAY, where as an urgency message uses PANPAN.

77. ATC instructs all stations to standby; it means they must?

All aircraft must stop transmitting (or change frequency) and remain silent

78. What is V_{s1g}? (328883)

Lowest speed at which the airplane can maintain 1g (force equal to its weight) in level flight

79. What are the possibilities of icing if you fly from warm to cold air?

There is a possibility of icing

80. Hydraulic system's valve function similarity to a diode in an electric circuit?

Check valve
They both serve as control elements -> directing flow and preventing back flow

A diode can allow electricity to flow in one direction only. A check valve, or non return valve, allows hydraulic fluid to flow in one direction only.

81. You are landing in low visibility and after touchdown you only see red and white centreline lights, how many meters are left? (107400)

Not more than 900m (before they're white) -> last 300m are red

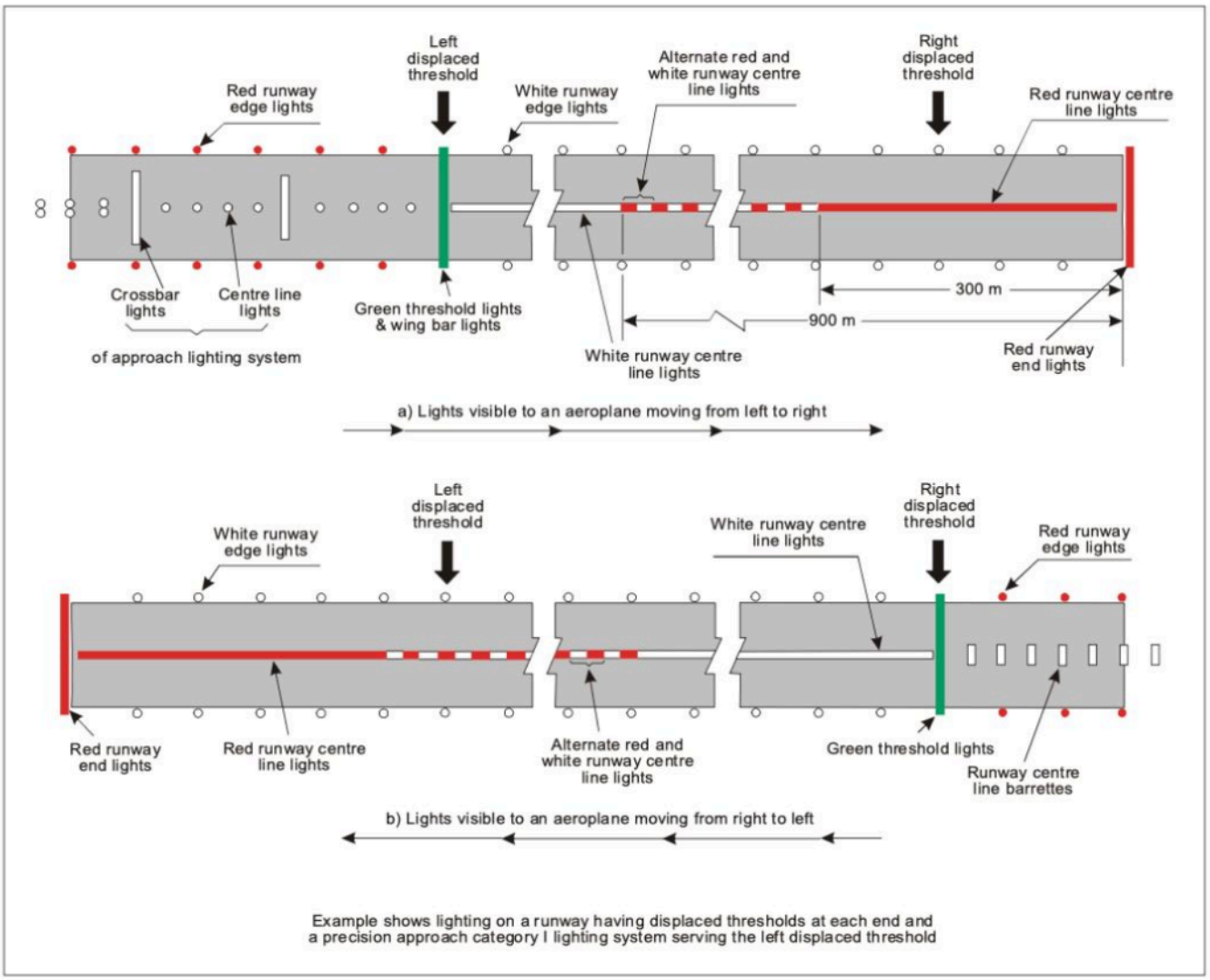


Figure 5-23. Example of approach and runway lighting for runway with displaced thresholds

82. How long rwy remaining when RWY centreline light turns solid red?

305m(1000ft)

83. How long rwy remaining when RWY centreline light turns alternating red and white?

915m(3000ft)

84. What colour are the runway edge lights (displaced threshold)? (105690)

Before the runway threshold -> red.
After the runway threshold -> white; they may turn yellow on the last 2000ft(600m)

85. What does AIRAC mean? (104964)

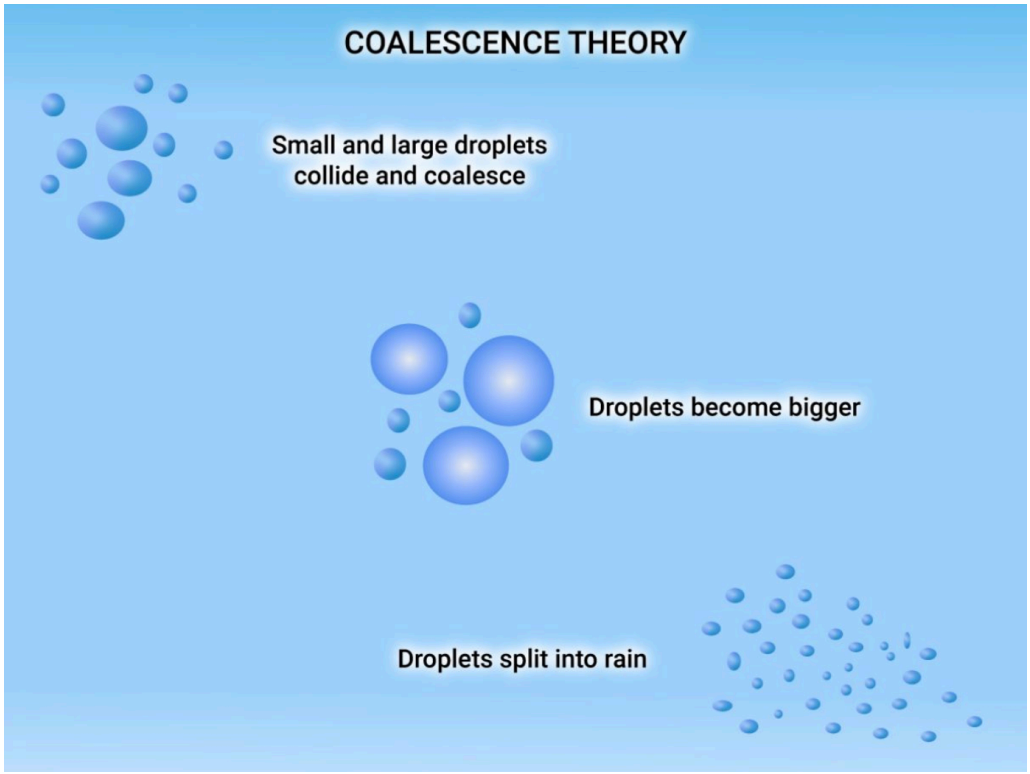
AIRAC (Aeronautical Information Regulation and Control) is a system aimed at advanced notification based on common effective dates, of circumstances necessitating significant changes in operating procedures

86. What are VMO and MMO?

VMO is the maximum operating speed; MMO is the maximum operating Mach number

87. What is produced by the coalescence process in the mid-latitudes? (506574)

Drizzle or very light rain



Refer to figure.
PRECIPITATION. There are currently two theories governing the formation of these precipitation drops:
BERGERON THEORY. It involves supercooled water droplets and explains how ice crystals grow at the expense of liquid cloud droplets within a mixed cloud. There are more water molecules surrounding the water droplets than there are surrounding the ice crystals. This occurs because the saturation vapor pressure over a water surface is greater than that over an ice surface at the same temperature. Some of the water droplets will turn to ice and will grow in size by sublimation of water vapour and collision with supercooled water droplets. The frozen droplets will be much heavier than the existing water droplets and drop out at the bottom of the cloud, either as snow or raindrops, depending on the temperature.
Unlike the Bergeron Process, where precipitation forms under supercooled conditions, the **COALESCENCE PROCESS** typically occurs within relatively warm clouds with tops warmer than -15ºC. As you can tell by the name of this process, the collision of falling and rising droplets is what allows them to grow large enough to fall to the ground as precipitation. **In mid-latitudes this process produces only drizzle or very light rain.** Because the extension of warmer clouds is less in mid-latitudes in addition to convective currents and air friction disintegrates large droplets.

88. Which of the following statements is true concerning the coalescence process?

In the mid-latitudes this process produces only drizzle or very light rain

89. Which of the following combination provides the best visual landmarks for a VFR flight? (618230)

1 - Large water reservoir, 3 - Excessively high mast, 5 - High tension power line.

90. What is the purpose of baffle check valves? (213183)

To prevent movement of fuel towards the wing tips

Most wings of large transport category aircraft have a slight dihedral. Consequently, the fuel has a tendency to flow towards the wing root. When maneuvering, however, fuel could flow outwards to the wingtip. Since the fuel pump is usually located at the wing root, fuel supply to the pump could be impaired. To prevent this condition, integral tanks are often subdivided into individual section by walls with baffle check valves. Baffle check valves will allow the free flow of fuel towards the wing root but prevent any reverse flow to the tip.
Baffles, on the other hand, are fitted in the fuel tanks to help in keeping the fuel from sloshing around, dampening rapid fuel movement during aircraft manoeuvres (acceleration/deceleration/ sideslip/etc).

91. What is the purpose of hydraulic thermal relief valves?

To relieve excess pressure caused by temperature rise

92. Registration marks shall be letters, numbers and shall be assigned by? (102656)

The state of registry or common mark registering authority

93. What type of engine gives less problem in case of critical engine failure? (321947)

Counter-clockwise rotating (Also Contra)

94. How do you increase your optimum altitude? (322771)

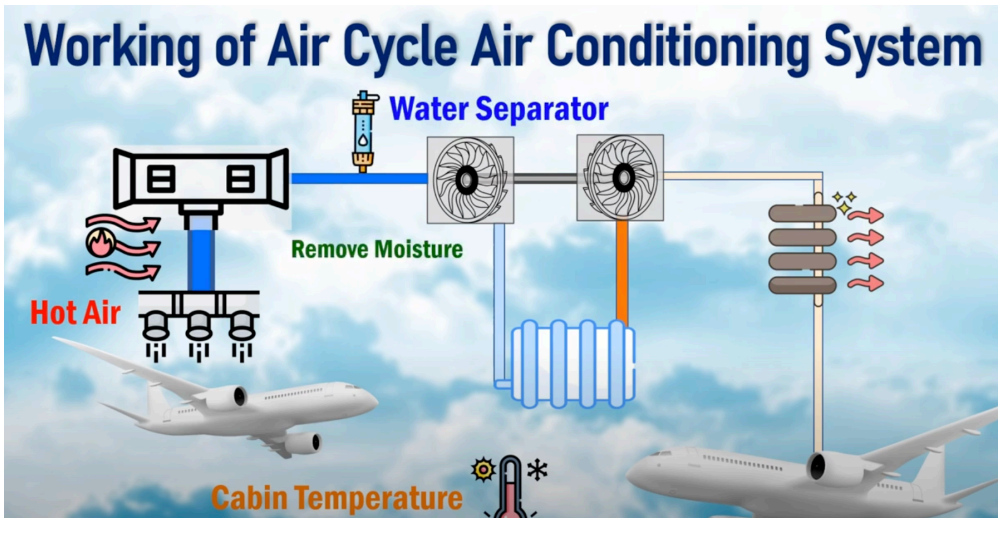
Less weight (burning fuel)

95. Which index colour of the AIC contains information about ATS facilities? (108703)

ICAO Doc 8126
Chapter 7. AERONAUTICAL INFORMATION CIRCULARS (AIC)
7.3 DISTRIBUTION
7.3.1 The originating State selects the AIC that are to be given international distribution. AIC thus selected must be given the same distribution as the AIP, AIP Amendments and AIP Supplements. In addition, it is highly recommended that AIC be colour coded by subject where there are sufficient circulars in force to warrant such identification, e.g.
a) white — administrative;
b) yellow — ATC;
c) pink — safety;
d) mauve — danger area map; and
e) green — maps/charts.

96. Regarding an air cycle type ECS pack, where is the water separator fitted?

After the cold air unit turbine



97. Which airplane behaviour will be corrected by the yaw damper? (227848)

Dutch roll -> by moving the vertical stabilizers while the rudder pedals remain fixed

98. How does VMCG change with increasing field elevation and temperature? (815370)

It decreases, because the engine thrust decreases

In simple words, VMCG is established as being the lowest speed at which rudder effect alone is sufficient to regain and maintain directional control after a sudden engine failure.
The major factor that affects VMCG is the difference in engine thrust. VMCG will therefore be lower at higher airport elevations and at a higher OAT, due to the associated lower thrust.
Conversely, **V**MCG **will be higher at lower airport elevations and at a lower OAT.**
If conditions are hot, high and humid the air is less dense. This reduces thrust and, consequently, when you lose the critical engine on take-off, there is less yawing effect from asymmetric thrust than there would be in denser air.

99. An aircraft manoeuvring in an airport's circuit receives a series of red flashes from the control tower, what does this mean?

Do not land, the airport is not available for landing/unsafe

4. SIGNALS FOR AERODROME TRAFFIC

4.1 Light and pyrotechnic signals

4.1.1 Instructions

Light		*From Aerodrome Control to:*	
		Aircraft in flight	*Aircraft on the ground*
Directed towards aircraft concerned (see Figure A1-1).	Steady green	Cleared to land	Cleared for take-off
	Steady red	Give way to other aircraft and continue circling	Stop
	Series of green flashes	Return for landing*	Cleared to taxi
	Series of red flashes	Aerodrome unsafe, do not land	Taxi clear of landing area in use
	Series of white flashes	Land at this aerodrome and proceed to apron*	Return to starting point on the aerodrome
Red pyrotechnic		Notwithstanding any previous instructions, do not land for the time being	

* *Clearances to land and to taxi will be given in due course.*

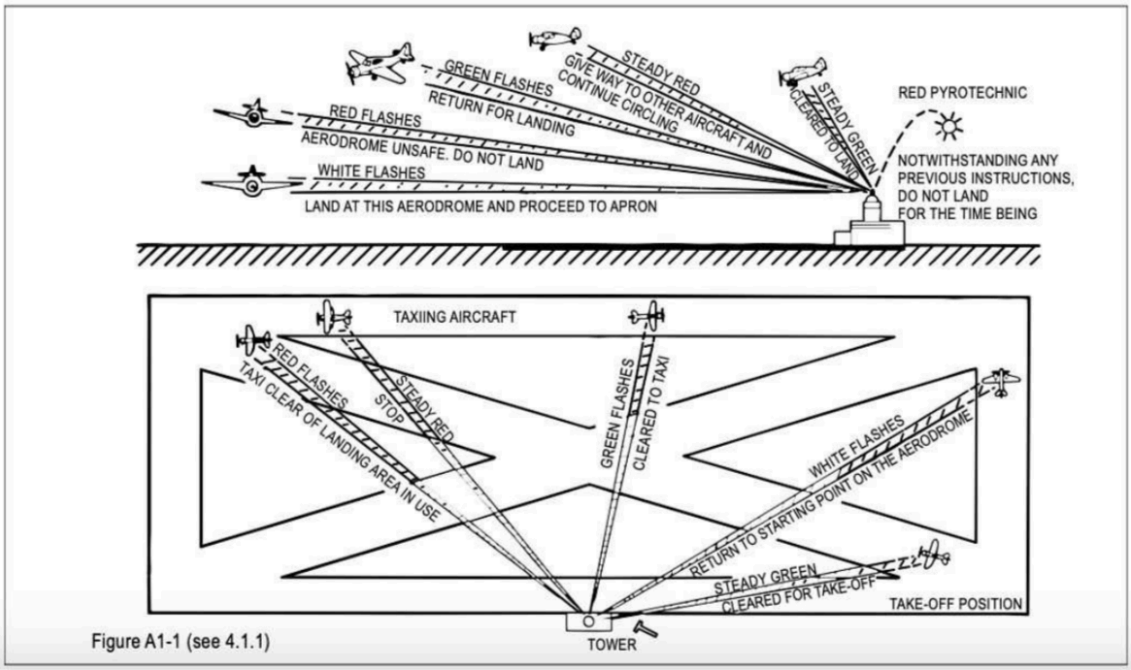


Figure A1-1 (see 4.1.1)

Source: ICAO Annex 2 – Appendix 1. "4. SIGNALS FOR AERODROME TRAFFIC"

100. At night an aircraft observes a luminous signal requesting help, how should the pilot indicate that he has received these signals? (105445)

By flashing his landing lights twice or navigation lights if not equipped with landing lights

Air-to-ground signals are used by pilots to indicate that ground signals have been understood.

- Daylight: Rocking the aircraft's wings
- Darkness: **Flashing the aircraft's landing lights twice**, or by switching the navigation lights on and off twice.

A lack of these aircraft signals indicates that the ground signal has not been seen or understood.
Source: ICAO Annex 12.

101. ATIS broadcasts messages containing departure and arrival should include cloud cover, when the clouds are: (901383)

5000ft or below the highest MSA (whichever is greater)

102. If the CG is near the forward limit, the airplane will?

Require elevator trim which will result in an increase in fuel consumption

103. The CDI for a VOR is selected to 90˚, indication TO, the CDI is deflected halfway to the right, on what radial is the aircraft?

Halfway to the right -> 5˚ -> CDI 90˚ means radial 270 -> 270+5 = 275

104. The semicircular canals form part of the? (403504)

Inner ear

105. The primary duty provided by a radar unit is:

To provide radar separation

106. A waypoint is:

A geographical location relating to RNAV

107. What happens to the climb time when the CG moves forward?

It is increased (higher drag and reduced climb performance)

108. Why do aircraft fly at high altitude?

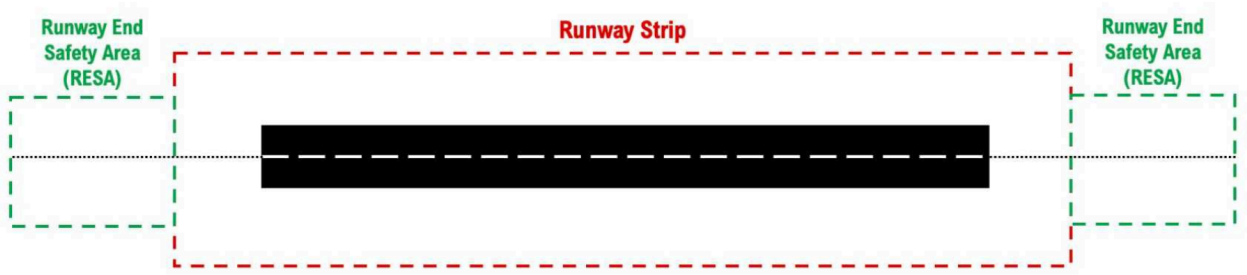
Fuel efficiency, speed, safety and passenger comfort are all improved, while avoiding congested areas and bad weather

109. What is the Mach formula? (818259)

M = TAS/LSS (LSS=sqrt(38.94X(k)), LSS (15ºC) =340m/s, Kelvin = Celsius + 273)

110. What is RESA? (105002)

RESA = Runway End Safety Area -> starts at the end of the RWY (symmetrical about the centreline) and has a minimum length of 90m (240m for longer RWYs).



ICAO Annex 14
Runway end safety area (RESA). An area symmetrical about the extended runway centre line and adjacent to the end of the strip primarily intended to reduce the risk of damage to an aeroplane undershooting or overrunning the runway.

3.5 Runway end safety areas
Dimensions of runway end safety areas
3.5.3 A runway end safety area shall extend from the end of a runway strip to a distance of at least 90 m where:
— the code number is 3 or 4; and
— the code number is 1 or 2 and the runway is an instrument one.
If an arresting system is installed, the above length may be reduced, based on the design specification of the system, subject to acceptance by the State.
Note.— Guidance on arresting systems is given in Attachment A, Section 10.

111. What happens when your Mach trim is inoperative? (224237)

Pitch down tendency isn't counteracted at high M -> M flown must be decreased

112. For a turbo-propeller aircraft, the landing distance at an alternate aerodrome shall be less than the available landing distance multiplied by a factor of? (717706)

0.7 (0.6 for jets)

ICAO Annex 6
7. Landing limitations
7.1 Aerodrome of destination — dry runways
7.1.1 No aeroplane should commence a take-off at a mass in excess of that which permits the aeroplane to be brought to a full stop landing at the aerodrome of intended destination from 15.2 m (50 ft) above the threshold:
a) ***for turbo jet*** powered aeroplanes, within 60 per cent of the landing distance available; and
b) ***for turbo-propeller aeroplanes***, within 70 per cent of the landing distance available.
The mass of the aeroplane is assumed to be reduced by the mass of the fuel and oil expected to be consumed in flight to the aerodrome of intended destination. Compliance is shown with 7.1.1.1 and with either 7.1.1.2 or 7.1.1.3.

113. Rods and cones, what is their purpose?

Rods -> peripheral vision, better at lower light levels and responsible for black and white
Cones -> centre field of vision, responsible for colour

114. Peripheral vision is important for? (401090)

Detecting moving objects

115. Where is the troposphere and stratosphere located?

The troposphere ranges from 0-11km; the stratosphere from 11-50km

116. How does the transponder transmit?

It uses pulse modulation and transmits on a fixed frequency of 1090MHz, when signals are received on 1030MHz

117. What is the priority of messages? (916994)

Distress, urgency, direction finding, flight safety, meteorological, flight regularity

118. Where can you find SAR info? (106690)

In the AIP part GEN

119. What is STD time? (614623)

It is the time set by the legal authorities for a part of a country. (US, Canada, Russia)

120. What is screen height? (323919)

The height at the end of the T/O distance required and at the beginning of the landing distance required

121. Which is more restrictive, operator or manufacturer lists?

The MMEL is provided by the manufacturer, the MEL by the operator. The MEL is(can be) usually more
restrictive than the MMEL

122. What happens to your glidepath when you experience more headwind than expected?

You need a shallower descent rate to maintain the glide because of a slower groundspeed

123. What happens when you set more flaps than needed for T/O?

You experience an increased drag, slower acceleration, longer T/O distances and reduced climb performance (if outside the T/O range)

124. Isogonic lines?

Connect positions that have the same variation

125. Compass deviation definition?

Angle between Magnetic North and Compass North

126. Seasons are due to:

Inclination of the polar axis with the ecliptic plane

127. Which speed represents maximum landing gear extended speed?

Vle

128. On a modern large, pressurized transport aircraft, the maximum cabin differential pressure is approximately?

7-9 PSI (A320~8.6PSI)

129. A "wide cut" fuel is?

More volatile than kerosene type fuel.

130. Station numbers and water lines are:

Means of locating airframe structure and components (3D grid system)

By convention the engine components are numbered from front to rear. A typical engine might look like this:

1 - Intake
2 - 3 = LP Compressor
3 - 4 = HP Compressor
5 - 6 = HP Turbine
6 - 7 = LP Turbine
8 - Exhaust

131. An aircraft making a radar approach should be directed to execute a missed approach if no clearance to land has been received from the non-radar controller; by the time the aircraft reaches a distance of:

2nm

132. The primary purpose of bonding the metallic parts of an aeroplane is to:

Provide safe distribution of electrical charges and currents.

133. Air Data Computer (ADC)?

Transforms air data measurements into electric impulses driving servo motors in instruments

134. When isobars stand close together on a surface chart?

Strong winds are present

135. Which airspeed provides the greatest gain in altitude in the shortest distance during climb after take-off?

Vx

136. Which airspeed provides the greatest gain in altitude in each period?

Vy

137. With a decreased flap setting from 20° to 10° on take-off the effect will be:

VLOF and V2 would both increase

138. The speed VLO is defined as:

The maximum speed with the landing gear in transit.

139. After a cabin pressure loss in approximately 35 000 FT the TUC (Time of Useful Consciousness) will be approximately:

30 - 60 seconds

43 000 ft 9-12 seconds
40 000 ft 15-20 seconds
35 000 ft 30-60 seconds

140. Susceptibility to carbon monoxide poisoning, as from smoking tobacco

Increases as altitude increases

141. The fundamental components of an autopilot control loop are:

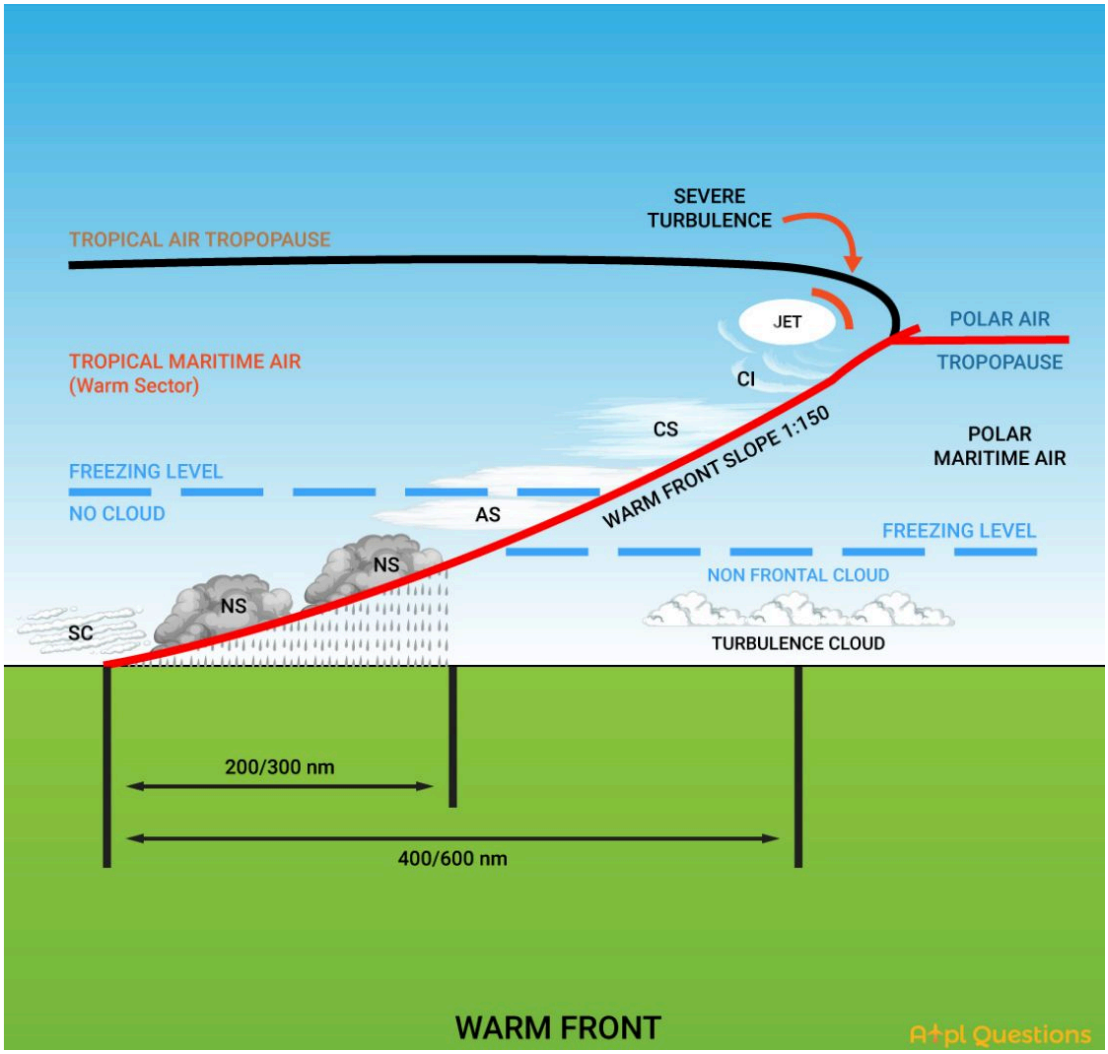
Rate gyro, servomotor, error signal generator.

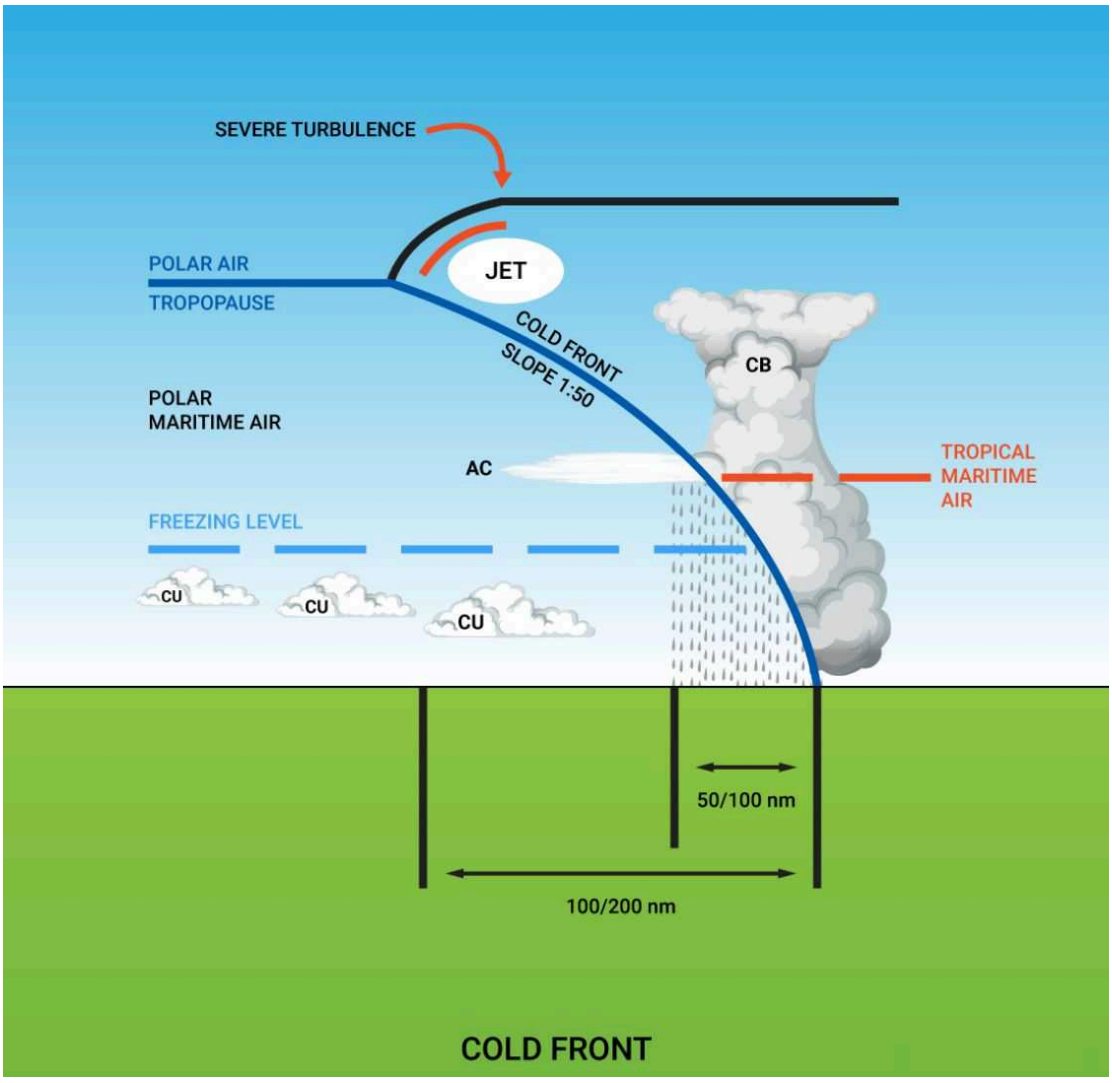
142. 'Fail safe construction' is:

A type of construction in which the load is carried by other components if a part of the structure fails.

143. How do air masses move at a warm front?

Warm air overrides a cold air mass


SEVERE
TURBULENCE
TROPICAL AIR TROPOPAUSE
JET
POLAR AIR
TROPOPAUSE
TROPICAL MARITIME AIR
(Warm Sector)
CI
CS
POLAR
MARITIME AIR
FREEZING LEVEL
NO CLOUD
AS
WARM FRONT SLOPE 1:150
FREEZING LEVEL
NS
NS
NON FRONTAL CLOUD
SC
TURBULENCE CLOUD
200/300 nm
400/600 nm
WARM FRONT
Apl Questions


SEVERE TURBULENCE
POLAR AIR
TROPOPAUSE
JET
COLD FRONT
SLOPE 1:50
CB
POLAR
MARITIME AIR
AC
TROPICAL
MARITIME
AIR
FREEZING LEVEL
CU
CU
CU
50/100 nm
100/200 nm
COLD FRONT

144. The "PAPI" shall consist of:

A wing bar of 4 sharp transition multi-lamp or paired units equally spaced

145. Gyro drift?

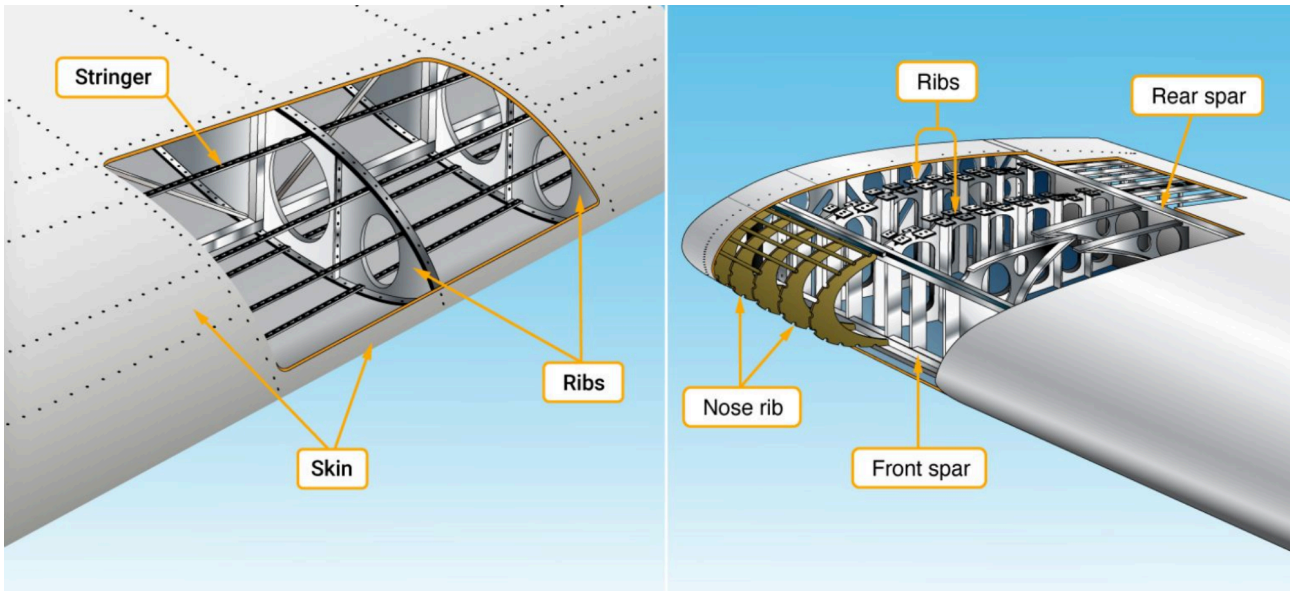
Because a horizontal axis gyro will 'drift' with Earth Rotation and with Transport Wander, it is necessary to periodically realign the DI with the magnetic compass every 15 minutes or so.

146. In the transonic range, CLmax will .... and the 1g stalling speed will ……?

Decrease, increase.

147. What are ribs for in a wing? (212652)

It gives the wing its cambered shape and they transmit loads from the skin and stringers to the spars.
Most ribs extend chordwise from the leading edge of the wing to the rear spar, or to the trailing edge of the wing.



Refer to figure.
The internal structures of most wings are made up of:

- Spars and stringers which run spanwise; and
- Ribs running chordwise (leading edge to trailing edge).

Spars: are the main structural member of a wing, supporting all distributed loads and concentrated weights (such as the fuselage, landing gear, and engines).
Skin: is attached to the wing structure and carries part of the loads imposed during flight. It also transfers the stresses to the wing ribs.
Ribs: perform similar functions to those performed by fuselage frames. They maintain the shape of the wing section, assist in transferring loads to the wing spars, and reduce the column length of the stringers.

148. What is the purpose of an ATC clearance? (102549)

ICAO Doc 4444
4.5 AIR TRAFFIC CONTROL CLEARANCES
4.5.1.1 Clearances are issued solely for expediting and separating air traffic and are based on known traffic conditions which affect safety in aircraft operation. Such traffic conditions include not only aircraft in the air and on the manoeuvring area over which control is being exercised, but also any vehicular traffic or other obstructions not permanently installed on the manoeuvring area in use.
4.5.1.4 ATC units shall issue such ATC clearances as are necessary to prevent collisions and to expedite and maintain an orderly flow of air traffic.

149. What is whiteout effect? (614394)

WHITEOUT
"An atmospheric optical phenomenon of the polar regions in which the observer appears to be engulfed in a uniformly white glow. Neither shadows, horizon nor clouds are discernible; sense of depth and orientation is lost; only very dark, nearby objects can be seen. Whiteout occurs over an unbroken snow cover and beneath a uniformly overcast sky when, with the aid of the snowblink effect, the light from the sky is about equal to that from the snow surface."

- More simply put, **the phenomenon occurs when you are in the presence of a large flat area and the overcast sky blends in with the ground**. You get the impression of being inside a bowl of milk or a ping-pong ball. <u>It is impossible to make out the horizon and distance from the ground</u>.

150. Percentage of tailwind and headwind to consider during take-off/landing runway calculation?

50% of the reported headwind and 150% of the tailwind

151. Mountain effect affects VORs or NDBs? and the phenomena is refraction/diffraction?

NDBs and Diffraction. (VORs prone to shadowing/reflection)

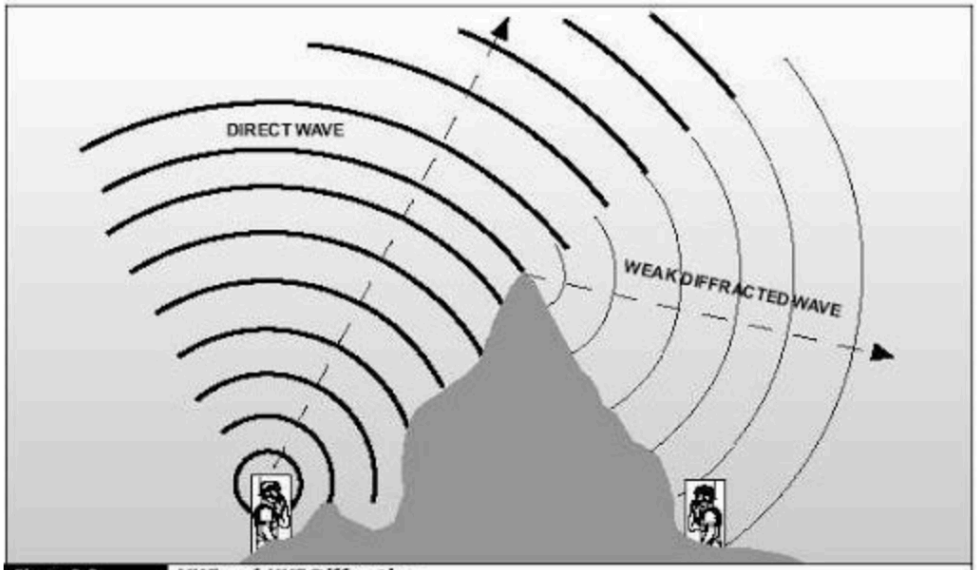


Figure 2-2. *VHF and UHF Diffraction*

152. What does "km/l" mean?

Kilometre/litre

153. Value of gravitational acceleration?

9.81 m/s^2

154. What level of noise can cause Noise Induced Hearing Loss (NIHL)? (401050)

85 dB

NOISE-INDUCED HEARING LOSS (NIHL)
Sounds can be harmful when they are too loud, even for a brief time, or when they are both loud and long-lasting. These sounds can damage sensitive structures in the inner ear, such as the membrane and sensitive hair cells in the cochlea, and cause Noise-induced Hearing Loss (NIHL).

- Sound is measured in units called decibels. Sounds at or below 70 decibels, even after long exposure, are unlikely to cause hearing loss. However, long or repeated exposure to **sounds at or above 85 dB can cause hearing loss.** NIHL can be caused by a one-time exposure to an intense "impulse" sound (above 120 dB), such as an explosion, or by continuous exposure to loud sounds over an extended period of time.

The early symptoms are an inability to hear high pitched notes as these notes are normally detected by the finer cells which suffer the greatest damage. NIHL is an occupational hazard for those of us in the aviation industry. In order to prevent NIHL, one is strongly encouraged to wear earplugs or other protective devices when involved in a loud activity. If you can't reduce the noise or protect yourself from it, move away from it.

Note: This question is seen as a 'type in' question in UK CAA for continuous exposure to noise, and the answer is '85 db'.

155. What does the Turn Coordinator measure? (222013)

Rate of change of heading

156. SNOWTAM validity:

8 hours

157. If part of rwy is not cleared after being contaminated in which section of SNOWTAM, will it be?

Section F – extent and type of contamination for each runway third
Section G - depth of contamination for each runway third

APPENDIX 2. SNOWTAM FORMAT

(See Chapter 5, 5.2.3.)

(COM heading)	(PRIORITY INDICATOR)	(ADDRESSES)	<≡
	(DATE AND TIME OF FILING)	(ORIGINATOR'S INDICATOR)	<≡
(Abbreviated heading)	(SWAA* SERIAL NUMBER) S W * *	(LOCATION INDICATOR)	DATE-TIME OF OBSERVATION / (OPTIONAL GROUP) <<≡(

SNOWTAM	(Serial Number) <≡

(AERODROME LOCATION INDICATOR)	A) <≡
(DATE-TIME OF OBSERVATION *(Time of completion of measurement in UTC)*)	B) →
(RUNWAY DESIGNATOR)	C) →
(CLEARED RUNWAY LENGTH, IF LESS THAN PUBLISHED LENGTH *(m)*)	D) →
(CLEARED RUNWAY WIDTH, IF LESS THAN PUBLISHED WIDTH *(m; if offset left or right of centre line add "L" or "R")*)	E) →
(DEPOSITS OVER TOTAL RUNWAY LENGTH *(Observed on each third of the runway, starting from threshold having the lower runway designation number)* NIL — CLEAR AND DRY 1 — DAMP 2 — WET 3 — RIME OR FROST COVERED *(depth normally less than 1 mm)* 4 — DRY SNOW 5 — WET SNOW 6 — SLUSH 7 — ICE 8 — COMPACTED OR ROLLED SNOW 9 — FROZEN RUTS OR RIDGES)	F) .../.../... →
(MEAN DEPTH *(mm)* FOR EACH THIRD OF TOTAŞ RUNWAY LENGTH)	G) .../.../... →
(ESTIMATED SURFACE FRICTION ON EACH THIRD OF RUNWAY) ESTIMATED SURFACE FRICTION GOOD — 5 MEDIUM/GOOD — 4 MEDIUM — 3 MEDIUM/POOR — 2 POOR — 1 *(The intermediate values of "MEDIUM/GOOD" and "MEDIUM/POOR" provide for more precise information in the estimate when conditions are found to be between medium and either good or poor.)*	H) .../.../... →
(CRITICAL SNOWBANKS *(If present, insert height (cm)/distance from the edge of runway (m) followed by "L", "R" or "LR" if applicable)*)	J) →
(RUNWAY LIGHTS *(If obscured, insert "YES" followed by "L", "R" or both "LR" if applicable)*)	K) →
(FURTHER CLEARANCE *(If planned, insert length (m)/width (m) to be cleared or if to full dimensions, insert "TOTAL")*)	L) →
(FURTHER CLEARANCE EXPECTED TO BE COMPLETED BY . . . *(UTC)*)	M) →
(TAXIWAY *(If no appropriate taxiway is avilable, insert "NO")*)	N) →
(TAXIWAY SNOWBANKS *(If higher than 60 cm, insert "YES" followed by the lateral distance apart, m)*)	P) <≡
(APRON *(If unusable insert "NO")*)	R) →
(NEXT PLANNED OBSERVATION/MEASUREMENT IS FOR) *(month/day/hour in UTC)*	S) →
(PLAIN-LANGUAGE REMARKS *(Including contaminant coverage and other operationally significant information, e.g. sanding, de-icing, chemicals)*)	T))<≡

NOTES: 1. *Enter ICAO nationality letters as given in ICAO Doca 7910, Part2.
2. Information on other runways, repeat from B to P.
3. Words in brackets ( ) not to be transmitted.

SIGNATURE OF ORIGINATOR (not for transmission)

158. Where to find wind limitations on contaminated runway?

OM Part B - includes operational procedures and limitations specific to the aircraft type

ORO.MLR.101 Operations manual – structure for commercial air transport
Except for operations with single-engined propeller-driven aeroplanes with an MOPSC of 5 or less or single-engined non-complex helicopters with an MOPSC of 5 or less, taking off and landing at the same aerodrome or operating site, under VFR by day, the main structure of the OM shall be as follows:
(a) ***Part A***: General/Basic, comprising all non-type-related operational policies, instructions and procedures;
(b) ***Part B***: Aircraft operating matters, comprising all type-related instructions and procedures, taking into account differences between types/classes, variants or individual aircraft used by the operator;
(c) ***Part C***: Commercial air transport operations, comprising route/role/area and aerodrome/ operating site instructions and information;
(d) ***Part D***: Training, comprising all training instructions for personnel required for a safe operation.

159. What is TAT? (224705)

Total Air Temperature (TAT)
When an aircraft is moving forwards through the air, it affects the air mass around it and causes a heating effect. As a result, the air temperature at the sensor is higher than the OAT and it is called Total Air Temperature.
TAT — Total air temperature is the SAT (actual OAT) plus the temperature rise associated with high-speed flight.

160. What is EPR?

EPR is the ratio of jet pipe pressure (turbine outlet) to compressor inlet pressure.

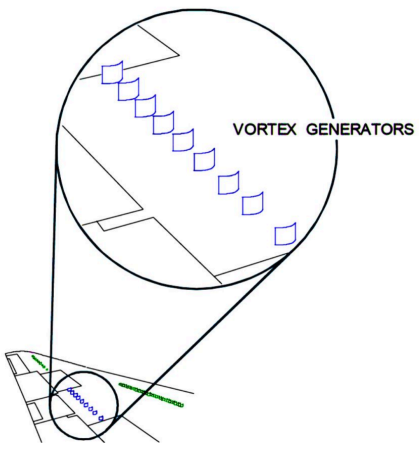
Engine Pressure Ratio (EPR) or Exhaust Pressure Ratio is the total turbine outlet pressure to the total compressor inlet pressure. Is a means of measuring the amount of thrust being produced by a jet engine. measurements are taken by probes installed in the engine inlet and at the turbine exhaust.

161. What is EGT?

Exhaust Gas Temperature (EGT), sometimes referred to as Turbine Outlet Temperature (TOT), is the temperature of the turbine exhaust gases as they leave the turbine unit. Measured on the turbine stage of the engine.

162. What does Vortex Generators do? (811624)

Transfer energy from the free airflow into the boundary layer.



163. Passengers shall have safety belts fastened:

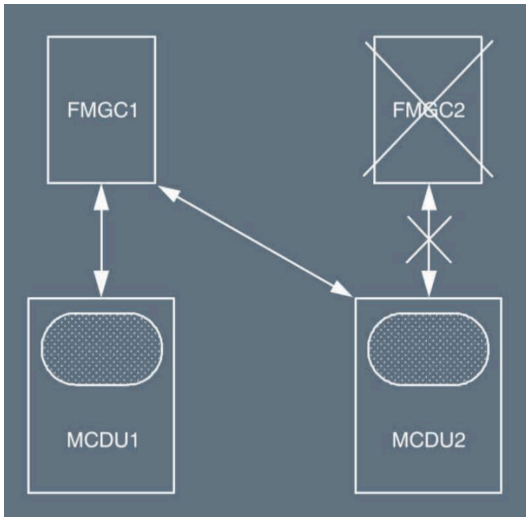
Before take-off and landing, and during taxiing, and whenever deemed necessary in the interest of safety, the commander shall be satisfied that each passenger on board occupies a seat or berth with his/her safety belt or restraint system properly secured.

CAT.OP.MPA.225 Seats, safety belts and restraint systems

(a) **Crew members**
(1) During take-off and landing, and whenever decided by the commander in the interest of safety , each crew member shall be properly secured by all safety belts and restraint systems provided.
(2) During other phases of the flight, each flight crew member in the flight crew compartment shall keep the assigned station safety belt fastened while at his/her station.

(b) Passengers
(1) Before take-off and landing, and during taxiing, and whenever deemed necessary in the interest of safety, the commander shall be satisfied that each passenger on board occupies a seat or berth with his/her safety belt or restraint system properly secured.
(2) The operator shall make provisions for multiple occupancy of aircraft seats that is only allowed on specified seats. The commander shall be satisfied that multiple occupancy does not occur other than by one adult and one infant who is properly secured by a supplementary loop belt or other restraint device.

164. What should be done in case of failure of one FMC unit?



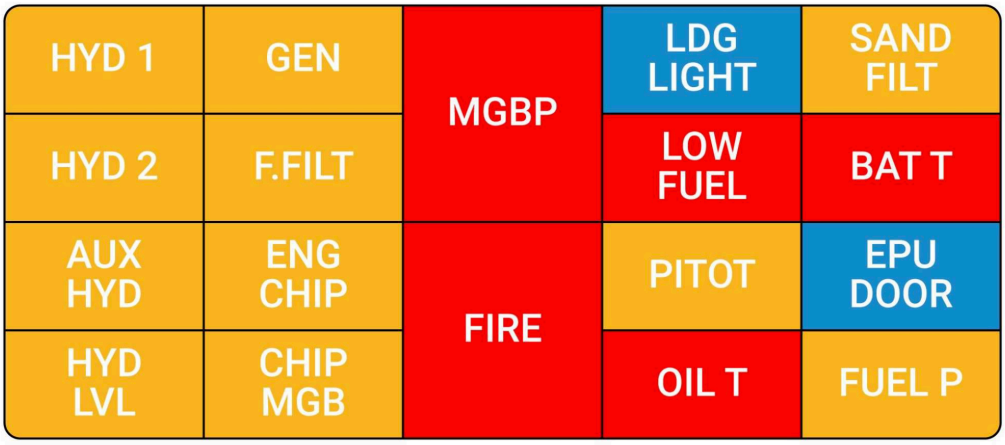
Refer to figure.
The different modes of operation of the FMS are the following:

- **Dual mode –** A modern commercial aircraft usually works in a dual FMS architecture (under normal conditions). In this mode, one FMC is always working as **the master and the other as the slave.** Both FMCs are synchronized, which means that each performs its own calculations then exchanges data with the other through a crosstalk bus. The master FMC sends its commands to the autopilot, the flight director system, and the autothrottle.

- **Independent mode –** Both FMCs are decoupled and there's ZERO cross-checking between them. This mode is automatically selected by the FMS under certain abnormal conditions such as different database validity on both FMCs.
- **Single mode –** When one FMC fails, the remaining one supplies both sides: its onside peripherals and failed FMC's peripherals.

165. In an aircraft that isn't fitted with an Electronic Flight Instrument System (EFIS) where are Flight Warning System (FWS) advisory alerts usually displayed?

Central Warning Panel (CWP)



166. The transponder is inoperative prior to departure and cannot be repaired at the departure aerodrome. Which of the following statements is correct?

The operation is allowed to the nearest suitable airport where repair can be carried out.

167. A flight crew is operating a Commercial Air Transport flight and arriving in VMC overhead the holding fix on the approach towards the destination airport A when ATC tells the Commander to take up the hold and expect 17 minutes delay. Use the data below for available fuel on board when commencing the hold and find the LEGAL and preferred COMMERCIAL solution.

Alternate Fuel: 40 minutes.
Final Reserve Fuel: 30 minutes.
Extra Fuel: 10 minutes.

Hold 10 min to see effectively if its a 17 min holding, and in case it is, proceed to alternate, leaving the remaining 30 extra fuel intact

168. Flap in position 3 instead of 2. What is the difference in the landing distance and go around?

Will have a reduced landing distance and a degraded go-around performance

169. Complete the sentence correctly. When turning right from 330° to 040° in the Northern Hemisphere, the direct reading magnetic compass will?

under-indicate the turn and liquid swirl will increase the effect

When turning through the nearest pole (North in the northern hemisphere, South in the southern hemisphere)

- Compass is sluggish
- Compass will under-indicate the turn
- Pilot must undershoot the turn (roll out early)
- Compass assembly and aircraft turning in same direction
- Swirl effect increases the error

When turning through the furthest pole (South in northern hemisphere and North in southern hemisphere)

- Compass is lively
- Compass will over-indicate the turn
- Pilot must overshoot the turn (roll out late)
- Compass assembly and aircraft turning in opposite directions
- Swirl effect reduces error

170. Profile drag is lower when?

fairings are used

171. When does the anvil form during CB?

Mature stage

172. What does the code TAF AMD mean?

Revised TAF

173. Landing distance if landing available is 2400m?

174. What is the most likely temperature at the tropical tropopause?

-75°C

The tropopause is higher and colder at the Equator (tropics). -45°C at the Poles, -55°C at mid-latitudes and -75°C at the Equator.

176. What is the VHF frequency range?

Line of sight

177. Bleeding air from the HP compressor of a turbofan, whilst maintaining thrust, increases:

EGT and fuel flow

If air is bled off from the compressor, then to maintain thrust, we must put more fuel into the engine, which will increase HP rpm and EGT.

178. Formula of SFC and what is? (WFF/THRUST)

- **For a propeller aircraft: SFC = Fuel Flow / Power.**
- For a jet aircraft: SFC = Fuel Flow / Thrust.

The overall fuel efficiency of a jet engine is usually expressed in terms of its Specific Fuel Consumption (SFC) and its propulsive and thermal efficiencies.
The overall fuel efficiency of a piston engine is measured by its Specific Fuel Consumption (SFC) only.
SFC is the mass of fuel required to produce a given amount of power/thrust for a given period of time.
The Specific Fuel Consumption (SFC) formulae are:

- **For a propeller aircraft: SFC = Fuel Flow / Power.**
- For a jet aircraft: SFC = Fuel Flow / Thrust.

So, for a propeller aircraft, Fuel Flow = SFC x Power, which means that for a given SFC the fuel flow is proportional to the power required.
Thus, the lower the SFC, the better the efficiency.

179. - What propeller is the best when you have a left engine failure (critical engine) departing on R36 with wind coming from 270? (Counter rotating, clockwise rotating, fuselage mounted engines, don'tremember)

180. Compass is reading 004°. Deviation is 1° W, and the variation is 5° W. What is the true heading?

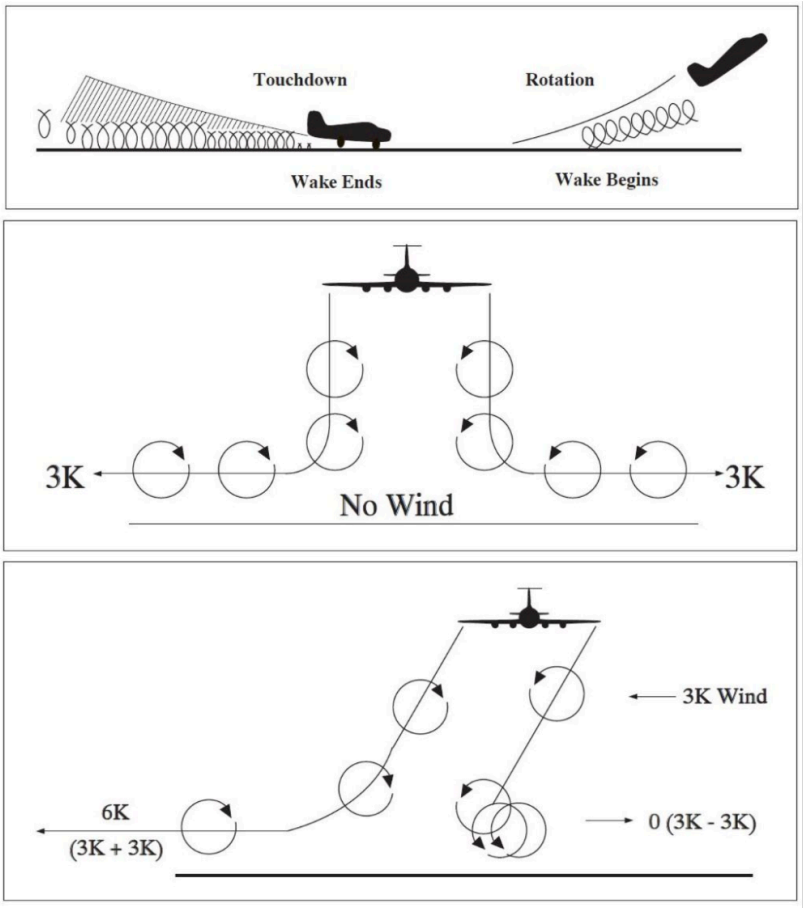
358°

181. Effects of flaps on TORA

When increasing flaps from no flaps, the extra lift generated means that the aircraft can take off at a slower speed and with a shorter distance, however as flaps increase further, the drag increases more than the lift provided and the TOD increases.

182. When is wake turbulence risk the highest?

When a heavy aircraft has just performed a take-off at a closely situated parallel runway with a light crosswind.



Refer to figure.

WAKE TURBULENCE

Whenever an airplane generates lift, air spills over the wing tips from the high pressure areas below the wings to the low pressure areas above them. This flow causes rapidly rotating whirlpools of air called wingtip vortices. An aircraft generates vortices from the moment it rotates on take-off to touchdown.

The intensity depends on aircraft weight, speed and configuration. **The greatest wake turbulence danger is produced by large, heavy airplanes operating at low speeds**, high angles of attack and in a clean configuration.

Although wake turbulence settles, it persists in the air for several minutes, depending on wind conditions. **In light winds of 3 to 7 knots, the vortices can stay in the touchdown area, sink into your take-off or landing path, or drift over a parallel runway**

=> Light crosswinds may cause the vortices to drift. A 3 to 5 knot crosswind will tend to keep the upwind vortex in the runway area and may cause the downwind vortex to drift toward another runway.

183. An aircraft is on the glide slope and there is a microburst ahead that is to the right of the glidepath. This will initially result in...

increasing airspeed, left drift and a slight in decrease in ROD

186. Symbol of operation complete?

LLL

No.	Message	Code symbol
1	Operation completed	
2	We have found all personnel	
3	We have found only some personnel	
4	We are not able to continue. Returning to base	
5	Have divided into two groups. Each proceeding in direction indicated	
6	Information received that aircraft is in this direction	
7	Nothing found. Will continue to search	

187. The latest model of an aircraft changed the long range performance climb speeds from 250kt / 0.74 to 250kt / 0.78. Which of the following changes to operational limits would cause this? (327186)

An increase in the MMO

Aircraft certified under CS-25 (and some aircraft certified under CS-23) have a VMO and an MMO.
VMO **is the maximum operating speed**, and is an indicated airspeed (IAS).
MMO **is the maximum operating Mach Number.** It is usually the limiting factor when flying above the crossover/change-over altitude, where the aircraft goes from flying using IAS to flying using Mach Numbers. Standard crossover altitudes are around 28 000 ft, and are dependent on the climb speed schedule.
The question gives two separate climb speed schedule, 250kt/0.74 and 250kt/0.78. This means that the old model of aircraft changed over to Mach Numbers in the climb at the altitude where 250 KIAS equals M0.74, and this has changed to where 250 KIAS equals M0.78 (which will be a higher altitude).
If this has changed due to an "operational limit", as it is worded in the question, then that must be one of the speed limits mentioned above. As it is the **Mach Number component that has increased**, then it must mean that the **M**MO **has increased**, and the climb speed schedule has changed to allow higher Mach Numbers because of this. Certainly, from the available options, this is the only possible correct one.

188. What's is SBAS and how does it work (geostationary satellites).

The system capable of measuring on the ground the signal errors transmitted by GNSS satellites and transmitting differential corrections and integrity messages by Comms satellite

189. Drizzle droplet size

To be classed as drizzle, the size of droplets must be 0.5mm or less

190. High aspect ratio, as compared with low aspect ratio, has the effect of?

Decreasing induced drag and critical angle of attack

Tip vortices are smaller on a high aspect ratio wing. Smaller vortices means there is less induced drag Also, smaller vortices means less downwash and a lower critical angle of attack, as the effective angle of attack is higher.

191. What is Impingement Drag?

Impingement drag refers to the aerodynamic drag caused by airflow impinging or striking an object directly, leading to energy losses. I.e. Precipitation or water accumulation on RWY.

192. How is speed written on the flight plan?

NXXXX for TAS and MXXX for Mach number

194. Why turn coordinator is affected by aircraft movement causing an error. There were different answers concerning rotating planes of gyroscope.

195. Which statement is true about complacency?

Complacency is a dangerous mindset. It can lead to a pilot overlooking potential hazards and therefore, taking unnecessary risks.

197. If the RPM lever of a constant speed propeller is moved forward during a glide with idle power and whilst maintaining constant airspeed, the propeller pitch will:

Decrease and the rate of descent will increase

With idle power, the propeller is being driven by the airflow so it has a negative angle of attack. Pushing the levers forward demands a higher rpm. So the pitch decreases to increase the negative angle of attack. But this increased angle of attack increases drag, so rate of descent increases.

198. An operator wishing to use the isolated aerodrome (IFR) fuel procedure must factor in the following fuel:

2 hours at holding speed, including final reserve fuel

CAT.OP.MPA.182 Fuel/energy scheme – aerodrome selection policy
– aeroplanes

199. Frontal fog can be formed…

The area ahead of a warm front is subject to prolonged continuous rain and the same air mass is pushed ahead of the front. The reduction in visibility is caused by the very high relative humidity.

200. When can the commander of a Commercial Air Transport flight plan on using the Final Reserve Fuel ?

It is prohibited as such fuel is for emergency use only

An aircraft must arrive overhead the destination or alternate, including en route alternates with the Final Reserve intact and plan to land without using it. It is only used in emergencies, such as delays at the aerodrome of landing.

AMC1 CAT.OP.MPA.150(b) Fuel policy
PLANNING CRITERIA —AEROPLANES

The operator should base the defined fuel policy, including calculation of the amount of fuel to be on

board for departure, on the following planning criteria:

(5) Final reserve fuel, which should be:

i) For aeroplanes with **reciprocating engines, fuel to fly for 45 minutes**; or

ii) For aeroplanes with **turbine engines, fuel to fly for 30 minutes at holding speed at 1500 ft (450m) above aerodrome elevation in standard conditions**, calculated with the estimated mass on arrival at the destination alternate aerodrome or the destination aerodrome, when no destination alternate aerodrome is required.

201. What is Contingency fuel?

(3) Contingency fuel, except as provided for in (b), which should be the **higher of:**

(i) Either:

(a) **5%** of the planned trip fuel or, in the event of in-flight replanning, 5% of the trip fuel for the remainder of the flight;

(b) **Not less than 3 %** of the planned trip fuel or, in the event of in-flightreplanning, 3% of the trip fuel for the remainder of the flight**, provided that an en-route alternate (ERA) aerodrome is available;**

(c) An amount of fuel sufficient for 20 minutes flying time based upon the planned trip fuel consumption, provided that the operator has established a fuel consumption monitoring programme for individual aeroplanes and uses valid data determined by means of such a programme for fuel calculation; or

(d) An amount of fuel based on a statistical method that ensures an appropriate statistical coverage of the deviation from the planned to the actual trip fuel. This method is used to monitor the fuel consumption on each city Pair/aeroplane combination and the operator uses this data for a statistical analysis to calculate contingency fuel for that city pair/aeroplane combination;

(ii) or an amount to fly for **5 minutes at holding speed at 1500 ft** (450m), above the destination aerodrome in standard conditions.

202. Frequency ranges for NDB, VOR

NDBs operate, according to ICAO, in the frequency range from 190 kHz to 1750 kHz.

VOR 108,00 to 118,00 MHz - from 108 to 112 only the even decimals as 108,40, 110,80…

203. Mach number and why we use it at Cruising Altitude?

When climbing to high altitude, maintaining a constant IAS, Mach Number steadily increases. When it gets close to Mmo, the crew will switch to maintaining a constant Mach number, to avoid exceeding that limitation. IAS will then decrease with increasing altitude.

Therefore, if descending at a constant Mach Number, IAS will be increasing. When it gets close to Vmo, the crew must switch to maintaining that constant IAS, to avoid exceeding that limitation.

The point at which these changeovers are necessary is known as the Changeover Altitude - typically between FL260 and FL280.

(The Transition Level is the flight level in the descent at which the crew reset their altimeters from the standard pressure setting (1013) to the local QNH).

204. PBN – Definitions

Performance Based Navigation

Performance Based Navigation means that your ability to operate within certain areas and routes depends on the performance of your navigation system(s). It is qualified by a 'RNP' number, which states the required navigation performance standard to be in that airspace.

So RNP 2.0 means that you must have positional confidence in your navigation systems to within 2.0 nm for 95% of the time. RNP ranges between 10.0 nm and 0.3 nm - the latter specifically aimed at helicopters.

205. What is the basic principle of operation of MLS?

The time interval between the TO and FROM scans in azimuth and elevation determines the aircrafts position, within the coverage area

MLS works in SHF with two scanning beams, one going left and right in azimuth, one going up and down in elevation.

In each plane the time between passage of the beam in the TO scan and its return in the FROM scan indicates to the aircraft its position in the scan pattern. The transmissions from the azimum and elevation beams alternate on the same frequency, a thing called time multiplexing.

With azimuth and elevation position defined at the aircraft it can make a straight in approach. The addition of precision DME (DME/P), a sophisticated nav system and autopilot/flight directors means that the aircraft can be guided down a curved or segmented approach.

206. Cabin altitude that is usually not exceeded

CS-25 says that a warning must be given if the cabin altitude exceeds 10,000 ft; the warning may be visual or aural.

207. The definition of True North for any observer is the…

Direction of the observers meridian to the North Pole

209. Temporary, long-term modifications (3 months or more) and short-term extensive or graphical information are published as…

AIP supplements

210. If pilot's ears get suddenly clogged in FL310 what the reason can be?

cabin pressurization system malfunctions

211. During an idle thrust descent at a constant indicated airspeed (IAS) in the clean configuration, what will happen if the pilots deploy the speed brakes?

Both the rate of descent and descent angle will increase, even if the speed is constant.

212. According to ICAO Annex 10 there will be a defined critical area and a sensitive area associated with an ILS installation at an aerodrome. Which of the following statements is correct?

ICAO say:

- The ILS **critical area** is an area of defined dimensions about the localizer and glide path antennas where vehicles, including aircraft, are **excluded** during all ILS operations. The critical area is protected because the presence of vehicles and/or aircraft inside its boundaries will cause unacceptable disturbance to the ILS signal-in-space.

- The ILS **sensitive area** is an area extending beyond the critical area where the parking and/or movement of vehicles, including aircraft, is **controlled** to prevent the possibility of unacceptable interference to the ILS signal during ILS operations. The sensitive area is protected against interference caused by large moving objects outside the critical area but still normally within the airfield boundary

213. When flying in warm air (warmer than standard atmosphere), indicated altitude is:

Lower than the true altitude

214. A forward CG...

Increases Vs

215. The correct definition of a safe forced landing is…

an unavoidable landing or ditching with a reasonable expectancy of no injuries to persons in the aircraft or on the surface.

216. Define geometric pitch of propeller blade

the theoretical distance a propeller would advance in one revolution at zero blade angle of attack.

220. When Fowler type trailing edge flaps are extended at a constant angle of attack, the following changes will occur:

CL and CD increases

221. Question about a colour you can find in the AIP

ICAO Doc 8126
Chapter 7. AERONAUTICAL INFORMATION CIRCULARS (AIC)
7.3 DISTRIBUTION
7.3.1 The originating State selects the AIC that are to be given international distribution. AIC thus selected must be given the same distribution as the AIP, AIP Amendments and AIP Supplements. In addition, it is highly recommended that AIC be colour coded by subject where there are sufficient circulars in force to warrant such identification, e.g.
a) white — administrative;
b) yellow — ATC;
c) pink — safety;
d) mauve — danger area map; and
e) green — maps/charts.

222. Which of the following sets of conditions are most likely to lead to the formation of advection fog?

A mild moist airstream flowing over colder surfaces with the wind speed less than 15 kt

223. Compass errors

Acceleration errors are caused by the CG of the compass needle not being coincident with the pivot point due to dip. They only occur when going East or West. Use the mnemonic ANDS (accelerate North decelerate South) for Northern hemisphere and SAND (South accelerate North decelerate) for Southern hemisphere. If taking off runway at 045° then, as the compass turns towards North, the compass reading will be less than 045°.

EASA learning objective 022.03.03.01.02 states: Describe how the direct-reading magnetic compass will only show correct indications during straight, level and unaccelerated flight, and that an error will occur during the following flight manoeuvres (no numerical examples): acceleration and deceleration; turning; during pitch-up or pitch-down manoeuvres.

The direct reading compass (DRC) suffers from indication errors when turning through Northerly or Southerly headings. This is due to the dip of the compass needle causing its centre of gravity to no longer be in line with the acceleration force that's acting through the needle pivot. The theory of turning errors appears to be complicated but it simply means that

the indicated heading will either be lagging behind or leading the actual heading when turning through North or South and will indicate normally when turning through Easterly or Westerly headings.
To be able to roll out on the correct heading a pilot must know whether the DRC indications are over-reading (leading) or under-reading (lagging), and by how much, to be able to stop the turn early or late as required.
It's important to note that stopping a turn early before you get to the required indicated heading is called 'Undershooting' and stopping the turn late after passing the required indicated heading is called 'Overshooting'

The easy way to remember these errors is to use the mnemonic NUNOS
In the Northern hemisphere pilots need to Undershoot the heading when turning through North and Overshoot the heading when turning through South
The size of the indication error varies with latitude but is approximately 20° at mid latitudes.
In the Southern hemisphere the errors are reversed so you need to Overshoot the heading when turning through North and Undershoot the heading when turning through South - **SONUS**

If we apply this technique to the question we can see that when turning left through a northerly heading from 040° to 330° will there be an indication error. A turn through an easterly heading from 110° to 070° produces no turning error so no correction is required.
Using **NUNOS** we can determine that we must undershoot the required heading so we stop the turn early when turning from **040° to 330°** In this case the pilot would stop the turn when the DRC indicated approximately 310° and as soon as the wings are level the DRC indication will swing round to indicate the correct heading of 330°
Turning through a southerly heading from 140° to 230° will require the pilot to overshoot the heading not undershoot.

224. Dihedral of a wing is the angle between:

The wing plane and the horizontal with the aeroplane in an unbanked, level condition.

225. What is the hold entry for given radials (almost tricked me since they gave us the heading to VOR as a radial we were inbound on, luckily, I read it again and got it)

227. What is MOCA?

MOCA is the sum of:
The maximum terrain or obstacle elevation, plus:a. 1000 ft for elevations up to and including 6000 ft.b.
2000 ft for elevations exceeding 6000 ft rounded up to the nearest 100 ft.
The lowest MOCA is 2000 ft.

229. The term 'Maximum Zero Fuel Mass' consist of:

Maximum Zero Fuel Mass (MZFM) is the maximum permissible mass of an aeroplane with no usable fuel.

231. If the airworthiness documents do not specify a correction for landing on a wet runway the landing distance must be increased by:

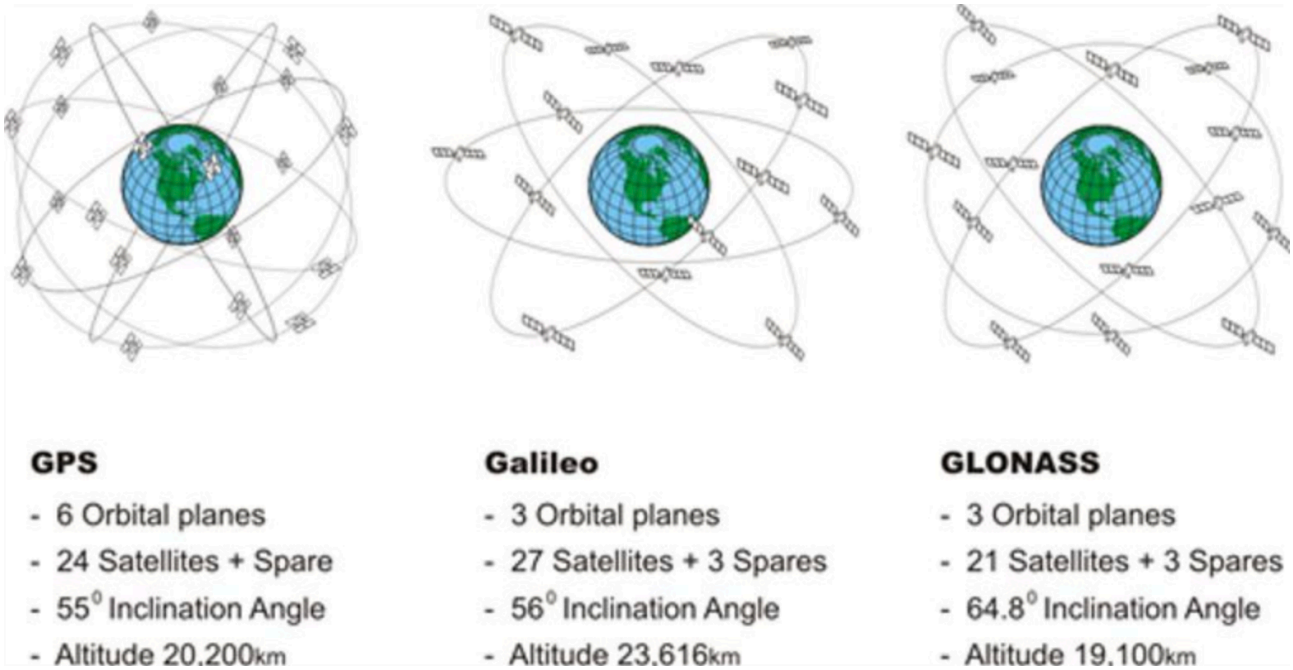
15%

233. Relationship between MMO and Vc

Vc is the "Design Maximum Cruising Speed" which is a speed used during testing and certification to assess the structural strength of the aeroplane. The airoplane must be able to withstand vertical gusts of +/- 50 fps (at 20,000'). If flying faster than Vc for example in a shallow dive, then the aircraft only needs to witstand +/-25 fps gusts.

Vc is the design speed which then has a safety factor applied to give Vmo/Mmo.

234. Glonass satellites altitude



235. How long does it normally take to align an INS/IRS at mid latitudes?

About 20 minutes

"the alignment process takes around 10 to 20 minutes at mid latitudes (longer at high latitudes)"

So do you go for 10 or 20 minutes? Both could be considered correct, by their own LOs.

I have gone for 20, as they state 'INS/IRS'. With an INS the mechanical gyros take longer to run up than RLG/FOG/MEMS on an IRS.

Not annoying at all, are they? If you can help with this question, please let us know through

236. Which of the following statements is correct about GLONASS and GPS?

They can be both used in a suitable equipped aircraft

237. Braking coefficient of 0,25

poor

Braking Coefficient.....Braking Action.....SNOWTAM Code
0.40 and Higher.....Good.....5
0.39 - 0.36.....Medium to Good.....4
0.35 - 0.30.....Medium.....3
0.29 - 0.26.....Medium to Poor.....2
0.25 and below.....Poor.....1

Table 2 — Basic fuel scheme — planning minima — aeroplanes
Destination alternate aerodrome, fuel ERA aerodrome, isolated destination aerodrome

Type of approach operation	Aerodrome ceiling (cloud base or vertical visibility)	RVR/VIS
Type B instrument approach operations	DA/H + 200 ft	RVR/VIS + 800 m
Type A instrument approach operations	DA/H or MDA/H + 400 ft	RVR/VIS + 1 500 m
Circling approach operations	MDA/H + 400 ft	VIS + 1 500 m
Crosswind planning minima: see Table 1 of AMC3 CAT.OP.MPA.182		
Wind limitations should be applied taking into account the runway condition (dry, wet, contaminated).		

238. What are irreversible controls?

Irreversible controls are a type of flight control system in which the movement of the control surface does not transmit back to the pilot's controls on the flight deck

239. The prop drag is higher or lower for a windmilling/feathered prop?

with windmilling

240. What is the equator?

An imaginary great circle around the Earth, equidistant from both the North and South Poles, dividing the planet into the Northern and Southern Hemispheres.

241. What is the inclination of the magnetic field to the magnetic equator?

0

242. What should the planning alternate minima be for a CAT 2??

Type of approach operation	Aerodrome ceiling (cloud base or vertical visibility)	RVR/VIS
Type B instrument approach operations	DA/H + 200 ft	RVR/VIS + 800 m
Type A instrument approach operations	DA/H or MDA/H + 400 ft	RVR/VIS + 1 500 m
Circling approach operations	MDA/H + 400 ft	VIS + 1 500 m

243. If mass is increased, what happens to the glide angle and speed?

If mass is increased, the **glide angle remains the same**, but the **speed** at which that glide is performed **must increase** to maintain the same lift-to-drag ratio and range

244. Autothrottle provides protection for what?

Exceedance of current thrust limit

Autothrottle provides protection against **overspeed and underspeed** conditions, as well as **engine exceedances like over-torque and over-temperature**. It also prevents **overspeed conditions related to flap and gear settings** and can help manage engine limitations during high-workload situations like takeoffs and emergencies.

245. If fuel is moved from the wings to the horizontal stabilizer, what happens with CG and range?

CG moves aft and range increases

246. The CG of an aircraft is at 25% MAC. MAC is in relation to what?

leading edge or datum

247. What is the aerodynamic center?

fixed at 25%

248. Where does the boundary layer separate near a shockwave?

Behind

249. The wind in metar is true or magnetic?

True

250. What is the VFR visibility and cloud clearance minima above FL100 ?

8KM, 1500M, 1000FT

251. The phrase “West is Best, East is Least” uses which type of memory?

mnemonic

252. How is an autocratic captain?

Over-Loaded

253. What is the average vertical extent of radiation fog?

500 feet

254. Find the QDM if the heading is X and bearing is X.

To find the QDM (Magnetic Bearing to the Station), you need to add the Relative Bearing to the aircraft's Heading. The QDM is the magnetic bearing to the station, and the Relative Bearing is the angle between the aircraft's nose and the station.

Heading + Relative Bearing = QDM

255. How does the critical angle of attack change with the deployment of trailing edge flaps?

decreases

256. It is 13:20 and you have a delay of 30 minutes. How will ATC announce this?

Estimated approach time : one three five zero

257. What happens during a coordinated turn with the blood pressure?

increases

258. When is carb icing more probable to occur?

0-15 degrees C

259. Changing the take-off flap setting from flap 15° to flap 5° will normally result in:

a longer take-off distance and a steeper climb angle

260. What is an example of Dry Operating Index?

DOI=DOM/12000

261. Why does Vs increase in a turn?

vertical component of lift decreases

262. Why is it dangerous to fly in leeside of the mountain?

turbulence

263. What should you do if microburst is reported on take off path?

Delay departure

264. What is the best action after an abortive take off?

check brake cooling time?

265. Above which type of terrain will the air temperature close to the ground/sea be the highest on a summers afternoon:

Above rocks

266. Given 145W and 165E what is the difference in longitude?

180-145 = 35
180-165= 15

35+15 = 50

267. How can you check time deviation when flying North?

East-West railroad

268. When can you use abbreviated callsign?

when the ground station uses it first

269. If cargo added in aft but not updated in load sheet chart, what happenes with V1 and performance?

Increased V1: The take-off decision speed, V1, will be higher. This is because the aircraft will require a longer distance to reach takeoff speed due to the increased weight and CG, and V1 must be adjusted accordingly.

Reduced takeoff performance: With a CG that is too far aft, the aircraft may be less stable during takeoff, requiring higher control inputs to maintain pitch control. In addition, the added weight will increase the takeoff distance required.

270. When does the take off second segment start?

After retraction of LG

280. FL for VFR flying 200(M) track?

085 105 125