

AIRCRAFT GENERAL KNOWLEDGE (2)
INSTRUMENTATION



- 1 The purpose of the vibrating device of an altimeter is to:
 - A reduce the effect of friction in the linkages
 - B inform the crew of a failure of the instrument
 - C allow damping of the measurement in the unit
 - D reduce the hysteresis effect

- 2 The error in altimeter readings caused by the variation of the static pressure near the source is known as:
 - A instrument error.
 - B hysteresis effect.
 - C position pressure error
 - D barometric error.

- 3 VFE is the maximum speed:
 - A with the flaps extended in a given position.
 - B with the flaps extended in landing position.
 - C at which the flaps can be operated in turbulence.
 - D with the flaps extended in take-off position.

- 4 The airspeed indicator of a twin-engine aircraft comprises different sectors and colour marks. The blue line corresponds to the:
 - A minimum control speed, or VMC
 - B maximum speed in operations, or VMO
 - C optimum climbing speed with one engine inoperative, or V_y
 - D speed not to be exceeded, or VNE

- 5 Indication of Mach number is obtained from:
 - A Indicated speed and altitude using a speed indicator equipped with an altimeter type aneroid
 - B An ordinary airspeed indicator scaled for Mach numbers instead of knots
 - C A kind of echo sound comparing velocity of sound with indicated speed
 - D Indicated speed (IAS) compared with true air speed (TAS) from the air data computer

- 6 In the building principle of a gyroscope, the best efficiency is obtained through the concentration of the mass:
 - A on the periphery and with a high rotation speed.
 - B close to the axis and with a high rotation speed.
 - C on the periphery and with a low rotation speed.
 - D close to the axis and with a low rotation speed.

- 7 Concerning the directional gyro indicator, the latitude at which the apparent wander is equal to 0 is:
 - A the equator
 - B latitude 30°
 - C latitude 45°
 - D the North pole

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- 8 The heading information originating from the gyromagnetic compass flux valve is sent to the:
- A error detector.
 - B erector system.
 - C heading indicator.
 - D amplifier.
- 9 A gravity erector system is used to correct the errors on:
- A an artificial horizon.
 - B a directional gyro.
 - C a turn indicator.
 - D a gyromagnetic compass.
- 10 A turn indicator is an instrument which indicates rate of turn.
Rate of turn depends upon:
- 1: bank angle
 - 2: aeroplane speed
 - 3: aeroplane weight
- The combination regrouping the correct statements is:
- A 2 and 3.
 - B 1, 2, and 3.
 - C 1 and 2.
 - D 1 and 3.
- 11 A pilot wishes to turn left on to a northerly heading with 10° bank at a latitude of 50° North. Using a direct reading compass, in order to achieve this he must stop the turn on an approximate heading of:
- A 030°
 - B 355°
 - C 330°
 - D 015°
- 12 During deceleration following a landing in a southerly direction, a magnetic compass made for the northern hemisphere indicates:
- A an apparent turn to the west.
 - B no apparent turn only on northern latitudes.
 - C no apparent turn.
 - D an apparent turn to the east.
- 13 The Decision Height (DH) warning light comes on when an aircraft:
- A passes over the outer marker.
 - B descends below a pre-set radio altitude.
 - C passes over the ILS inner marker.
 - D descends below a pre-set barometric altitude.

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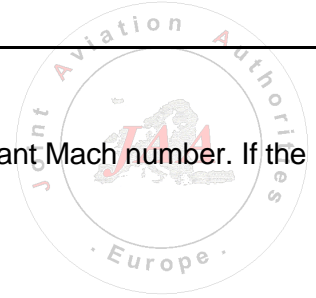


- 14** Flight Director Information supplied by an FD computer is presented in the form of command bars on the following instrument:
- A** BDHI Bearing Distance Heading Indicator.
 - B** ADI Attitude Director Indicator.
 - C** HSI Horizontal Situation Indicator.
 - D** RMI Radio Magnetic Indicator.
- 15** The flight director indicates the:
- A** path permitting reaching a selected radial over a minimum distance.
 - B** path permitting reaching a selected radial in minimum time.
 - C** optimum path at the moment it is entered to reach a selected radial.
 - D** optimum instantaneous path to reach selected radial.
- 16** During large control inputs from an automatic flight control system (AFCS), the control stick in the cockpit is moved to inform the pilot of the action. This is:
- A** achieved by the flight director.
 - B** a false statement; the information is displayed to the pilot via the ADI, HSI and AFCS controller.
 - C** achieved by a parallel actuator.
 - D** achieved by a series actuator.
- 17** An autopilot system:
- A** must provide at least aircraft guidance functions.
 - B** must provide at least aircraft stabilisation functions.
 - C** may provide automatic take off functions.
 - D** must provide automatic take off functions.
- 18** During an automatic landing, between 50 FT AGL and touch down, the autopilot maintains:
- A** a constant flight path angle with reference to the ground.
 - B** a constant vertical speed.
 - C** a vertical speed according to the GPS height.
 - D** a vertical speed according to the radio altimeter height.
- 19** The automatic pitch trim:
- 1 - ensures the aeroplane is properly trimmed when the autopilot is engaged.
 - 2 - permits the elevator to always be in neutral position with respect to horizontal stabiliser;
 - 3 - ensures the aeroplane is properly trimmed when the autopilot is disengaged.

The combination regrouping all the correct statements is

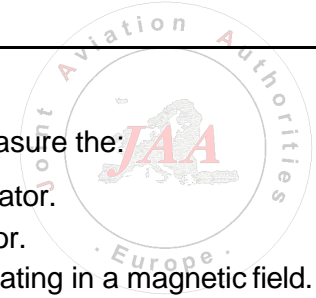
- A** 2, 3.
- B** 1, 3.
- C** 1, 2, 3.
- D** 1, 2.

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- 20** An aeroplane is in a steady climb. The auto-throttle maintains a constant Mach number. If the total temperature remains constant, the calibrated airspeed:
- A** increases.
 - B** decreases.
 - C** decreases if the static temperature is lower than the standard temperature, increases if higher.
 - D** remains constant.
- 21** The purpose of Auto Throttle is:
- A** to deactivate manual throttles and transfer engine control to Auto Pilot
 - B** to synchronize engines to avoid "yawing"
 - C** to maintain constant engine power or airplane speed
 - D** automatic shut down of one engine at too high temperature
- 22** If the GPWS (Ground Proximity Warning System) activates, and alerts the pilot with an aural warning "DON'T SINK" (twice times), it is because:
- A** the aircraft experiences an unexpected proximity to terrain, without landing-flap selected.
 - B** at too low altitude, the aircraft has an excessive rate of descent.
 - C** the aircraft experiences an unexpected proximity to the terrain, with landing gear retracted.
 - D** during take-off or missed approach manoeuvre, the aircraft has started to loose altitude.
- 23** TCAS 2 (Traffic Collision Avoidance System) uses for its operation:
- A** both the replies from the transponders of other aircraft and the ground-based radar echoes.
 - B** the echoes of collision avoidance radar system especially installed on board.
 - C** the echoes from the ground air traffic control radar system.
 - D** the replies from the transponders of other aircrafts.
- 24** On the display of a TCAS 2 (Traffic alert and Collision Avoidance System), a resolution advisory (RA) is represented by:
- A** a white or cyan empty lozenge.
 - B** a red full square.
 - C** an amber solid circle.
 - D** a white or cyan solid lozenge.
- 25** A stall warning system is based on a measure of:
- A** groundspeed.
 - B** attitude.
 - C** airspeed.
 - D** aerodynamic incidence.
- 26** Total Air Temperature (TAT) is:
- A** higher or equal to Static Air Temperature (SAT), depending on altitude and SAT.
 - B** lower than Static Air Temperature (SAT), depending on altitude and SAT.
 - C** higher or equal to Static Air Temperature (SAT), depending on mach number and SAT.
 - D** lower than Static Air Temperature (SAT), depending on mach number and SAT.

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- 27** The operating principle of the "induction" type of tachometer is to measure the:
- A** rotation speed of an asynchronous motor energized by an alternator.
 - B** electromotive force (EMF) produced by a dynamo or an alternator.
 - C** frequency of the electric impulse created by a notched wheel rotating in a magnetic field.
 - D** magnetic field produced by a dynamo or an alternator.
- 28** The float type fuel gauges provide information on:
- A** volume whose indication varies with the temperature of the fuel.
 - B** volume whose indication is independent of the temperature of the fuel.
 - C** mass whose indication varies with the temperature of the fuel.
 - D** mass whose indication is independent of the temperature of the fuel.

Sample
Questions

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1. The vibrator overcomes linkage friction, it does not warn of failures or damp the output. Hysteresis is the irregular response of the capsule to pressure changes.
Answer A
2. Instrument error is due to imperfections of manufacture. Hysteresis is the irregular response of the capsule to pressure changes. Barometric error is caused by setting the wrong datum on the sub-scale.
Answer C
3. VFE is the maximum speed at which any flap can be extended; there may be further speed limits for other specific flap settings.
Answer A
4. To be absolutely correct the optimum climbing speed with one engine inoperative is VYSE.
Answer C
5. The Mach Meter modifies the output from an airspeed capsule by using an altimeter (aneroid) capsule.
Answer A
6. By 'best efficiency' they mean 'greatest rigidity'
Answer A
7. Apparent wander comprises of earth rate (zero at the equator) and transport wander (zero at the equator).
Answer A
8. 'Error detector' means signal selsyn.
Answer A
9. Pendulous vanes in the air-driven gyros and mercury switches in the electrical version.
Answer A
10. Rate of turn depends on angle of bank and aircraft speed, not aircraft weight.
Answer C
11. Remember UNOS in the northern hemisphere; to turn through – or in this case on to – North the pilot should 'underturn' (i.e. stop the turn early. 355° and 330° are 'late' stops. The examiner expects about 20° to be applied so 30° would be too much. Stopping the turn 15° early is not enough, use 30°
Answer A
12. When accelerating or decelerating the errors on the direct reading magnetic compass are maximum on East and West and zero on North and South.
Answer C
13. The warning light is triggered by the radio altimeter.
Answer B
14. Command bars are on the ADI.
Answer B
15.
Answer D
16. Dodgy question: in the Airbus it would be answer B because the control stick doesn't move. In more conventional aircraft the control stick may move, using parallel actuators, or may not in which case it is using series actuators.
Answer B or C

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17. The minimum requirement for an autopilot is to stabilize the aircraft in pitch and roll. Answer B
18. Answer D
19. If the aircraft is not properly trimmed the autopilot cannot be engaged. Answer A
20. In isothermal conditions if the aircraft climbs at constant Mach Number the TAS will be constant and CAS will decrease. Answer B
21. Answer C
22. Mode 3. Answer D
23. TCAS only looks at other aircraft's transponders. Answer D
24. A Resolution Advisory (RA) is an immediate threat. Answer B
25. Aerodynamic incidence means (more or less) angle of attack and this is the minimum input to a stall warning system. Answer B
26. The 'ram-rise' always causes the indicated temperature (TAT) to be too high and the error will vary with speed (TAS or MN). Answer C
27. Answer C
28. Answer A