



EAST AFRICAN SCHOOL OF AVIATION EXAMINATION

SUPPLEMENTARY EXAMS

SAFETY-SECTION

SUBJECT: AGK

COURSE: DIPLOMA IN FLIGHT DISPATCH

DAY/DATE:

Time: 1400-1600HRS

INSTRUCTIONS TO CANDIDATES

1. Answer ALL the questions.

PART A (55marks)

1. The wing of an aircraft in flight, powered by engines located under the wing, is subjected to a bending moment due to thrust and drag. The loading on the front spar of the torsion box from the wing root to the wing tip is:
 - A. tension.
 - B. tension, and then compression.
 - C. compression.
 - D. compression, and then tension.
2. In a commercial transport aircraft the landing gear operating system is usually:
 - A. Mechanically driven.
 - B. Hydraulically driven.
 - C. Electrically driven.
 - D. Pneumatically driven.
3. Tyre "creep" may be described as the:
 - A. the decrease in inflation pressure due to increase in ambient temperature.
 - B. circumferential movement of the tyre in relation to the wheel flange.
 - C. gradual circumferential increase of tyre wear.
 - D. the increase in inflation pressure due to decrease in ambient temperature
4. On an aircraft landing gear, an under-inflated tyre:
 - A. will have an increased critical hydroplaning speed
 - B. it's tread will deteriorate faster
 - C. will be more subject to viscosity aquaplaning on dry runway
 - D. will wear at the shoulders
5. The component that converts hydraulic pressure into linear motion is called:
 - A. A pressure regulator.
 - B. An actuator or jack.
 - C. An accumulator.
 - D. A hydraulic pump.
6. The principle of the Mach indicator is based on the computation of the ratio :
 - A. $(P_t + P_s)$ to P_s
 - B. $(P_t - P_s)$ to P_s
 - C. P_t to P_s
 - D. $(P_t - P_s)$ to P_t
7. Sound propagates through the air at a speed which only depends on :
 - A. pressure.
 - B. density.
 - C. temperature.
 - D. temperature and the pressure
8. If the static source of an altimeter becomes blocked during a descent the instrument will:
 - A. gradually indicate zero
 - B. under-read
 - C. indicate a height equivalent to the setting on the millibar subscale
 - D. continue to display the reading at which the blockage occurred
9. Concerning the airspeed indicator, IAS is:
 - A. the indicated airspeed corrected for instrument and position errors.
 - B. the indicated reading on an instrument presumed to be perfect.
 - C. the indicated reading on the instrument.
 - D. the indicated airspeed corrected for instrument error only.

10. Equivalent Air Speed (EAS) is:
- Indicated Air Speed (IAS) corrected for compressibility error.
 - Calibrated Air Speed (CAS) corrected for density error.
 - True Air Speed (TAS) corrected for compressibility error.
 - Indicated Air Speed (IAS) corrected for position, instrument and compressibility errors.
11. Ambient static pressure is fed to the ASI in flight to:
- cancel static pressure entering the instrument diaphragm through the pitot tube
 - cancel dynamic pressure in the pitot tube
 - add static pressure entering the instrument diaphragm through the pitot tube
 - subtract the static pressure from the dynamic pressure
12. When descending at a constant Mach number:
- CAS increases.
 - CAS remains constant.
 - the difference between surrounding conditions and ISA must be known to deduce the CAS variation.
 - CAS decreases
13. VNO is the maximum speed:
- with flaps extended in landing position.
 - at which the flight controls can be fully deflected.
 - not to be exceeded except in still air and with caution.
 - which must never be exceeded
14. Given:
 Pt = total pressure
 Ps = static pressure
- Dynamic pressure is:
- P_t / P_s
 - $P_t - P_s$
 - $(P_t - P_s) / P_t$
 - $(P_t - P_s) / P_s$
15. The term "pressure cabin" applies when an aeroplane:
- is only pressurised in the area of the control cabin.
 - has the ability to maintain a constant cabin differential pressure at all flight altitudes.
 - has the means to maintain cabin pressure higher than ambient pressure.
 - has the ability to maintain a constant cabin altitude at all flight altitudes.
16. The illumination of the green landing gear light indicates that the landing gear is:
- in the required position.
 - locked-down.
 - not in the required position.
 - locked-down and its door is locked
17. The purposes of the oil and the nitrogen in an oleo-pneumatic strut are:
- the oil supplies the sealing and lubrication function, the nitrogen supplies the damping function.
 - the oil supplies the damping and lubrication function, the nitrogen supplies the heat-dissipation function.
 - the oil supplies the damping function and the nitrogen supplies the spring function

D. the oil supplies the spring function and the nitrogen supplies the damping function.

18. The function of a fusible plug is to

- A. protect the brake against brake disk fusion due to excessive temperature.
- B. function as a special circuit breaker in the electric system
- C. protect the tyre against explosion due to excessive temperature.
- D. protect against excessive pressure in the pneumatic system.

19. The hydraulic device similar to an electronic diode is a:

- A. flow control valve.
- B. shutoff valve.
- C. distribution valve.
- D. check valve

20. If the static source to an altimeter becomes blocked during a climb, the instrument will:

- A. over-read
- B. gradually return to zero
- C. under-read by an amount equivalent to the reading at the time that the instrument became blocked
- D. continue to indicate the reading at which the blockage occurred

21. During flight, the wing anti-ice system has to protect

- A. the whole leading edge and the whole upper wing surface.
- B. the whole upper wing surface and the flaps.
- C. a part of the whole leading edge.
- D. slats and the leading edge flaps only

22. The reported QNH of a given station is the:

- A. actual barometric pressure measured at the station
- B. station's standard pressure of 1013.2
- C. actual barometric pressure measured at sea level
- D. station's barometric pressure corrected to mean sea level pressure

23. A diluter demand oxygen regulator:

- A. delivers oxygen flow only above FL 100.
- B. delivers oxygen flow when inhaling.
- C. is only recommended for use with smoke in the cockpit.
- D. mixes air and oxygen in a passenger oxygen mask.

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- A. station's standard pressure of 1013.2
- B. station's barometric pressure corrected to mean sea level pressure
- C. actual barometric pressure measured at sea level
- D. actual barometric pressure measured at the station

25. VNE is the maximum speed :

- A. with flaps extended in landing position
- B. which must never be exceeded
- C. not to be exceeded except in still air and with caution
- D. at which the flight controls can be fully deflected

26. If the outside temperature at 35 000 feet is -40°C , the local speed of sound is :

- A. 247 kt.
- B. 307 kt.
- C. 686 kt.
- D. 596 kt.

27. The Mach number is :
- the ratio of the aircraft true airspeed to the sonic velocity at the altitude considered
 - a direct function of temperature ; it varies in proportion to the square root of the absolute temperature
 - the ratio of the indicated airspeed to the sonic velocity at the altitude considered
 - the ratio of the aircraft conventional airspeed to the sonic velocity at the altitude considered
28. In the absence of position and instrument errors, IAS is equal to:
- CAS and EAS.
 - TAS.
 - EAS.
 - CAS.
29. The limits of the yellow scale of an airspeed indicator are:
- VLE for the lower limit and VNE for the upper limit
 - VLO for the lower limit and VNE for the upper limit
 - VFE for the lower limit and VNE for the upper limit
 - VNO for the lower limit and VNE for the upper limit
30. VNE is the maximum speed:
- with flaps extended in landing position
 - at which the flight controls can be fully deflected
 - which must never be exceeded
 - not to be exceeded except in still air and with caution
31. Given:
- Pt = total pressure
 Ps = static pressure
 Pso = static pressure at sea level
- Dynamic pressure is :
- Pt - Ps
 - Pt - Pso
 - $(Pt - Pso) / Pso$
 - $(Pt - Ps) / Ps$
32. True Air Speed (TAS) is:
- Calibrated Air Speed (CAS) corrected for density error.
 - Equivalent Air Speed (EAS) corrected for density error.
 - Equivalent Air Speed (EAS) corrected for compressibility error.
 - Calibrated Air Speed (CAS) corrected for compressibility error.
33. VLE is the maximum :
- A speed authorized in flight
 - flight speed with landing gear down
 - speed at which the landing gear can be operated with full safety
 - speed with flaps extended in a given position
34. VLO is the maximum :
- flight speed with landing gear down.
 - speed with flaps extended in a given position.
 - cruising speed not to be exceeded except in still air with caution.
 - speed at which the landing gear can be operated with full safety.

35. VFE is the maximum speed:
- with the flaps extended in a given position.
 - with the flaps extended in take-off position.
 - with the flaps extended in landing position.
 - at which the flaps can be operated in turbulence
36. The cabin heating supply in a heavy jet transport aircraft is obtained from:
- an electrical heater system.
 - hot air coming from the engine's turbines.
 - a fuel heater system.
 - hot air coming from the engine's compressors.
37. The ice protection for propellers of modern turboprop aeroplanes works
- with hot air.
 - pneumatically.
 - with anti-icing fluid.
 - electrically.
38. substance which may never be used in the vicinity or on parts of an oxygen installation is:
- Grease
 - Water
 - Nitrogen
 - Halon
39. Which of the following is considered as auxiliary flight control
- Ruddervator
 - Upper rudder
 - Leading edge flaps
 - None of the above
40. In flight, a cantilever wing of an airplane containing fuel undergoes vertical loads which produce a bending moment:
- highest at the wing root
 - the span equal to half the weight of the aircraft multiplied by the semi span
 - lowest at the wing root
 - equal to the zero -fuel weight multiplied by the span
41. For an aeroplane, spoilers are:
- upper wing surface devices, their deflection can be symmetrical or asymmetrical.
 - upper wing surface devices, their deflection is always asymmetrical.
 - lower wing surface devices, their deflection is always asymmetrical.
 - lower wing surface devices, their deflection can be symmetrical or asymmetrical.
42. Given:
- Pt: total pressure
 Ps: static pressure
 Pd: dynamic pressure
- The altimeter is fed by:
- Pt-Pd.
 - Ps-Pt.
 - Pd.
 - Pd-Ps.

43. On a jet aircraft fuel heaters are:

- A. Installed only in the centre tank.
- B. Installed in each tank.
- C. not necessary at all.
- D. Located on the engines.

44. The purposes of the oil and the nitrogen in an oleo-pneumatic strut are:

- A. the oil supplies the sealing and lubrication function, the nitrogen supplies the damping function.
- B. the oil supplies the damping and lubrication function, the nitrogen supplies the heat-dissipation function.
- C. the oil supplies the damping function and the nitrogen supplies the spring function
- D. the oil supplies the spring function and the nitrogen supplies the damping function

45. The function of a fusible plug is to

- A. protect the brake against brake disk fusion due to excessive temperature.
- B. function as a special circuit breaker in the electric system
- C. protect the tyre against explosion due to excessive temperature.
- D. protect against excessive pressure in the pneumatic system

46. True Air Speed (TAS) is obtained from Indicated Air Speed (IAS) by correcting for the following errors:

- 1 - instrument
- 2 - position
- 3 - compressibility
- 4 - density

- A. 1,2,3,4
- B. 1,2
- C.3,4
- D. 4

47. When climbing at a constant RAS in a standard atmosphere:

- 1 - TAS decreases
- 2 - TAS increases
- 3 - Mach number increases
- 4 - Mach number decreases

The combination regrouping all the correct statements is:

- A. 1, 3.
- B. 2, 4.
- C. 1, 4.
- D. 2, 3.

48. True Air Speed (TAS) is:

- A. Calibrated Air Speed (CAS) corrected for instrument, position, compressibility and density errors.
- B. Indicated Air Speed (IAS) corrected for compressibility and density errors only.
- C. Calibrated Air Speed (CAS) corrected for instrument, compressibility and density errors.
- D. Indicated Air Speed (IAS) corrected for instrument, position, compressibility and density errors.

49. Pneumatic mechanical ice protection system are mainly used for:
- A. propellers.
 - B. wings.
 - C. pitot tubes.
 - D. Windscreens
50. In jet aeroplanes the 'thermal anti-ice system' is primarily supplied by
- A. turbo compressors.
 - B. the APU.
 - C. ram air, heated via a heat exchanger.
 - D. bleed air from the engines

PART B (20Marks)

1. Describe the Primary Flight Control and control surface movement during a roll to the right. **(10marks)**
2. Explain with the aid of a diagram the operation of an Altimeter. **(10marks)**