EAST AFRICAN SCHOOL OF AVIATION
EXAMINATION

FINAL EXAM

IATA/SAFETY SECTION

SUBJECT: AIRCRAFT GENERAL KNOWLEDGE

Stream: Flight Dispatch No.21 **Duration: 2 Hrs**

DATE: 15/09/2016 **TIME: 2.00 – 4.00 PM**

INSTRUCTIONS TO CANDIDATE:

1. This paper consists of ***TEN (10)*** Printed pages.
2. This paper consists of ***TWO SECTIONS***
3. Answer the questions as per the instructions given
4. Examination rules and regulations shall apply

PART A

1. Draw and label regions of a tire (10 mks)

2. Explain the operation of turn buckles in the wake of cable extension (5 mks)

PART B-

1. Regarding a safe life structure:
    1. Will only fail after a known number of operations or hours of use
    2. Should not fail until a predicted number of fatigue cycles has been achieved
    3. Has a programmed inspection cycle to detect and rectify faults
    4. Is changed before its predicted life is reached

        1 and 2 apply
        A and 3 apply
        2, 3 and 4 apply
        All of the above apply

2. A fail safe structure:
    A. Has a programmed inspection cycle to detect and rectify faults
    B. Is changed before its predicted life is reached
    C. Has redundant strength which will tolerate a certain amount of structural damage
    D. Is secondary structure of no structural significance

3. The skin of a modern pressurized aircraft:
    A. Is made up of light alloy steel sheets built on the monocoque principle
    B. Houses the crew and the payload
    C. Provides aerodynamic lift and prevent corrosion by keeping out adverse weather
    D. Is primary load bearing structure carrying much of the structural loads

4. The primary purpose of the fuselage is to:
    A. Support the wings
    B. House the crew and payload
    C. Keep out adverse weather
    D. Provide access to the cockpit

5. Station numbers (Stn) and water lines (WL) are:
    A. A means of locating airframe structure and components
    B. Passenger seat locations
    C. Runway markings for guilding the aircraft to the terminal
    D. Compass alignment markings

6. Flight deck windows are constructed from:
   A. An amalgam of strengthened glass and vinyl with rubber pressure seals
   B. Strengthened glass with shock absorbing clear vinyl interlayers and rubber pressure seals
   C. Strengthened clear vinyl with an electrical conduction coat for de-icing and rubber pressure seals
   D. Strengthened glass with rubber seals

7. A cantilever wing:
   A. Is externally braced with either struts and/or bracing wires
   B. Is supported at one end only with no external bracing
   C. Has both an upper and lower airfoil section
   D. Folds at the root section to ease storage in confined spaces

8. A lightening hole in a rib:
   A. Prevents lightning strikes damaging the fuselage
   B. Provides a means of passing cables and controls through a pressure bulkhead
   C. Collects and disposes of electrical charges
   D. Lightens and stiffens the structure

9. Control surface flutter:
   A. Provides additional lift for takeoff and landing in the event of engine failure
   B. Occurs at high angles of attack
   C. Is a destructive vibration that must be damped out within the flight envelop
   D. Is a means of predicting the critical safe lift of the wing

10. Controls surface flutter is minimized by:
    A. Reducing the moment of the critical engine
    B. Aerodynamic balance of the control cables
    C. Changing the wings before they reach their critical life
    D. Mass balance of the control surface

11. A damage tolerant structure:
    A. Has degree of structural strength redundancy spread over a large area
    B. Is light non load bearing structure, damage to which will not adversely affect the aircraft
    C. Is replaced when it reaches its predicted life
    D. Need not be repaired until the aircraft undergoes deep maintenance

12. Aircraft structure consists mainly of:
    A. Light alloy steel sheets with copper rivets and titanium or steel materials at points requiring high strength
    B. Magnesium alloy sheets with aluminium rivets and titanium or steel at points requiring high strength
    C. Aluminium alloy sheets and rivets with titanium or steel materials at points requiring high strength
    D. Aluminium sheets and rivets with titanium or steel materials at points requiring high strength.

13. A force of 100N is applied to 2 separate jacks the area of one is $0.02m^3$ and the other is $0.04m^2$.
    A. The smaller jack will exert a pressure of 2,000Pa and the larger 4,000 Pa
    B. The smaller jack will exert a pressure of 5,000Pa and the larger 4,000Pa
    C. Both jacks will move at the same speed
    D. Both have the same load

14. A shuttle valve:
    A. Is used to replace NRV's
    B. Allows two supply sources to operate one unit
    C. Allows one source to operate two units
    D. Acts as a non-return valve
15. Def. Stan 91/48 is …… and is …… based:
    A. Red, mineral
    B. Red, synthetic
    C. Green, mineral
    D. Purple, synthetic

16. A restrictor valve:
    A. Is used to restrict the number of services available after loss of systems pressure
    B. Controls the rate of movement of a service
    C. Controls the rate of buildup of pressure in the system
    D. Controls the distance a jack moves

17. The hydraulic fluid is changes but the wrong fluid is replaced. This would lead to:
    A. High operating fluid temperature
    B. System failure from leaks and blocked filters, high temp and possible corrosion
    C. A rise in the reservoir fill level
    D. Normal operation, it does not matter which fluid is used

18. A relief valve:
    A. Relieves below system pressure
    B. Maintains pressure to a priority circuit
    C. Relieves at its designed pressure
    D. Prevents excessive pressure through increased fluid temperature
19. The primary purpose of a hydraulic reservoir is:

    A. To compensate for leaks, displacement and expansion
    B. To allow a space into which spare fluid may be stored
    C. To indicate system contents
    D. To maintain fluid between a jack and the accumulator

20. Pascal's law states that:
    A. Pressure is inversely proportional to load
    B. Liquid is compressible
    C. C. Oxygen can be used to charge the accumulator
    D. Applied force acts equally in all directions
21. A high pressure hydraulic pump:
    A. Needs a positive fluid supply
    B. Does not need a positive fluid supply
    C. Outlet pressure is governed by centrifugal force
    D. Does not need a cooling fluid flow

22. The purpose of an accumulator is to:
    A. Relieve excess pressure
    B. Store fluid under pressure
    C. Store compressed gas for tyre inflation
    D. Remove air from the system.

23. With one way check valve (NRV)
    A. Flow stops when input pressure is greater than output
    B. Flow starts when the thermal relief valve off loads the hand pump
    C. Flow stops when input pressure is less than output pressure
    D. Flow stops when input pressure is less than output pressure

24. Hydraulic pressure of 3,000 Pa is applied to an actuator, the piston areas of which is $0.02m^2$ and the same pressure is exerted on actuator whose area is $0.04m^2$.
    A. Both have the same force
    B. Both jacks will move at the same speed
    C. The smaller jack will exert a force of 600N and the larger 1,200N
    D. The smaller jack will exert a force of 60N and the larger 120N

25. In an operating hydraulic actuator the pressure of the fluid will be:
    A. Greatest near the actuator due to the load imposed on the jack
    B. Greatest at the opposite end to the actuator due to the load imposed on the actuator.
    C. High initially falling as the actuator completes its trave
    D. The same at all points

26. A pressure maintaining or priority valve:
    A. Enables ground operation of services when the engines are off
    B. Is used to ensure available pressure is directed to essential services.
    C. Is used to control pressure to services requiring less than systems pressure
    D. Is used to increase pressure in the system.

27. In an enclosed system pressure is left
    A. More at the piston head than the rest of the cylinder
    B. More at the cylinder end than the piston head
    C. More when the piston is moving than when it is stationery
    D. The same at both ends between the piston and the cylinder head

28. A non-return valve:
    A. Can only be fitted if provided with a bypass selector
    B. Closes if inlet pressure
    C. Opens if inlet pressure equals outlet pressure
    D. Closes if inlet pressure ceases

29. The specification of hydraulic fluids, mineral, vegetables or ester based is:
    A. Always distinguishable by taste and smell
    B. Generally distinguished by colour
    C. Generally distinguishable by colour only if they are from the same manufacturer.
    D. Cannot be distinguished by colour alone

30. The purpose of a reservoir is to:
    A. Allow the parking brake to remain on overnight if required
    B. Allow a reduced pressure to the wheel brake system to prevent the wheels locking
    C. Prevent over pressurizing the reservoir as altitude increases
    D. Prevent total loss of system fluid if the brake pipeline is ruptured

31. A shuttle valve will allow:
    A. The accumulator to be emptied after engine shutdown
    B. The pressure pump to off-load when the system pressure is reached
    C. Two independent pressure sources to operate a system/component
    D. High pressure fluid to return to the reservoir if the Full Flow Relief Valve fails

32. The purpose of a reservoir is to:
    A. Compensate for temperature
    B. Compensates for small leaks, expansions and jack displacement
    C. Compensates for fluid loss
    D. To minimize pump cavitation

33. When the hydraulic system pressure is released:
    A. Reservoir air pressure will increase
    B. Reservoir fluid contents will rise if reservoir is lower than the other components in the system
    C. Reservoir fluid contents will fall if reservoir is the highest point in the system
    D. Reservoir contents are dumped over board

34. Hydraulic pressure in a closed system:
    A. Is greater in pipes of larger diameters
    B. Is greater in pipes of smaller diameters
    C. Does not vary with pipe diameter
    D. Varies in direct proportion to the system demand

35. Skydrol hydraulic fluid can be used replenish:
    A. Any hydraulic system without restriction
    B. Hydraulic systems that have butyl rubber seals only
    C. Any hydraulic system in an emergency
    D. Hydraulic systems that have neoprene seals only

36. Hydraulic Thermal Relief Valves are fitted:
    A. To release all the pressure back to return in an overheat situation
    B. To release half the pressure back to return in an overheat situation
    C. To relieve excess pressure back to the actuator in an overheat situation
    D. In isolated lines only to relieve excess pressure caused by temperature rises

37. A main system hydraulic pump:
    A. Does no need a positive fluid supply if printed before startup
    B. Does need a positive fluid supply in order to prevent cavitation
    C. Does not need a positive fluid supply in order to prevent cavitation
    D. Can be run dry without causing any damage

38. Different diameter actuators supplied with the same pressure at the same time
    A. Exert the same force
    B. Will lift equal loads
    C. Will move at the same speed
    D. Exert different forces

39. Which of the following applies?
    A. All the statements are correct
    B. None of the statements are correct
    C. Statements 1,2,3,4,5,8 and 9 are correct
    D. Statements 1,2,3,6,7 and 9 are correct

40. The seal materials used with hydraulic fluids to DEF/STAN 91-48 and SKYDROL 700 specification are respectively:
    A. Natural rubber and neoprene
    B. Neoprene and natural rubber
    C. Butyl and neoprene
    D. Neoprene and butyl

41. To prevent cavitation of the pump a hydraulic reservoir may be:
    A. Pressurized
    B. Bootstrapped
    C. Above the pump
    D. All of the above

42. A hand pump is usually fitted:
    A. For ground servicing purposes
    B. Lowering the landing gear in an emergency
    C. Pressurizing the oleo struts in the air
    D. Retracting the gear after take-off

43. Oil is used in an oleo strut to:
    A. Support the weight of the aircraft
    B. Limit the speed of compression of the stut
    C. Lubricate the piston within the cylinder
    D. Limit the speed of extension and compression of the strut

44. The nose wheel assembly must be centered before retraction because:
    A. There is limited space in the nose wheel bay
    B. The aircraft may swerve on the next landing if the nose wheel is not straight
    C. The tyres may be damaged on landing if the nose wheel is not straight
    D. It will remove any slush or debris which may have accumulated on take –off

45. The movement of the of the hear on lowering is normally damped to:
    A. Prevent the fluid becoming aerated
    B. Counteract the force of gravity which would bring the gear down too fast
    C. Make the lowering time greater than the raising time.
    D. Prevent the hydraulic fluid becoming overheated.

46. Inadvertent retraction of the landing gear on the ground is:
    A. Not possible because the system is not powerful enough.
    B. Prevented by the ground/ air logic system
    C. Always a danger after the ground locks have been removed
    D. Creep (Slippage):

47. Creep (Slippage):
    A. Is not a problem with tubeless tyres
    B. Refers to the movement of the aircraft against the brakes
    C. Can rip out the inflation valve on tubed tyres and deflate the tyre
    D. Can be prevented by painting lines on the wheel and tyre

48. Tyre wear when taxying can be reduced:
    A. Restricting the use of breaks and using thrust reversers
    B. Taxying at less than 40 KPH
    C. Staying on the smoothest parts of the taxiway.
    D. Taxying at less than 25 knots.

49. To prevent scrubbing the tyres while taxying, you should:
    A. Use tyre with fusible plugs
    B. Make sharp turns only if you have high speed fitted
    C. Turn no sharper than the minimum specified radius.
    D. Deflate the tyres to minimum pressure

50. The best extinguishant to use on a wheel or brake fire is:
    A. CO2
    B. Dry powder
    C. Freon
    D. WATER

51. The most likely cause of brake fade is:
    A. Oil or grease on the brake drums
    B. Worn stators
    C. The pilot reducing the brake pressure
    D. The brake pads overheating

52. The pressure needed to operate the wheel brakes on a large aircraft comes from:
    A. The aircraft main hydraulic system
    B. The pilot brake pedals
    C. A self-contained power pack
    D. The hydraulic reservoir

53. The formula which gives the minimum speed (Vp) at which aquaplaning may occur is:
    A. Vp=9x √P where P is Kg/cm2 and Vp is in knots
    B. Vp=9x √P where P is psi and Vp is in mph
    C. Vp=9x √P where P is psi and Vp is in knots
    D. Vp=34x √P where P is Kg/cm² and Vp is in mph

54. A torsion box:
    A. Is a structure within the fuselage to withstand compression, bending and twisting loads
    B. Is a structure formed between the wing spars, skin and ribs to resist bending and twisting loads
    C. Is a structure within the wing for housing the fuel tanks, flight controls and landing gear
    D. Is a structure designed to reduce the weight

55. The maximum Zero Fuel Mass (MZFM) of an aircraft is:
    A. The maximum permissible take off mass of the aircraft
    B. The maximum permissible mass of an aircraft with no useable fuel
    C. The maximum permissible mass of an aircraft with zero payload
    D. The maximum permissible landing mass