Question Paper 1

1. A single axis autopilot system:

a. provides stabilization about the normal axis
b. provides control about the pitch axis
c. is unsuitable for use in powered aircraft
d. provides control about the roll axis

2. A single axis autopilot may also be called:

a. altitude hold
b. wing leveller
c. pitch control loop
d. auto-stabilization loop

3. An autopilot:

a. is a system which will maintain a preselected altitude
b. is a system which will maintain a preselected airspeed
c. is an auto-stabilization system
d. is an outer loop control system

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

a. rate gyro, servomotor, error signal generator
b. rate gyro, servomotor, torque limiter
c. torque limiter, error signal generator, servomotor
d. servomotor, rate gyro, torque limiter, error signal generator

5. A device in a closed loop control system in which a small power input controls a much larger power output in a strictly proportionate manner is:

a. an amplifier
b. a servomechanism
c. a powered flying control unit
d. a rate gyro

6. An automatic flight control system:

a. is another name for an autopilot system
b. applies flight data to the autopilot system
c. is automatically disengaged by a gpws alert
d. can only be used in EFIS equipped aircraft

7. An aircraft has yaw damping included in its auto-stabilization system. An essential requirement of such a system is:

a. a three axis autopilot system
b. parallel connected servomotors
c. automatic maintenance of C of G position
d. INS inputs to the CADC

8. Automatic flight systems may be capable of controlling the aircraft flight in:

a. azimuth, elevation and velocity
b. azimuth and velocity only
c. azimuth only
d. azimuth and elevation only

9. An automatic flight control system is fitted with control wheel steering (CWS).

a. The autopilot must be disengaged before the pilot can input manoeuvring commands
b. Manoeuvring commands may be input by applying normal forces to the control yoke without first disengaging the autopilot
c. Manoeuvring commands may be input using pitch and turn controls on the automatic flight system control panel, without first disengaging the autopilot
d. The CWS is only there for steering on the ground

10. During an approach to an autoland at 1500 feet:

a. off line channels are manually engaged, flare mode is armed
b. localizer is controlling the roll channel, off line channels are automatically engaged and flare mode is armed
c. localizer is controlling the roll channel, stabilizer is trimmed nose up and roll out is armed
d. provided both localizer and glide slope signals are valid LAND 3 will illuminate

11. What type of autoland system would be required for the landing to continue following a single failure below alert height?

a. Fail-soft
b. Fail-passive
c. Fail-operational or fail-active
d. Land 2 system

12. Inputs to the rudder channels initially originate from:

a. servomotors
b. compass gyro and gyro for ah
c. compass gyro and turn and slip gyro
d. AH gyro and turn and slip gyro

13. An automatic flight system which can safely continue with an automatic landing after a system failure is a:

a. fail-redundant system
b. fail-passive system
c. three axis system
d. fail-operational system

14. Altitude Select and Altitude Hold are examples of:

a. inner loop functions in pitch
b. manometric functions from the ADC
c. interlocking functions
d. outer loop functions in roll

15. During an autoland the caption LAND 2 is illuminated. The system is:

a. fail-active or fail-operational
b. fail-passive
c. approaching decision height
d. requiring a crew input

16. For an autoland system to meet FAIL-PASSIVE criteria it must:

a. have suitable system redundancy
b. withstand a system failure without excessive deviations from flight path
c. can continue with an autoland below alert height
d. can continue with an autoland above alert height

17. During an autoland at 50 ft AGL (45' GA) the pitch control of the autopilot is ..... and the roll control is .....

a. glide slope localizer
b. glide slope roll out
c. flare roll out
d. flare localizer

18. During an autoland approach:

a. flare is engaged at 1500'AGL
b. localizer roll control is disengaged just prior to touchdown
c. flare is disengaged prior to touchdown at 5' GA
d. glide slope is the engaged pitch mode until 5' GA

19. In an autoland at 1000' AGL with two autopilots engaged:

a. the armed roll mode would be LOCALIZER
b. the engaged roll mode would be GLIDE SLOPE
c. the engaged pitch mode would be FLARE
d. the engaged roll mode would be LOCALIZER

20. An automatic flight control system in which the application of normal forces on the control column allows the pilot to input demands to the autopilot is a:

a. control wheel steering
b. touch control steering
c. series connected system
d. parallel connected system

21. If a fault develops in a triplex autopilot system during an approach, the system will revert to:

a. fail-passive and the landing may continue
b. fail control wheel mode
c. fail-operational
d. a manual disconnect

22. Central Air Data Computers (CADCs) transmit data concerning;-

a. airspeed, altitude and decision height
b. airspeed, altitude and Mach number
c. airspeed, attitude and Mach number
d. airspeed and altitude only

23. Inner loop stability is obtained by;-

a. inputs from the Air Data Computer
b. manometric locks
c. rate gyro displacement
d. raw data feed to the data control bus bar

24. The autothrottle is used to control some factors during the three primary control modes; they are:

a. EPR, Mach and Speed
b. EPR, wheel and speed
c. EPR, Mach and altitude
d. EPR, wheel and altitude

25. The mode that enables the pilot to manoeuvre his aircraft in pitch and roll by use of the automatic control system is called the:

a. control wheel steering (CWS) mode that allows the pilot to control the aircraft, and when the wheel is released, the aircraft holds the newly established attitude
b. touch control steering that will permit the pilot to control the aircraft via the air data computer
c. control wheel steering mode which will disengage the servomotors
d. touch control steering mode which will prevent the flaps retracting

26. Touch control steering:

a. prevents aerodynamic feedback
b. will only operate while the flaps are down
c. allows the pilot to control the aircraft with the servomotors disengaged
d. engages the servomotors during manual operation in pitch and roll

27. A system which can still function without degradation of performance after a failure has:

a. fail-passive ability
b. fail-soft ability
c. fail-operational ability
d. fail-symbol ability

28. During a CAT 2 ILS automatic approach, the source for altitude information is the:

a. basic altitude capsule stack
b. radar altimeter which becomes effective below about 2500 feet
c. radio altimeter which becomes effective below about 2500 feet
d. mode comparator sensor

29. Heading hold mode relates to control in:

a. the height lock via the CADC
b. the pitch channel via the inner loop
c. the roll channel via the outer loop control source
d. the manometer mode of the CADC

30. The system which allows the pilot to control the aircraft with the servomotors engaged is called:

a. touch control steering
b. control wheel steering
c. the electronic inner/outer axis loop
d. the outer loop control

31. The type of automatic landing system which would necessitate a manual landing after a system failure during an automatic approach is:

a. fail-passive
b. fail-safe
c. fail-active
d. fail-operational

32. After a failure of one of the necessary redundant systems below alert height you would:

a. continue the descent but revert to a higher DH
b. carry out a missed approach
c. disengage autoland and take over manually
d. continue descent and land automatically

33. When localizer and glide slope are captured at 1500 feet during an automatic landing sequence, two other functions will be activated at the same time; they are:

a. touchdown mode and roll out mode
b. flare mode arm and touchdown mode
c. flare mode engage and roll out mode
d. flare mode arm and off line channels engaged

34. A fundamental requirement of a closed loop servomechanism is:

a. a stable reference device
b. an interlock control
c. a tacho-generator
d. feedback

35. ALT HOLD is an example of:

a. inner loop control in the roll axis
b. outer loop input to the pitch channel
c. outer loop control about the longitudinal axis
d. inner loop control in the pitch axis

36. A rate gyro:

a. has three degrees of freedom, two gimbals and a transducer
b. senses rate of turn and positions an indicator on the EHSI
c. supplies rate and displacement information to the computer
d. controls the outer loop inputs

37. To prevent servomotor runaway from producing excessive demands to the control surface:

a. a gyro damper is fitted
b. a torque limiter is fitted
c. a gyro limiter is fitted
d. a torque converter is fitted

38. Auto-trim is functional:

a. in the pitch and roll channel with the autopilot engaged
b. in the pitch channel only with the autopilot engaged
c. in the pitch channel only with the autopilot disengaged
d. in the pitch and roll channel with the autopilot disengaged

39. L NAV is an..... input to the .....channel using data from the.....

a. outer loop, pitch, FMC
b. inner loop, pitch, ADC
c. outer loop, roll, FMC
d. inner loop, roll, ADC

40. In an aircraft which requires a Mach trim system it will apply inputs to the horizontal stabilizer:

a. all the time
b. at high Mach numbers with the autopilot engaged
c. at Mach one with the autopilot engaged or not
d. at high subsonic speeds with the autopilot engaged or not

Question Paper 2

1. With the autopilot engaged in the Alt mode the Captain alters the barometric setting. The aircraft

a. maintains its altitude
b. changes its altitude in accordance with the change in pressure setting
c. switches barometric input over to the 1st Pilot setting
d. trips out of altitude hold

2. Control wheel steering enables a pilot to:

a. taxi the aircraft on the ground
b. manoeuvre the aircraft in the air while the autopilot is engaged
c. alter the flight path while the autopilot is engaged by applying a breakout force
d. manoeuvre the aircraft with the autopilot disengaged

3. Autopilot synchronization in an aircraft:

a. requires that the interlocks are made before the autopilot will engage
b. ensures that, when the autopilot is engaged, the take-over is effected smoothly and without snatching on the control system
c. requires that the aircraft is trimmed out before the autopilot can be engaged
d. needs at least two alternators running in parallel

4. The rules for the use of auto-trim are that it:

a. can be engaged without the autopilot
b. usually operates on all three axes
c. is not needed if the autopilot is engaged
d. operates only in conjunction with the autopilot

5. The JAR OPS requirements for single pilot operation under IFR state that the aircraft must be fitted with:

a. a single axis autopilot
b. a two axis autopilot
c. a three axis autopilot
d. a two axis autopilot with autothrottle

6. JAR 25 operational requirements for the installation of automatic pilot state that the system must have:

A. automatic synchronization
B quick release controls on both control wheels.

a. Only statement A is correct
b. Only statement B is correct
c. Both statements are correct
d. Neither statement is correct

7. Consider the following statements regarding flight envelope protection:

A High speed protection prevents the airspeed from exceeding V_{MO}/M_{MO}
B High angle of attack protection comes in when the aircraft reaches the stalling AoA

a. Only statement A is correct
b. Only statement B is correct
c. Both statements are correct
d. Neither statement is correct

8. The control laws for an autopilot are known as:

a. normal law and emergency law
b. alternate law and direct law
c. normal, alternate and emergency laws
d. normal, alternate and direct laws

9. An autoland system that, in the event of an autopilot failure, continues to function without degradation of performance beyond the limits required automatic, would be one with the status:

a. fail-passive
b. fail-safe
c. fail-operational
d. duplex

10. The autoland sequence is considered to be complete when:

a. reverse thrust is engaged
b. the autopilot is manually disengaged by the pilot
c. the aircraft touches down
d. the aircraft reaches the end of the runway

11. The autothrottle will come on automatically even with the A/T switch OFF when:

a. in a FBW aircraft the AoA reaches a critical value called floor
b. the AoA reaches the stalling angle
c. TOGA button is pressed
d. reverse thrust is selected in flight

12. An aircraft on autopilot is engaged in the VOR mode and loses the VOR signals as it flies through the VOR cone of silence. The autopilot:

a. automatically switches to Heading mode
b. decouples from the VOR and disconnects
c. tunes to the next VOR on the route
d. decouples from the VOR and flies the last heading for a fixed period

13. For an aircraft with a non-synchronized autopilot system, 'snatching' of the controls by the autopilot when engaging or disengaging can be prevented by:

a. the pilot ensuring that the aircraft is trimmed out before selecting or disengaging the autopilot
b. being in a straight and level position
c. disengaging the auto-trim
d. switching on the yaw dampers

14. With the autopilot in CWS the pilot manoeuvres the aircraft and releases control. The aircraft will maintain:

a. heading and altitude
b. heading, speed and attitude
c. altitude and attitude
d. attitude at the time of release

15. Autopilot corrections affecting pitch are carried out by:

a. auto-trim only
b. auto-trim and elevators
c. elevators only
d. autothrottle

16. For a commercial aircraft operating with a single pilot in IFR the minimum requirement is that the autopilot should have control in:

a. three axes
b. Heading mode
c. Altitude Hold and Heading mode
d. Altitude Hold, Heading mode and Speed