Module Fourteen

1. From where is manifold pressure taken on a supercharged engine?

a) Between the carburetor and the supercharger

b) Between the supercharger and the throttle

 # c) Between the carburetor and the induction ports

2. on a gas turbine engine, what is the fan driven by?

a) HP turbine

 # b) LP turbine

c) IP turbine

3. What is an engine stage?

 # a) One rotor plus one stator

b) One IGV and one rotor

c) One compressor rotor and one nozzle guide vane

4. The air data input to the FADEC fails. The result will be

a) a lack of flight data

b) uncorrected data from hard wired analogue sensors is utilized

 # c) the FADEC reverts to the failsafe mode

5. Torque measurement is taken from the

a) free turbine shaft

 # b) reduction gearbox

c) prop shaft

6. A FADEC system consists of

 # a) HMU, sensors and an EEC

b) HMU, ADC and sensors

c) EEC, ADC and sensors

7. What power supply is required for a thermocouple system to work?

a) Direct current

b) Alternating current

 # c) Neither of the above

8. In a 24 thermocouple system, one thermocouple goes open circuit. What error is detected at the indicator?

 # a) None

b) No indication

c) Gauge freezes at last known reading

9. in a thermocouple temperature sensing system, what is the purpose of the compensating resistor?

a) To standardize the reading for different engine types

 # b) To correct for varying ambient temperatures at the cold junction

c) To correct for varying ambient temperatures at the hot junction

10. In a dive, with the throttles fixed, the EPR will

a) increase

b) decrease

 # c) not change

11. How is the N1 and N2 measured on a triple spool engine?

 # a) Pulse type speed probes

b) Tachometer connected to the external gearbox

c) Tachometer connected to the internal gearbox

12. A twin spool engine has

a) one turbine on one shaft

b) two turbines on one shaft

 # c) two turbines on two shafts

13. A free turbine aircraft engine is most likely to be used on a

a) high bypass engine

b) a direct coupled engine

 # c) a helicopter engine

4. Propeller speed is measured from

 # a) a slip ring pulse probe

b) a tachometer on the LP turbine shaft

c) a pulse probe at the engine side of the reduction gear

15. Propeller torque is analogous to

a) engine RPM

 # b) shaft horsepower

c) propeller RPM

16. How is power indicated on a fixed pitch propeller?

 # a) RPM gauge

b) Torque gauge

c) Horsepower gauge

17. What are the units of manifold pressure on a normally aspirated engine?

a) PSI

b) Inches of water

 # c) Inches of mercury

18. In a FADEC what is the result of Channel A failing to receive information from a sensor?

a) Channel B will assume control

 # b) Channel A will take the information from channel B

c) Channel A will take the information from the backup sensor

19. A synchro pressure measuring system requires

 # a) alternating current

b) direct current

c) either ac or dc

20. A synchro pressure measuring system works on the principle of changes in pressure related to changes in

a) frequency

b) voltage

 # c) flux

21. Pure jet engines use

 # a) stagnation thermocouples

b) rapid response

c) variable resistance thermocouples

22. Modern oil pressure servo transmitters sense

 # a) differential pressure

b) absolute pressure

c) HP oil pressure

23. EGT thermocouples are usually made of

a) nickel and platinum

b) chromel and platinum

 # c) chromel and alumel

24. Thrust is generated in a turboprop system by

a) moving a small mass of air quickly

b) moving a large mass of air quickly

 # c) moving a large mass of air slowly

25. Power is adjusted in a variable pitch turboprop aircraft by

a) increasing RPM

 # b) increasing fuel flow

c) increasing pitch

26. Thrust in a high bypass engine is measured by measuring

a) N3 RPM

b) fuel flow

 # c) neither of the above, thrust is not indicated in flight

27. EPR is a ratio of

a) P1 to P4

b) P1 to Pfan

 # c) P1 to P6

28. The majority of power in a free turbine engine is used to

a) drive the gas generator

 # b) drive the free turbine

c) expel gases through the exhaust

29. The total power in a turboprop engine is the

a) SHP

 # b) ESHP

c) BHP

30. To measure oil temperature, which of the following would most likely be used?

 # a) Resistance temperature measurement

b) Thermocouple measurement

c) Optical pyrometer

31. Strain gauges may be used to measure

a) thrust

 # b) torque

c) pressure

32. Piezo electric transducers convert

a) a tensile stress into a current output

b) a pressure input into a resistance output

 # c) a force input into a voltage output

33. A broadband vibration reading indicates

a) the N1 vibration

 # b) the average vibration

c) the peak allowable vibration

34. Vibration analysers determine which component is vibrating by analysing

 # a) frequency

b) amplitude

c) voltage

35. An annular combustion chamber consists of

a) an air tube and a flame tube

 # b) an outer skin and an inner and outer flame skin

c) a series of flame tube in an air annulus

36. What percentage of air passing through the combustion section is burned?

 # a) 40%

b) 50%

c) 75%

37. A full flow oil system has

a) a single fixed minimum oil pressure

b) a hot and cold oil pressure limit

 # c) a variable oil pressure dependant upon throttle setting

38. Oil quantity is transmitted to the EICAS by

a) a float switch in the oil tank

 # b) a reed switch ladder activated by magnetic float in the oil tank

c) a belt type capacitor system

39. Thrust in a high bypass fan engine is indicated by

 # a) N1 RPM or EPR

b) N3 RPM or P1/P4 ratio

c) N1 RPM or N3 RPM

40. The purpose of the LP fuel pump is to

a) ensure the fuel flow governor gets enough fuel

b) pump fuel from the aircraft fuel tanks to the engine

 # c) ensure the HP fuel pump does not cavitate

41. The principle of operation of a DC ratio meter is

a) one coil moving in a uniform magnetic field

b) two coils moving in a uniform magnetic field

 # c) two coils moving in a non-uniform magnetic field

42. A thermocouple indicator is basically a

 # a) millivoltmeter

b) milliohmeter

c) milliameter

43. If a FADEC loses its ADC input, in the short term it will

 # a) go into soft redundancy

b) go into hard redundancy

c) go to limit protection mode

44. With an aircraft with a fixed pitch propeller, what indication has the pilot got of the output power?

a) fuel flow

b) oil pressure

 # c) engine speed indicator

45. The primary purpose of an EEC is

a) to change analogue inputs into digital format to provide glass cockpit information and reduce flight crew workload

b) to change analogue inputs into digital format to reduce flight crew workload and provide maintenance information

 # c) to save fuel, reduce crew workload and reduce maintenance costs

46. If a tachogenerator indicated in reverse, the probable cause is

a) wrong input frequency

 # b) two phases cross connected

c) supply and transmitter cross connected

47. A sensing element goes open circuit in a ratiometer. What will be happen?

a) Temperature indicates below ambient

 # b) Full scale deflection

c) Hairspring takes indicator off scale

48. A thermocouple is constructed of

 # a) two dissimilar metals welded together

b) two dissimilar metals with an air gap between them

c) three dissimilar metals welded together

49. A thermocouple indication is taken from the

a) hot junction

 # b) cold junction

c) difference between the hot junction and the cold junction

50. On a twin spool engine, the HP compressor is driven by

a) ram air over the compressor

 # b) early stages of the turbine

c) later stages of the turbine

51. In a multiple probe thermocouple system, what is the effect if one probe fails?

 # a) No noticeable effect

b) Reduction in temp reading

c) Increase in temp reading

52. In a gas turbine if air is tapped from the H.P bleed

 # a) EPR decreases and EGT increases

b) EPR stays constant and EGT decreases

c) EPR increases and EGT decreases

53. The vane on a vane type fuel flow measuring device becomes stuck. What safety backup is available for the engine fuel flow?

a) A fuel bleed valve

b) A bypass valve

 # c) A differential pressure bypass valve

54. In a FADEC engine with a hydromechanical fuel system, how is fuel flow controlled?

a) By fuel pressure

 # b) By electro-hydraulic servo valves (EHSVs)

c) By oil hydraulics

55. In the HEIU the discharge resistor

a) allows sufficient voltage to be stored to provide relight facilities

up to 55,000 ft.

b) protects the unit from excessive voltages.

 # c) allows the capacitors to discharge when the unit is switched off.

56. A modular constructed gas turbine engine means that

 # a) its major assemblies can be removed and replaced

b) all engines have a specific component layout

c) the engine is constructed by the vertical assembly technique

57. The purpose of a high pypass ducted fan engine is to

 # a) improve efficiency

b) improve thrust

c) reduce size

58. When using a test set to test an EGT thermocouple circuit

 # a) no compensation for ambient temperature is required

b) only consider ambient temperature compensation if the ambient temperature is over 20oC

c) always compensate for ambient temperature

59. Where is EGT measured?

a) In the combustion chamber

 # b) Downstream of the combustion chamber

c) Upstream of the combustion chamber

60. How does a boost gauge compensate for altitude changes?

 # a) Spring sealed bellows

b) Two bellows against atmospheric pressure

c) There is no compensation

61. An EMF is produced by a thermocouple. This is sensed

a) at the hot junction

 # b) at the cold junction

c) between the hot and cold junctions

62. Supervisory EEC sends its output to the

a) fuel valve

 # b) HMU/FFG

c) EGT thermocouple circuit

63. Ratiometer pointer movement is achieved by

a) one coil providing a torque against a permanent magnet

b) two opposing coils providing a torque in a varying magnetic field

 # c) two opposing coils providing a torque in a permanent magnetic field

64. A fuel flow transmitter requires a motor or a synchronous motor to have a

a) constant voltage within small tolerances

 # b) constant frequency within small tolerances

c) low EMF as it is immersed in fuel

65. A boost gauge measures

 # a) absolute pressure on the inlet port

b) brake mean effective pressure

c) gauge pressure at the injector

66. On a thermocouple circuit on a non FADEC engine, what is the purpose of the ballast resistor?

a) To compensate for ambient temperatures

 # b) To standardise both engine's EGT readings

c) To compensate for altitude

67. Boost pressure is measured in

 # a) inches of Hg

b) inches of water

c) PSI

68. Power is adjusted in a gas turbine engine by

a) increasing airflow to the combustion chamber

b) increasing air and fuel flow

 # c) increasing fuel flow

69. The EPR reading is taken from a ratio of

 # a) jet pipe pressure to compressor inlet pressure

b) compressor delivery pressure to compressor inlet pressure

c) turbine inlet pressure to compressor delivery pressure

70. The basic gas turbine engine cycle is

 # a) induction, compression, combustion, expansion, exhaust

b) induction, compression, expansion, combustion, exhaust

c) compression, combustion, induction, expansion, exhaust

71. The high bypass duct

a) drives a cabin air compressor

b) provides engine cooling

 # c) improves propulsive efficiency

72. If an engines fadec system loses air data permanently the pilot will

 # a) select alternate pitot static

b) switch to alt on the relevent EEC

c) turn that EEC off

73. An EPR system reads slightly over 1, this would mean

a) the transmitter datum point has moved and needs replacing

 # b) no action required this is normal

c) the indicator needs re-calibrating back to 1

74. Manifold pressure is measured

 # a) at inlet port above and below ambient conditions

b) at inlet port above and below standard atmosphere at sea level

c) at inlet port indicating boost pressure

75. A temperature indicating system incorporating a resistance bulb on a selected range has pointer movement

 # a) proportional to bulb resistance

b) inversely proportional to bulb resistance

c) resistance does not affect pointer movement

76. In a ducted fan engine, the fan is driven by the

a) accessory gearbox

 # b) turbine

c) air passing over the compressor

77. In a FADEC system, active control switchover occurs

 # a) on shutdown

b) when channels A and B are healthy

c) on engine startup only

78. Gas turbines work on the

a) otto cycle

 # b) brayton cycle

c) diesel cycle

79. Oil systems consists of

a) 2 systems

 # b) 3 systems

c) 4 systems

80. With the EEC in control the throttle levers are always

a) in the fully forward position

b) in the fully aft position

 # c) anywhere between the fully fwd and fully aft positions

81. Turboprop thermocouple probes are

 # a) rapid response

b) stagnation

c) surface mounted

82. Propelling nozzle provide

a) pressure thrust

b) velocity thrust

 # c) pressure and velocity thrust

83. How are the combustion chambers cooled?

a) By l.p compressor air

 # b) By h.p compressor air

c) By fan pressure air

84. Fan blade speed is measured by

 # a) phonic wheel

b) drag cup and tachometer

c) eddy currents

85. Fadecs operate by

a) 2 controlling 1 operating

b) 1 controlling 1 operating

 # c) 2 units each capable of independent control

86. When a thermocouple fails, the temperature reading will

a) over read

b) under read

 # c) stay the same

87. An aircraft flying at 800mph would typically use

 # a) turbojet

b) turbofan

c) turboprop

88. The inlet of a turbo fan is

 # a) divergent

b) convergent

c) convergent-divergent

89. What is the pressure increase over one stage of a centrifugal compressor?

 # a) 5:1

b) 1.2:1

c) 8:1

90. The bleed valve on a engine at start up is

 # a) open

b) closed

c) modulating

91. EPR is measured between inlet and

 # a) jet pipe

b) cold and hot exhaust

c) front of turbine

92. One stage of a turbine is

 # a) n.g.v then turbine blade

b) turbine blade then n.g.v

c) i.g.v then turbine blade

93. in a flow type fuel system, fuel shutoff is done by

 # a) mechanical ball valve

b) fcu torque motor

c) l.p fuel cock

94. The fuel flow transmitter is downstream of

a) prsov

b) h.p pump

 # c) l.p pump

95. How is fuel flow varied in a variable displacement pressure type pump?

 # a) Alter the camplate angle

b) Remote servo pressure

c) Direct cable to camplate

96. Advantage of flow type over pressure type is

a) it has lower pressure so greater reliability

 # b) it can take into account rpm, pressure (ambient) and e.g.t.

c) has no need for fly weights and governors

97. When the full authority fuel control unit is changed, the rating plug

 # a) stays with the engine

b) stays with the FAFC

c) is replaced every time

98. The EEC is powered and able to operate via

a) only a dedicated alternator

b) the aircraft electrical system

 # c) The EEC is capable of being powered by both independently depending on conditions

99. The EEC uses

 # a) ARINC 429 formatted data

b) ARINC 629 formatted data

c) uses neither ARINC 429 or 629 formatted data

100. The fuel metering unit has direct inputs via

a) only the EEC

b) the EEC and the fire control handle

 # c) the EEC, fire control handle and the engine master switch

101. The optimum turbine speed is defined as

 # a) the most efficient speed of the turbine

b) 100% rpm of the engine

c) 95 % rpm of the engine

102. An increase in fuel flow through the impeller type fuel flow transmitter is measured by

a) drum lags impeller

 # b) impeller lags turbine

c) decreasing angle between the two

103. No power to EGT is indicated by

 # a) yellow flag in front counter

b) bug moves in the x direction

c) bug moves in the y direction

104. Connection to a tachogenerator

 # a) 3 phase star

b) 3 phase delta

c) 2 phase star

105. A short circuit in a d.c ratiometer will give

a) max scale reading

b) zero scale reading

 # c) min scale reading

106. An open circuit in a d.c ratiometer will give

 # a) max scale reading

b) zero scale reading

c) min scale reading

107. A compressor shaft rotates on

a) sintered bearings

 # b) ball and roller bearings

c) plain bearings

108. The EEC changes power settings by

a) changing the throttle lever angle

 # b) changing the fuel flow input

c) changing the airflow input

109. A torque pressure measuring indicator is fed by

 # a) direct oil pressure

b) differential pneumatic pressure

c) servo operated

110. The tacho generator output has:

a) A fixed frequency

 # b) A Variable frequency

c) A DC Current output

111. On a fuel flow measuring device located on the engine

 # a) no adjustments can be made

b) external adjustments can be made for maximum rate fuel flow

c) external adjustments can be made for minimum rate fuel flow

112. Where is the hot junction of a EGT thermocouple system found?

a) In the indicator

b) Upstream of the combustion chamber

 # c) Downstream of the combustion chamber

113. The fan on a turbofan engine is turned by

a) induction of the air across the fan into the compressor

 # b) the turbine section

c) the combustion chamber gases

114. When terminating connections for a EGT sensing system

a) ensure that the pins and sockets are correctly crimped and brazed

b)ensure that all connections are silver soldered

 # c) ensure that the pins and sockets are of the same material as the leads

115. An EPR gauge indicates '1'. You should

a) adjust the indicator back to zero

b) replace the indicator, there is no adjustment

 # c) do nothing this is what it should read with the engine shut down.

116. A Gas Turbine's propulsion force is produced by

 # a) reaction of the rearward moving gasses

b) impingement of the gasses on the surrounding air

c) induced airflow into the engine

117. In a single spool gas turbine engine the compressor rev/min is

a) more than the turbine speed

b) less than the turbine speed

 # c) equal to the turbine speed

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118. A tacho pointer is moved by

 # a) drag cup coupling

b) ac servo motor

c) synchronous motor

119. In a twin spool engine

a) the HP turbine drives both LP and HP compressors

 # b) the LP turbine drives the LP compressor and the HP turbine drives the HP compressor

c) the HP turbine drives the LP compressor and the LP turbine drives the HP compressor

120. Relative permeability of fuel is also known as

a) density of the fuel

b) weight of the fuel

 # c) dielectric constant of the fuel

121. The cycle of a gas turbine engine is

a) completed in one revolution of engine.

b) completed in two revolution of the engine.

 # c) continuous

122. Engines having two independent moving systems are

a) compound engines

 # b) twin spool engines

c) complex engines

123. Compression ratio of compressor of gas turbine Engine is

 # a) outlet pressure to Inlet pressure.

b) measured across all rotor stages of compressor

c) mass of airflow to combustion.

124. Torque pressure indication to measure power output of an engine is

a) used in all Gas Turbine engines.

b)not used in Gas Turbine engines.

 # c) only used when engine output pressure is used for torque not for thrust.

125. Manifold pressure is measured in

a) direct absolute pressure in Bars

b) differential pressure in millibars

 # c) direct absolute pressure in inch of Hg

126. Typically a torque pressure indication system is

a) differential pressure type

b) remote synchronous type

 # c) direct Oil Pressure sensing type

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127. A tachometer used to measure Rev/Min in turbine engines

 # a) develops its own power for the system

b) 28V dc is required

c) 115V ac is required

128. Primary power for electronic engine control

a) 115V ac essential bus.

b) on side 115V ac bus bar supply.

 # c) Permanent Magnet Alternator

129. Leads to measure thermocouple temperature are

 # a) calibrated for circuit in used and cannot be shortened

b) affected by Magnetic and electrical interference

c) insulated by heat legging device to reduce errors in the indication end

130. A thermocouple sensing system test set requires

 # a) a serviceable battery

b) No power

c) 24V dc

131. The HP compressor is powered by

 # a) the first set of turbines

b) the last set of turbines

c) the intermediate compressor

132. Torque is measured in gas turbine engines

a) never

 # b) where there is a free turbine providing the power

c) on small pure jet engines

133. What is the supply voltage to tacho generators?

a) 28vdc

b) 115vac

 # c) It has no supply

134. A FADEC takes measurements of engine speed,

 # a) temperature and pressure

b) temperature

c) pressure

135. The fuel metering valve in the hydro mechanical unit of a FADEC system is operated by

a) hydraulic servo pressure

 # b) fuel servo pressure

c) electrical servo

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136. Boost pressure is

a) atmospheric above ambient

b) atmospheric below ambient

 # c) the absolute of the manifold chamber

137. To check/test a temperature indicator you would

 # a) connect a decade box in place of the temperature sensing element

b) connect a decade box in series with the temperature sensing element

c) connect a decade box in parallel with the temperature sensing element

138. Calibration for a ratiometer type temperature indicator takes into account

a) the material of the coils

 # b) the material of the sensing element

c) the type of representation on the dial

139. Reverse thrust can only be selected when the throttle is

a) 75% power position.

b) open.

 # c) at the idle stop

140. On a FADEC engine the EEC

 # a) has electronic control of the hydro-mechanical fuel control unit in all modes

b) has electronic control of the hydro-mechanical fuel control in some modes

c) has mechanical control of the hydro-mechanical fuel control system