ASSIGNMENT 6

Textbook Assignment: "Aircraft Power Plants," chapter 6, pages 6-1 through 6-20.

6-1. In 250 B.C., the first reaction engine was built by what group of people?

1. Romans
2. Egyptians
3. Greeks
4. Babylonians

6-2. Naval aircraft jet propulsion engines may be identified by what total number of categories?

1. One
2. Two
3. Three
4. Four

6-3. The gas turbine engine powers almost all Navy aircraft.

1. True
2. False

6-4. Rocket engines carry their own oxidizer for combustion for what primary reason?

1. For travel above the atmosphere
2. For travel within the atmosphere
3. To take the place of hydrogen
4. To take the place of carbon

6-5. Jet propulsion engine operations can be explained by which of the following laws of motion?

1. Newton's first
2. Newton's second
3. Newton's third
4. Newton's fourth

6-6. When the stem of an inflated balloon is released, what action causes the balloon to move forward?

1. The force of the escaping air
2. The low-pressure area against the front of the balloon
3. The pressure from inside the balloon pushing against the outside air
4. The pressure of the air on the inside of the balloon directly opposite the open stem

6-7. A basic gas turbine engine consists of what total number of major sections?

1. Six
2. Five
3. Three
4. Four

6-8. Most of the air taken into the combustion chamber of a jet engine is used for what purpose?

1. Compression
2. Propulsion
3. Combustion
4. Cooling

6-9. A compressor stage consists of what row(s) of blades or vanes?

1. Rotating blades only
2. Stator vanes only
3. Rotating blades and stator vanes
4. Three or more rows of rotating blades and stator vanes

6-10. In a compressor, the air pressure increases each time it passes through a set of rotors and stators for which of the following reasons?

1. The areas of the rotors and stators gets larger
2. The areas of the rotors and stators gets smaller
3. The spool area of the stators increases
4. The spool area of the rotors increases

6-11. Since the initial appearance of the split-spool compressor engine, the potential thrust of today's engines has been boosted considerably. These compressors are driven individually by what means?

1. The turbine assembly
2. Separate wheels of the turbine assembly
3. The rotor assembly
4. The stator assembly

6-12. Compressor stalls may be eliminated by using which of the following systems?

1. Rotor vane and stator vane system
2. Inlet guide vane and stator vane system
3. Front and rear compressor system
4. Compressor bleed-air system and variable vane system

6-13. Which of the following is NOT a basic requirement for a satisfactory and efficient combustion chamber system?

1. Light weight
2. A minimum pressure drop
3. A high rate of burning
4. Can-annular design

6-14. Fuel is introduced into the combustion chamber at what location?

1. Back of the combustion chamber
2. Top of the combustion chamber
3. Front of the combustion chamber
4. Bottom of the combustion chamber

6-15. A gas turbine engine normally has provisions for what total number of igniter plugs in the combustion chamber?

1. One
2. Two
3. Three
4. Four

6-16. The flame from the chambers containing the igniter plugs is spread to the remaining chambers through what design feature?

1. Guide vanes
2. Drilled holes
3. Flame tubes/cross ignition tubes
4. Louvers

6-17. What percent of the air in the combustion chamber actually takes part in the combustion process?

1. 25%
2. 35%
3. 45%
4. 55%

6-18. Secondary air is used in the combustion chamber for what purpose?

1. To dilute and cool the hot gases
2. To help the combustion process
3. To drive the compressor
4. To drive the turbine

6-19. What function does the turbine assembly serve?

1. It develops exhaust gas power
2. It reduces the speed of the compressor
3. It increases the turbine gas temperatures
4. It drives the compressor

6-20. The flowing gases from the combustion chamber of a turbojet engine act directly against what engine component?

1. Impeller
2. Compressor
3. Turbine disk blades
4. Auxiliary equipment

6-21. Turbine blades are normally made from what material alloy?

1. Copper
2. Aluminum
3. Magnesium
4. Steel

6-22. What is the function of the inner cone in the exhaust section?

1. To eliminate exhaust gas turbulence
2. To direct air to the outer exhaust cone
3. To give support to the exit guide vanes
4. To cool the turbine wheel

6-23. The inner cone is attached to the outer cone by what means?

1. Copper alloy tubes
2. Streamlined vanes called brace assemblies
3. Stainless steel sheets
4. Tapered cylinder-shaped brackets

6-24. The exhaust cone is made from what material?

1. Aluminum alloy
2. Stainless steel sheets
3. High-temperature alloy
4. Low-temperature alloy

6-25. What material is used to insulate the cone?

1. High-temperature alloy
2. Copper sheets
3. Aluminum alloy sheets
4. Aluminum foil

6-26. The turboprop engine is capable of developing what maximum horsepower per pound of weight?

1. 1/2 hp
2. 1 1/2 hp
3. 2 hp
4. 2 1/2 hp

6-27. A turboprop engine has what total number of major assemblies?

1. One
2. Two
3. Three
4. Four

6-28. What component of the power section of a turboprop engine provides the power that drives the propeller?

1. Turbine
2. Combustion chamber
3. Compressor
4. Exhaust

6-29. Torsional deflection in a turboprop engine is an indication of what variable?

1. Temperature
2. Horsepower
3. Pressure
4. Rpm

6-30. What is the function of the reduction gear assembly?

1. To change the propeller blade angle to a variable rpm
2. To provide a constant rpm unit for propeller operation
3. To reduce the engine rpm to within the range of efficient propeller rpm
4. To provide higher propeller rpm than the engine provides

6-31. What is the basic function of the propeller assembly?

1. To efficiently develop thrust
2. To drive the reduction gearbox assembly
3. To drive the compressor section
4. To efficiently develop rpm

6-32. Turboshaft engines are currently being used on which of the following types of aircraft?

1. Fighters
2. Attack
3. Transport
4. Helicopters

6-33. Which of the following types of gas turbine engines operates on the free turbine principle?

1. Turboprop
2. Turboshaft
3. Turbofan
4. Turbojet

6-34. During all operations of the turboshaft engine, automatic protection is provided for which of the following malfunctions?

1. Turbine overspeed, compressor stall, combustion flame-out, and turbine overtemperature
2. Compressor overspeed, turbine stall, turbine overtemperature, and combustion flame-out
3. Combustion flame-out, turbine under temperature, turbine overspeed, and compressor stall
4. Turbine underspeed, compressor stall, combustion flame-out, and turbine overtemperature

6-35. Operation of the turbofan engine is similar to which of the following gas turbine engines?

1. Turboshaft
2. Turbojet
3. Turboprop
4. Turbopulse

6-36. The turbofan engine has a low rate of fuel consumption.

1. True
2. False

6-37. A turbofan powered aircraft that is approximately the same size as a turbojet aircraft is capable of accomplishing which of the following tasks?

1. Handling higher gross weight at takeoff
2. Producing more thrust during climb
3. Using shorter takeoff distance
4. Each of the above

6-38. What factor causes the low noise level of the turbofan engine?

1. The enclosed fan, which is driven at the engine's speed
2. The high velocity of compressed air that passes through the burner and turbine sections
3. The increased thrust from the use of the afterburner
4. The low gas velocity coming out of the tailpipe

6-39. What are the two basic groups of modern fuel control systems?

1. Pneumatic and pressure
2. Hydromechanical and electronic
3. Automatic and manual
4. Pressure and mechanical

6-40. What is considered to be the "heart" of a gas turbine engine fuel system?

1. Fuel control
2. Fuel cell pumps
3. Fuel cross-feed valves
4. Fuel shutoff valve

6-41. Which of the following inputs does the fuel control system combine to operate a gas turbine engine?

1. Fuel flow, compressor pressure, turbine speed, and temperature
2. Combustion, ignition, altitude, fuel flow, and acceleration
3. Engine speed, altitude, exhaust temperature, and throttle position
4. Throttle position, compressor discharge pressure, engine speed, and compressor inlet temperature

6-42. What lubrication system returns engine oil back to the oil tank for reuse?

1. Pressure pump system
2. Wet sump system
3. Scavenge system
4. Pressurized sump system

6-43. The purpose of a pressurized oil tank in the lubricating system of a gas turbine engine is to prevent pump cavitation under what condition?

1. High altitude
2. Engine start
3. Low altitude
4. Engine stop

6-44. The lubricating system used on a gas turbine engine is, with few exceptions, always the dry sump design.

1. True
2. False

6-45. What type of oil is used in all gas turbine engine lubrication systems?

1. Synthetic oil
2. Petroleum-based oil
3. Animal fat-based oil
4. Mineral-based oil

6-46. What type of ignition system has been universally accepted for use in a gas turbine engine?

1. Low spark, capacitor
2. High capacitor, low spark
3. High energy, capacitor
4. Low capacitor, low energy

6-47. To avoid a lethal electrical shock from the ignition system, which of the following components must be grounded before maintenance work can be started?

1. Resistors
2. Igniter plugs
3. Spark plugs
4. Capacitors

6-48. The accessory section is usually mounted to what section on a gas turbine engine?

1. Turbine section
2. Combustion section
3. Compressor section
4. Exhaust section

6-49. The term used to describe a process that begins with certain conditions and ends with those same conditions is known as "Brayton Cycle."

1. True
2. False

6-50. The MIL-STD-1812 designation system has no provision for what branch of the armed forces?

1. Navy
2. Army
3. Air Force
4. Coast Guard

IN ANSWERING QUESTIONS 6-51 THROUGH 6-53, REFER TO TABLE 6-1.

6-51. What aircraft letter symbol identifies a turbojet engine?

1. RJ
2. R
3. J
4. T

6-52. What aircraft letter symbol identifies a turboshaft engine?

1. R
2. J
3. T
4. TF

6-53. What aircraft letter symbol identifies a turbofan engine?

1. R
2. J
3. T
4. TF

6-54. Following the first letter symbol identifying the engine type, a number appears to identify the service that uses the engine(s). Which of the following numbers represents an Air Force engine?

1. 20
2. 30
3. 31
4. 40

IN ANSWERING QUESTIONS 6-55 THROUGH 6-58, REFER TO TABLE 6-2 IN THE TEXT.

6-55. The manufacturer's symbol BA identifies which aircraft engine manufacturer?

1. Allison Division, General Motors Corporation
2. General Electric Company
3. Bell Aircraft Company
4. McDonald–Douglas Aircraft Company

6-56. What engine manufacturer's symbol identifies the Lockheed Aircraft Company?

1. LA
2. LD
3. AD
4. GA

6-57. The manufacturer's symbol PW identifies which aircraft engine manufacturer?

1. Rolls Royce, Ltd.
2. Westinghouse Electric Company
3. AiResearch Division, Garrett Corporation
4. Pratt and Whitney Aircraft Division

6-58. What engine manufacturer's symbol identifies the Curtis-Wright Corporation?

1. WE
2. WA
3. PW
4. MD

6-59. When two manufacturers' are jointly producing an engine, the symbol is one letter from each manufacturer's symbols.

1. True
2. False

6-60. The third part or section of the engine designation consists of a dash and a number indicating the model number. The Navy model number begins with 2 and continues with consecutive even numbers.

1. True
2. False

6-61. Under special engine designations, what prefix letter is assigned to experimental and service test engines?

1. W
2. X
3. Y
4. Z

6-62. Under special engine designations, what prefix letter is assigned to restricted service engines?

1. W
2. X
3. Y
4. Z

6-63. Normally the restricted service designation for an engine is dropped after completion of what total number of qualifying test hours?

1. 50 hr
2. 100 hr
3. 150 hr
4. 200 hr

6-64. The MIL-STD-1812 engine designation system is made up of what total number of parts or sections?

1. One
2. Two
3. Three
4. Four

6-65. The Air Force, Navy, and Army are assigned a block of engine configuration model numbers that are used consecutively.

1. True
2. False

6-66. What series or block of engine configuration model numbers are assigned to the Navy?

1. 100
2. 400
3. 700

6-67. Which of the following characters identifies the type of engine in the designation number F401–PW–400?

1. F
2. 401
3. PW
4. 400

6-68. Which of the following characters identifies the engine manufacturer in the designation number F401–PW–400?

1. F
2. 401
3. PW
4. 400

6-69. Which of the following personnel is/are responsible for trying to discover and eliminate unsafe work practices?

1. Commanding officer
2. Maintenance officer
3. Work center supervisor
4. All hands

6-70. The greatest hazard of working near the aircraft intake ducts occurs during which of the following operations?

1. Engine start
2. Engine stop
3. Maximum power
4. Minimum power

6-71. Serious hearing damage may occur to unprotected ears if the dB (decibel) level is greater than what maximum level?

1. 140 dB
2. 120 dB
3. 110 dB
4. 100 dB