ASSIGNMENT 4

Textbook Assignment: "Gas Turbines," chapter 6, pages 6-1 through 6-20, and "Internal Combustion Engines," chapter 7, pages 7-1 through 7-14.

4-1. The patent application for the gas turbine, as we know it today, was submitted in 1930 by what person?

1. Sir Frank Whittle
2. Christian Huygens
3. Thomas Young
4. Augustin Fresnel

4-2. The United States entered the gas turbine field in what year?

1. 1910
2. 1941
3. 1953
4. 1961

4-3. The first jet aircraft was flown in the United States in what year?

1. 1910
2. 1920
3. 1931
4. 1942

4-4. The U.S. Navy entered the marine gas turbine field with which of the following types of ships?

1. Aircraft carriers
2. Battleships
3. Patrol gunboats
4. Destroyers

4-5. What is basically stated in Newton's third law of motion?

1. For every reaction there is an equal and opposite action
2. For every action there is an unequal and opposite reaction
3. For every unequal action there is an unequal reaction
4. For every action there is an equal and opposite reaction

4-6. The Otto cycle consists of how many basic events?

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

4-7. What are the two primary means of classifying gas turbine engines?

1. By the type of compressor used and how the power is used
2. By the type of pistons used and how the power is used
3. By the type of fuel used and the weight
4. By the length of the engines and their rated horsepower

4-8. Most gas turbines of modern design use what type of compressor?

1. Single-entry
2. Dual-entry
3. Triple-entry
4. Single-stage

4-9. In the axial-flow engine, where is the compressor located?

1. On the side of the engine
2. At the rear of the engine
3. At the front of the engine
4. On top of the engine

4-10. What are the three basic types of gas turbines in use?

1. Dual shaft, twin spool, and split end
2. Single spool, common shaft, and split shaft
3. Single shaft, split end, and twin spool
4. Single shaft, split shaft, and twin spool

4-11. In current U.S. Navy service, the single-shaft turbine engine is used primarily for what purpose?

1. Driving ship’s service generator
2. Propelling aircraft carrier
3. Driving auxiliary steam compressors
4. Propelling small boats

4-12. What are the four major sections of a gas turbine engine?

1. Compressor, igniter, turbine, and hydraulic
2. Compressor, auxiliary, combustor, and turbine
3. Compressor, combustor, turbine, and accessory
4. Turbine, auxiliary, hydraulic, and compressor

4-13. What are the three types of combustion chambers?

1. Hot air, forced draft, and stationary
2. Can, annular, and can-annular
3. Closed, open, and stationary
4. Dual shaft, twin spool, and annular

4-14. The annular combustion liner is usually found on what type of engines?

1. Dual-compressor
2. Axial-flow
3. Single-stage
4. Dual-stage

4-15. In theory, design, and operating characteristics, the turbines used in gas turbine engines are quite similar to the turbines used in

1. an electrical power generating system
2. a reciprocating power plant
3. an emergency generator
4. a steam plant

4-16. The ship’s propulsion plant can be operated from which of the following stations?

1. The local control console
2. The central control console
3. The ship control console
4. All of the above

4-17. When compared to other engines, what is the gas turbine’s greatest asset?

1. Its low fuel consumption
2. Its high power-to-weight ratios
3. Its low maintenance cost
4. It ability to resist corrosion

4-18. Internal combustion engines convert heat energy into what other type of energy?

1. Mechanical energy
2. Hydraulic energy
3. Electrical energy
4. Potential energy

4-19. The back-and-forth motion of the pistons in an engine is known as

1. combustion motion
2. mechanical motion
3. reciprocating motion
4. rotary motion

4-20. In the internal combustion engine, what changes reciprocating motion to rotary motion?

1. A crankshaft
2. A connecting rod
3. Both 1 and 2 above
4. A piston

4-21. Which of the following parts will NOT be found on a diesel engine?

1. Pistons
2. Valves
3. Spark plugs
4. Connecting rods

4-22. In the internal combustion engine, what are the four basic strokes?

1. Intake, extension, power, and exhaust
2. Intake, compression, power, and exhaust
3. Intake, reduction, expansion, and exhaust
4. Compression, expansion, extension, and power

4-23. On a four-stroke engine, the camshaft turns at one-half

1. piston speed
2. push rod speed
3. timing gear speed
4. crankshaft speed

4-24. In a four-stroke engine, how many crankshaft revolutions are required to complete one cycle?

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

4-25. In a four-stroke engine, how many piston strokes are required to complete one cycle?

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

4-26. In a four-stroke engine, each piston makes one power stroke for each

1. revolution of the crankshaft
2. two revolutions of the crankshaft
3. three revolutions of the crankshaft
4. four revolutions of the crankshaft

4-27. In a four-stroke engine, the intake valve is open and the exhaust valve is closed during what piston stroke?

1. Intake
2. Compression
3. Power
4. Exhaust

4-28. In a diesel engine, a charge of fuel is forced into the cylinder when the piston nears the top of what stroke?

1. Intake
2. Compression
3. Power
4. Exhaust

4-29. In a gasoline engine, the fuel air mixture is ignited by a spark plug near the top of what piston stroke?

1. Intake
2. Compression
3. Power
4. Exhaust

4-30. In a two-stroke diesel engine, how often in the cycle does the power stroke occur?

1. Every stroke
2. Every second stroke
3. Every third stroke
4. Every fourth stroke

4-31. Which of the following parts will NOT be found in a two-stroke engine?

1. Pistons
2. Exhaust valves
3. Intake valves
4. Cylinders

4-32. In a four-stroke engine, how fast does the camshaft turn in relation to the crankshaft?

1. 1/2 as fast as the crankshaft
2. 1/3 as fast as the crankshaft
3. 1/4 as fast as the crankshaft
4. 1/8 as fact as the crankshaft

4-33. The relation between the volume of the cylinder with the piston at the bottom of its stroke and the cylinder volume with the piston at the top of its stroke is called the

1. displacement ratio
2. travel ratio
3. stroke length
4. compression ratio

4-34. As the compression ratio is increased, what, if anything, happens to the temperature of the air in the cylinder?

1. It decreases
2. It increases
3. It decreases rapidly, then increases
4. Nothing

4-35. Current gasoline engines operate at which of the following compression ratios?

1. Between 6:1 and 11:1
2. Between 11:1 and 12:5
3. Between 12:5 and 13:1
4. Between 13:1 and 14:5

4-36. Current diesel engines operate at which of the following compression ratios?

1. Between 10:1 and 11:1
2. Between 11:1 and 12:1
3. Between 12:1 and 19:1
4. Between 19:1 and 20:5

4-37. The lubricating system of an engine delivers oil to the moving parts for which of the following purposes?

1. To reduce friction
2. To assist in keeping the parts cool
3. To prevent serious damage to engine parts
4. All of the above

4-38. Most diesel and gasoline engines are equipped with what type of lubricating system?

1. Splash
2. Pressure
3. Gravity feed
4. Immersion

4-39. To carry away the excess heat produced in the engine cylinders, marine engines are equipped with what type of cooling system?

1. Oil
2. Water
3. Alcohol
4. Air

4-40. Which of the following types of starting systems are used in internal combustion engines?

1. Electric
2. Hydraulic
3. Compressed air
4. All of the above

4-41. Electric starting systems in internal combustion engines use which of the following types of current?

1. Direct current
2. Alternating current
3. Magnetic current
4. All of the above

4-42. What are the two distinct circuits in the ignition system of a gasoline engine?

1. Alternating and direct
2. Mechanical and electric
3. Primary and secondary
4. Hot and cold

4-43. Which of the following events happens at the exact instant that a cylinder is due to fire in a gasoline engine?

1. The ignition breaker points open
2. The ignition breaker points close
3. Fuel is injected directly into the cylinder
4. The intake valve closes

4-44. On a gasoline engine, the distributor is connected to what circuit?

1. Primary
2. Secondary
3. Low-voltage
4. Mechanical

4-45. In a gasoline engine, the high voltage that jumps the gap in the spark plugs comes from what source?

1. The battery
2. The generator
3. The starter
4. The ignition coil

4-46. In an operating gasoline engine system, which of the following happens when the breaker points open?

1. High voltage is produced in the primary circuit
2. Low voltage is produced in the secondary circuit
3. High voltage is produced in the secondary circuit
4. Low voltage is produced in the generator circuit

4-47. In a gasoline engine ignition circuit, what is the primary purpose of the condenser?

1. To protect the breaker points from being burned
2. To produce high-voltage current
3. To reduce the moisture content in the distributor
4. To aid in producing a colder spark

4-48. In electronic ignition systems, what opens and closes the primary circuit?

1. Breaker points
2. A can
3. A mechanical switch
4. An electronic control unit

4-49. What type of energy is contained in fuel for operating engines?

1. Kinetic
2. Potential
3. Pneumatic
4. Hydraulic

4-50. In a diesel engine, which of the following is drawn into the cylinders on the intake stroke?

1. Fresh air
2. Fuel
3. Both 2 and 3 above
4. Oil

4-51. Which of the following controls the speed of a diesel or gasoline engine?

1. The ignition timing
2. The carburetor discharge pressure
3. The valve overlap setting
4. The amount of fuel and air mixture burned in the cylinders

4-52. The push or pressure created in an engine cylinder to move the piston is a result of what action?

1. The reciprocating motion of the connecting rod
2. The rotary motion of the camshaft
3. Burning of a mixture of fuel and air
4. The governor drive assembly

4-53. As the piston nears the bottom of the power stroke in a two-stroke diesel engine, the exhaust valves open and the piston continues downward to

1. uncover the intake ports
2. cover the intake ports
3. uncover the fuel regulator valve
4. cover the exhaust ports

4-54. In many respects, an ignition coil on a gasoline engine ignition system is similar to

1. a battery
2. a condenser
3. an electromagnet
4. a spark plug

4-55. In a gasoline engine ignition system, what prevents arcing across the breaker points?

1. A high tension coil
2. A low tension coil
3. An insulated distributor cap
4. A condenser

4-56. On the compression stroke in a diesel engine, the air is compressed and the temperature in the cylinder will rise to what maximum temperature?

1. 1,200°F
2. 1,100°F
3. 1,000°F
4. 700°F

4-57. Each movement of the piston in an engine from top to bottom or from bottom to top is known by what term?

1. Event
2. Stroke
3. Cycle
4. Transaction

4-58. On some types of engines, the camshaft is located near the crankshaft. In these designs, the action of the cam roller is transmitted to the rocker arm by what means?

1. A spring
2. A lever
3. A push rod
4. A crankshaft

4-59. In the two-stroke engine, the camshaft rotates at what speed in relation to the crankshaft?

1. The camshaft rotates at one-half the speed of the crankshaft
2. The camshaft rotates at twice the speed of the crankshaft
3. The camshaft rotates at four times the speed of the crankshaft
4. The camshaft rotates at the same speed as the crankshaft

4-60. You can find detailed information on compression ignition systems in which of the following publications?

1. NSTM, chap 422
2. NAVEDTRA 10539
3. OPNAVINST 4790.4
4. OPNAVINST 1500.22