Assignment 5

Textbook Assignment: "Pneumatics," chapter 11; "Basic Diagrams and Systems," chapter 12; chapters 9 and 10.

Learning Objective: Recall facts pertaining to the development of gases and the characteristics of gases.

5-1. Pneumatic power is most commonly used in complex systems.

1. True
2. False

5-2 Which of the following characteristics is/are true for gases?

1. They have no definite volume
2. They have no definite shape
3. Gases are lighter than equal volumes of liquids
4. All of the above

Learning Objective: Relate the common temperature scales by converting temperature readings between them.

IN ANSWERING QUESTIONS 5-3 THROUGH 5-6, SELECT FROM COLUMN B THE TEMPERATURE THAT CORRESPONDS TO THE ABSOLUTE ZERO TEMPERATURE FOR EACH OF THE SCALES IN COLUMN A.

	A. SCALES	B. TEMPERATURES
5-3.	Celsius	1. -460°
		2. -273°
5-4.	Fahrenheit	
5-5.	Kelvin	3. 0°
5-6.	Rankine	

5-7. Which of the followni g statements is true concerning absolute zero?

1. It is the temperature at which no heat remains in a gas but not the lowest temperature obtainable
2. It was attained only once, at which time the absolute zero point of -273.16°C was determined
3. It is the temperature at which all molecular activity in a substance ceases
4. It is the temperature to which liquids, solids, and gases can be reduced and at which most molecular activity ceases

IN ANSWERING QUESTIONS 1-8 THROUGH 5-12 REFER TO FIGURE 11-1 IN YOUR TEXTBOOK.

5-8. What is the Celsius scale equivalent of 68°F?

1. 5.7°C
2. 20.0°C
3. 37.7°C
4. 52.0°C

5-9. What is the Kelvin scale equivalent of 68°F?

1. 253°K
2. 273°K
3. 293°K
4. 341°K

5-10. What is the Rankine scale equivalent of 68°F?

1. 341°R
2. 441°R
3. 460°R
4. 528°R

5-11. What Is the Celsius scale equivalent of 263°K?

1. 90°C
2. 10°C
3. 0°c
4. -10°C

5-12. What is the Fahrenheit scale equivalent of 263°K?

1. -l8°F
2. -14°F
3. 14°F
4. 18°F

Learning Objective: Recognize the pressure characteristics of gases and liquids, including how pressure is caused by the weight of the atmosphere, and identify how pressures are measured.

5-13. Gases exert equal pressure on all surface areas of their containers.

1. True
2. False

5-14. When a reading is taken of the pressure in an automobile tire, what does the gauge reading represent?

1. Local atmospheric pressure plus the absolute pressure
2. Absolute pressure minus the local atmospheric pressure
3. Local atmospheric pressure minus the absolute pressure
4. Absolute pressure

5-15. What is the absolute pressure (psia) in a cylinder that has a gauge reading of 1990 psig?

1. 1843
2. 1975.3
3. 2004.7
4. 2137

5-16. What is the gauge pressure (psig) of a container that has an internal pressure of 113 psia?

1. 98.3
2. 99.7
3. 125.3
4. 127.7

5-17 Whenever you apply the gas laws, you must use absolute pressure.

1. True
2. False

Learning Objective: Identify various theories, laws, and properties of gases, correlate these with applicable formulas, and solve related problems.

5-18 When you observe that the pressure of gas in a sealed container has increased, you can assume that

1. heat has been absorbed by the gas
2. heat has been removed from the gas
3. the kinetic energy of the gas has decreased
4. molecules of the gas gained energy from each other while colliding

5-19. Four cubic feet of nitrogen are under a pressure of 50 psig. If the nitrogen is compressed to 2 cubic feet, what is the new gauge pressure?

1. 104 psig
2. 114.7 psig
3. 124 psig
4. 134 psig

5-20. A cylinder of gas at 75°F has a pressure of 900 psig, To what maximum temperature may it be heated without exceeding 1000 psig?

1. 211.9°F
2. 174.9°F
3. 158.4°F
4. 133.4°F

5-21. The general gas equation used in the study of gases is a combination of the gas laws of

1. Charles and Boyle
2. Charles and Kelvin
3. Boyle and Fahrenheit
4. Boyle, Charles, and Kelvin

5-22. Four cubic feet of a gas at 40°F has a gauge pressure of 100 psig. If the volume of the gas is expanded to 6 cubic feet and the gas heated to a temperature of 90°F, what will the new gauge pressure be?

1. 67.9 psig
2. 69.4 psig
3. 71.5 psig
4. 73.6 psig

Learning Objective: Recognize characteristics of gases used in pneumatic systems, safety precautions for handling compressed gas, and color codes of compressed gas cylinders.

5-23. In addition to being nonpoisonous and free from any acids that might cause system corrosion, the gas used as the fluid medium for a pneumatic system must possess which of the following characteristics?

1. Nonflammability
2. Chemical stability
3. Ready availability
4. All of the above

5-24. The gases used in Navy pneumatic systems are similar to the liquids used in hydraulic systems, except that the gases are not

1. acid free
2. nontoxic
3. good lubricants
4. chemically stable

5-25. What characteristic of compressed air makes it undesirable as a medium for pneumatic systems?

1. Its toxicity
2. Its flammability
3. Its moisture content
4. Its lubricating qualities

5-26. In all compressed air systems, the compressor, due to the unlimited supply of air, is installed in the distribution lines leading to the device to be operated.

1. True
2. False

5-27. Which of the following statements is NOT true of LP air systems?

1. The LP air system is supplied with LP air by LP air compressors
2. The LP air system is supplied with air by the HP air system supplying air through a pressure-reducing station
3. The LP air system is supplied with air by the MP air system supplying air through a pressure-reducing station
4. LP compressed air is used in the production of nitrogen

5-28. Why is the use of nitrogen preferred over the use of compressed air in many aircraft and missile pneumatic systems?

1. Nitrogen cannot support living organisms
2. Nitrogen cannot support combustion and fire
3. Nitrogen does not cause rust or decay of the surfaces with which it comes in contact
4. All of the above

5-29. Which of the following steps can a maintenance person take to control contamination of pneumatic systems?

1. Install an air filter in the supply line
2. Keep all tools and the work air clean and dirt free
3. Cap or plug all lines and fittings immediately after disconnecting them
4. Both 2 and 3 above

5-30. You must NEVER use the contents of a cylinder identified by which of the following color codes for purging an oxygen system?

1. Gray
2. Black
3. One black stripe around its top
4. One green stripe around its top

5-31. Inasmuch as compressed air is neither toxic nor flammable, the ordinary precautions for handling compressed gases do not apply to handling it.

1. True
2. False

5-32. Inasmuch as nitrogen is nontoxic, the usual ventilation precautions need not be observed when nitrogen is used in confined spaces.

1. True
2. False

5-33. Which, if any, of the following operations is an acceptable practice during the use of compressed gases?

1. Perform general space cleanup
2. Tighten leaking portions of compressed gas systems while they are pressurized to ensure that you stop the leak
3. Pressurize empty lines and vessels rapidly
4. None of the above

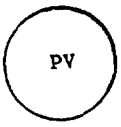
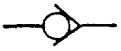
Learning Objective: Recognize the importance of diagrams and symbols, identify symbols used in diagrams, and types of diagrams.

5-34. For a mechanic or technician. which of the following aids is/are provided by diagrams?

1. Location of components within a system
2. Location of general components
3. Understanding of how a system operates
4. All of the above

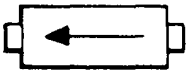
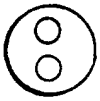
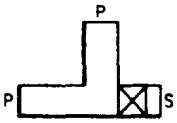
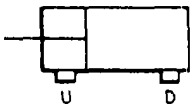
REFER TO APPENDIX II OF YOUR TEXTBOOK IN ANSWERING QUESTIONS 5-35 THROUGH 5-3B.

FOR QUESTIONS 5-35 THROUGH 5-38, SELECT FROM COLUMN B THE MECHANICAL SYMBOL FOR EACH HYDRAULIC SYSTEM COMPONENT LISTED IN COLUMN A.

A COMPONENTS	B SYMBOLS
5-35. Sequence valve	1. 
5-36. Variable displacement pump	
5-37. Check Valve	2. 
5-38. Pressure gauge	3.
	4.

REFER TO APPENDIX III OF YOUR TEXTBOOK IN ANSWERING QUESTIONS 5-39 through 5-41.

FOR QUESTIONS 5-35 THROUGH 5-41, SELECT FROM COLUMN B THE AERONAUTICAL MECHANICAL SYMBOL FOR EACH HYDRAULIC SYSTEM COMPONENT LISTED IN COLUMN.

A. COMPONENTS	B. SYMBOLS
5-39. Power-driven pump	1. 
5-40. Actuating cylinder	2. 
5-41. Automatic check valve	3. 
	4. 

FOR. QUESTIONS 5-42 THROUGH 5-45, SELECT FROM COLUMN B THE DIAGRAM THAT IS DEFINED IN COLUMN A.

	A. DEFINITIONS	B. DIAGRAMS
5-42.	Shows the internal parts of the components	1. Combination
		2. Pictorial
5-43.	Shows the general location of components	3. Graphic
		4. Cutaway
5-44.	Uses symbols, shows actual appearance, and shows internal working part	
5-45.	Uses symbols to show components	

5-46. Which of the following diagrams includes the interconnecting system piping?

1. Combination
2. Pictorial
3. Graphic
4. Each of the above

5-47. Which, if any, of the following diagrams contains pipe sizes and data on the sequence of system operation?

1. Combination
2. Pictorial
3. Graphic
4. None of the above

5-48. A schematic diagram of a hydraulic system enables a mechanic to accomplish which of the following tasks?

1. Understand the operation of the system
2. Identify components of the system
3. Trace the flow of fluid through the system
4. All of the above

5-49. Which of the following statements about an oper-center hydraulic system is false?

1. The directional control valves are connected in parallel
2. There is no pressure in the system when the actuators are idle
3. The system may have any number of subsystems with a directional control valves, for each
4. The pump circulates fluid from the reservoir, through the directional control valves, and back to the reservoir

5-50. Why are closed-center hydraulic systems the most widely used systems.?

1. They provide smooth operation of their actuators
2. They eliminate continuous system pressurization
3. They operate very rapidly
4. They do all of the above

Learning Objective: Recognize Navy applications, component functions. construction features, and operating characteristics of hydraulic power drive systems.

5-51. Hydraulic power drives are used in the Navy to perform which of the following functions?

1. Drive and control winches, capstans , and windlasses
2. Train and elevate nearly all calibers of guns
3. Position rocket and missile launchers
4. All of the above

QUESTIONS 5-52 THROUGH 5-55, SELECT FROM COLUMN B THE HYDRAULIC POWER DRIVE SYSTEM COMPONENT TO WHICH EACH STATEMENT IN COLUMN A APPLIES.

	A. STATEMENTS	B. COMPONENTS
5-52.	It can be an electric motor	1. A- end
5-53.	It is a hydraulic motor mover	2. B-end
5-54.	It is a hydraulic pump	3. Prime
5-55.	It can be a gasoline enigine	

REFER TO FIGURE 12-5 IN YOUR TEXTBOOK IN ANSWERING QUESTIONS 5-56 THROUGH 5-62.

5-56. The forward shaft of the prime mover drives which of the following components?

1. The hydraulic pump
2. The hydraulic motor
3. The auxiliary pumps
4. All of the above

5-57. What type of pump is the A-end pump of this power drive?

1. Axial-flow variable-displacement
2. Radial-flow variable-displacement
3. Axial-flow constant-displacement
4. Radial-flow constant-displacement

5-58. Which of the following statements is true concerning the operation of the A-end?

1. Its output is variable because it is driven at a variable speed
2. Its output is constant because it is driven at a constant speed
3. Its output is variable even though it is driven at a constant speed
4. Its output is constant even though it is driven at a variable speed

IN QUESTIONS 5-59 THROUGH 5-62, SELECT FROM COLUMN B THE AUXILIARY PUMP THAT PERFORMS EACH FUNCTION LISTED IN COLUMN A.

	A. FUNCTIONS	B. PUMPS
5-59.	Transmits a pulsing effect to the fluid in the response pressure	1. Replenishing
5-60.	Replaces fluid in the active systems of the power drive	2. sump pump and oscillator
5-61.	Supplies high-pressure fluid to the various pistons in the system	3. Control pres sure
5-62.	Pumps leakage to the expansion tank	

5-63. What function(s) does the reservoir provide?

1. A method of cleansing and storing fluid
2. A reserve supply of fluid
3. A cooling surface for the fluid
4. Both 2 and 3 above

REFER TO FIGURE 12-6 IN YOUR TEXTBOOK IN AWSWERING QUESTIONS 5-64 AND 5-65.

5-64. How is the tilting box positioned?

1. Locally by the stroke control shaft
2. Automatically by the stroke control shaft
3. Mechanically by hand control
4. By each of the above means

5-65. The tilting box will not move under which of the conditions listed below?

1. IHP = 385 psi, HPC = 900 psi
2. IHP = 500 psi, HPC = 1000 psi
3. IHP = 750 psi, HPC = 750 psi
4. IHP = 800 psi, HPC = 1000 psi

5-66. The direction and speed of the hydraulic motor are controlled by the

1. electric motor
2. hydraulic pump
3. prime mover
4. B-end

REFER TO FIGURE 12-8 IN YOUR TEXTBOOK IN ANSWERING QUESTIONS 5-67 THROUGH 5-71.

5-67. Which of the following components is/are NOT operated by nitrogen from the manually operated nitrogen bottle?

1. Dump valves
2. Nose gear cylinder
3. Main gear unlock cylinders
4. Aft door cylinders

5-68. What provides the force to reposition the shuttle valves for emergency operation?

1. Hydraulic fluid
2. Gravity
3. Springs
4. Nitrogen

5-69. When the emergency system is actuated, what force extends the main gear after the unlock hooks are released?

1. Gravity
2. Hydraulic pressure
3. Nitrogen pressure
4. A combination of gravity and nitrogen pressure

5-70. When the emergency system is actuated, what component is used in the system to prevent a fluid lock in the landing gear?

1. Dump valve
2. Timer valve
3. Relief valve
4. Shuttle valve

REFER TO FIGURE 12-10 IN YOUR TEXTBOOK IN ANSWERING QUESTIONS 5-71 AND 5-72.

5-71. How is the main valve in the 4-way valve assembly normally operated?

1. Electrically
2. Hydraulically
3. Manually

5-72. What is the function of the orifice plate installed in the lines to port A of the hydraulic cylinders?

1. To control the flow of hydraulic fluid to the cylinder for raising operations
2. To control the flow of hydraulic fluid to the cylinder for lowring operations
3. Both 1 and 2 above
4. To allow for changes in the viscosity of the hydraulic flluid as its temperature changes