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PUMPS AND MOTORS $200.00

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I affirm that I personally completed the entire text of the course. I also affirm that I completed the exam without assistance from any outside source. I understand that it is my responsibility to file or maintain my certificate of completion as required by the state or by the designation organization.

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You will have 90 days from the start of this course to complete in order to receive your Professional Development Hours (**PDHs**) or Continuing Education Unit (**CEU**). A score of 70 % is necessary to pass this course. We prefer if this exam is proctored. No intentional trick questions. If you should need any assistance, please email all concerns and the completed manual to info@tlch2o.com.

We would prefer that you utilize the enclosed answer sheet in the front, but if you are unable to do so, type out your own answer key. Please include your name and address on your answer key and registration page and make copy for yourself. You can e-mail or fax your Answer Key along with the Registration Form to TLC. **(S) Means answer may be plural or singular**. **Multiple Choice Section. One answer per question and please use the answer key.**

Section 1 – SCADA Introduction

1. Industrial organizations and companies in the public and private sectors to maintain and control efficiency, distribute data for smarter decisions, and communicate system issues to help mitigate downtime utilize SCADA systems.
A. True B. False

2. SCADA systems are critical for industrial organizations (like water and wastewater facilities) since they help to maintain efficiency, process data for smarter decisions, and communicate system issues to help mitigate downtime.
A. True B. False

3. The SCADA software will process, distribute, and display important data, helping operators and other employees understand the data and make important decisions.
A. True B. False

4. The acronym SCADA refers to the centralized computer systems that control and monitor the entire sites, or they are the complex systems spread out over large areas. Nearly all the control actions are automatically performed by the remote terminal units (RTUs) or by the programmable logic controllers (PLCs).
A. True B. False

5. Data acquisition starts at the HMI level, which includes the equipment status reports, and meter readings. Data is then formatted in such way that the operator of the control room can make the supervisory decisions to override or adjust normal HMI controls, by using the PLC.
A. True B. False

6. SCADA systems implement the distributed databases known as Excel databases, containing data elements called rows or columns.
A. True B. False

7. The key attribute of a SCADA system is its capability to perform a supervisory operation over a variety of other proprietary devices.
A. True B. False

8. The internet is linked to the SCADA system's databases, to provide the diagnostic data, management information and trending information such as logistic information, detailed schematics for a certain machine or sensor, maintenance procedures and troubleshooting guides.
A. True B. False

9. The HMI, or Human Machine Interface, is a device apparatus that gives the processed data to the human operator. A human operator uses HMI to control processes.
A. True B. False

10. The information provided by the HMI to the operating personnel is graphical, in the form of mimic diagrams. This means the schematic representation of the plant that is being controlled is obtainable to the operator.
A. True B. False

11. Which of the following terms can convert electrical signals coming from the equipment into digital values like the status- open/closed – from a valve or switch, or the measurements like flow, pressure, current or voltage?
A. RTU C. PLC
B. HMI D. None of the Above

12. By converting and sending the electrical signals to the equipment, _____ may control the equipment, like closing or opening a valve or a switch, or setting the speed of the pump.
A. RTU C. SCADA system
B. HMI D. None of the Above

13. A 'supervisory Station' refers to the software and servers responsible for communication with the field equipment (PLCs, RTUs etc.), and after that, to _____ software running on the workstations in the control room, or somewhere else.
A. RTU C. SCADA system
B. HMI D. None of the Above

14. Which of the following terms can have multiple servers, disaster recovery sites and distributed software applications in larger SCADA systems?
A. Master station C. SCADA system(s)
B. SCADA implementation(s) D. None of the Above

15. For increasing the system integrity, _____are occasionally configured in hot standby or dual-redundant formation, providing monitoring and continuous control during server failures.
A. Multiple servers C. Multiple stations
B. Independent systems D. None of the Above

16. Which of the following terms originally used modem connections or combinations of direct and radio serial to meet communication requirements, even though IP and Ethernet over SONET/SDH can also be used at larger sites like power stations and railways?

A. SCADA systems
B. SCADA implementation(s)
C. SCADA
D. None of the Above

17. The monitoring function or remote management of the _____ is referred to as telemetry.

A. SCADA operator
B. SCADA implementation(s)
C. SCADA system(s)
D. None of the Above

18. An important part of most SCADA implementations is _____. The system monitors whether certain alarm conditions are satisfied, to determine when an alarm event has occurred.

A. Policies and procedures
B. The cyber security team
C. Alarm handling
D. None of the Above

19. Once an alarm event has been detected, one or more actions are taken (such as the activation of one or more alarm indicators, and perhaps the generation of email or text messages so that management or _____are informed).

A. SCADA operator
B. SCADA implementation(s)
C. Remote SCADA operators
D. None of the Above

20. In many cases, a _____ may have to recognize the alarm event; this may deactivate some alarm indicators, whereas other indicators remain active until the alarm conditions are cleared.

A. SCADA operator
B. SCADA implementation(s)
C. SCADA
D. None of the Above

21. Which of the following terms might automatically monitor whether the value in an analogue point lies outside high and low- limit values associated with that point?

A. SCADA operator
B. SCADA implementation(s)
C. SCADA system(s)
D. None of the Above

22. Which of the following terms translates the electrical signals from the equipment to digital values such as the open/closed status from a switch or a valve, or measurements such as pressure, flow, voltage or current? By translating and sending these electrical signals out to equipment the RTU can control equipment, such as opening or closing a switch or a valve, or setting the speed of a pump.

A. RTU
B. HMI
C. PLCs
D. None of the Above

Section 2 - Physical Science and Related Laws
Pascal's Law- Introduction

23. Pascal discovered that pressure in a fluid acts equally in some directions.
A. True B. False

24. According to the text, pressure acts at right angles to the containing surfaces.
A. True B. False

25. If a pressure gauge, with an exposed face, is placed beneath the surface of a liquid at a specific depth and pointed in different directions, the pressure will read the same.
A. True B. False

26. Pressure in a _____of direction.
A. Modern hydraulics D. Weight of a liquid
B. Liquid at a specific depth E. Height of a liquid
C. Liquid is independent F. None of the Above

27. Pressure due to the _____, at any level, depends on the depth of the fluid from the surface.
A. Modern hydraulics D. Weight of a liquid
B. Liquid at a specific depth E. Height of a liquid
C. Liquid is independent F. None of the Above

Static Pressure

28. When velocity becomes a factor it must have a direction, the force related to the velocity must also have a direction, so that Pascal's law alone does not apply to the dynamic factors of?
A. Pressure drop D. Fluid power
B. Velocity of flow E. Static head
C. Volume of a liquid F. None of the Above

29. Velocity head and _____ are obtained at the expense of static head.
A. Pressure drop D. Fluid power
B. Friction head E. Static head
C. Volume of a liquid F. None of the Above

Volume and Velocity of Flow

30. _____ is usually expressed in gallons per minute (gpm) and is associated with relative pressures of the liquid, such as 5 gpm at 40 psi?
A. Pressure drop D. Velocity of flow
B. Friction head E. Volume of flow
C. Volume of a liquid F. None of the Above

31. Which of the following flow terms is defined as the average speed at which the fluid moves past a given point. It is expressed in feet per second (fps) or feet per minute (fpm).
A. Pressure drop D. Velocity of flow
B. Friction head E. Volume of flow
C. Volume of a liquid F. None of the Above

32. Which of the following flow terms is an important consideration in sizing the hydraulic lines?

A. Pressure drop
B. Friction head
C. Volume of a liquid
D. Velocity of flow
E. Volume of flow
F. None of the Above

Section 3 - Fluid Mechanics and Hydraulic Principles
Key Terms

33. Which of the following definitions is the engineering science that pertains to liquid pressure and flow?

A. Pressure, Absolute
B. Pressure
C. Hydraulics
D. Hydrokinetics
E. Pascal's Law
F. None of the Above

34. Which of the following definitions is the engineering science pertaining to the energy of liquid flow and pressure?

A. Pressure, Absolute
B. Pressure
C. Hydraulics
D. Hydrokinetics
E. Pascal's Law
F. None of the Above

35. _____ is the pressure applied to a confined fluid at rest and is transmitted with equal intensity throughout the fluid.

A. Pressure, Absolute
B. Pressure
C. Hydraulics
D. Hydrokinetics
E. Pascal's Law
F. None of the Above

36. Which of the following definitions is height of a column or body of fluid above a given point expressed in linear units?

A. Head, Friction
B. Head, static
C. Head
D. Hydraulics
E. Hydrokinetics
F. None of the Above

37. _____ is often used to indicate gauge pressure?

A. Head, Friction
B. Head, static
C. Head
D. Hydraulics
E. Hydrokinetics
F. None of the Above

38. Which of the following definitions is when the pressure is equal to the height times the density of the liquid?

A. Head, Friction
B. Head, static
C. Head
D. Hydraulics
E. Hydrokinetics
F. None of the Above

39. _____ is required to overcome the friction at the interior surface of a conductor and between fluid particles in motion?

A. Head, Friction
B. Head, static
C. Head
D. Hydraulics
E. Hydrokinetics
F. None of the Above

40. Which of the following definitions varies with flow, size, type, and conditions of conductors and fittings, and the fluid characteristics?
A. Head, Friction D. Hydraulics
B. Head, static E. Hydrokinetics
C. Head F. None of the Above

41. _____ is the pressure in a fluid at rest?
A. Pressure, Atmospheric D. Pressure, Gauge
B. Pressure, Static E. Pascal's Law
C. Hydraulics F. None of the Above

42. Which of the following definitions is the height of a column or body of fluid above a given point?
A. Head, Friction D. Hydraulics
B. Head, static E. Hydrokinetics
C. Head F. None of the Above

43. _____ is the pressure exerted by the atmosphere at any specific location?
A. Pressure, Atmospheric D. Pressure, Gauge
B. Pressure, Static E. Pascal's Law
C. Hydraulics F. None of the Above

Section 3 - Fluid Mechanics and Hydraulic Principles- Introduction
Hydraulics
44. Which of the following terms includes the manner in which liquids act in tanks and pipes, deals with their properties, and explores ways to take advantage of these properties.
A. Pressure D. Hydraulics
B. Hydrostatics E. Flow
C. Hydrokinetics F. None of the Above

45. Which of the following terms includes the consideration of liquids at rest, involves problems of buoyancy and flotation?
A. Pressure D. Hydraulics
B. Hydrostatics E. Flow
C. Hydrokinetics F. None of the Above

46. _____ includes the behavior of all liquids, although it is primarily concerned with the motion of liquids.
A. Fluids D. Hydraulics
B. Hydrostatics E. Flow
C. Hydrokinetics F. None of the Above

47. Which of the following terms includes the study of liquids in motion, is concerned with such matters as friction and turbulence generated in pipes by flowing liquids?
A. Pressure D. Hydraulics
B. Hydrostatics E. Flow
C. Hydrokinetics F. None of the Above

48. Which of the following terms is about the pressures exerted by a fluid at rest?
A. Pressure D. Hydraulics
B. Hydrostatics E. Flow
C. Hydrokinetics F. None of the Above

Section 4 - Fluid/Hydraulic Forces & Pressures Introduction
Atmospheric Pressure
49. According the text, if a column of air 1-inch square extending all the way to the "atmosphere", this column of air would weigh approximately 2.31 pounds at sea level.
A. True B. False

50. Which of the following terms at sea level is approximately 14.7 psi?
A. Static pressure D. Bottom
B. Pressure E. Atmospheric pressure
C. Gauge pressure F. None of the Above

51. If you were to ascend, the atmospheric pressure increases by approximately 1.0 psi for every 2,343 feet.
A. True B. False

Pressure
52. Water is incompressible, while air is very compressible.
A. True B. False

53. Both air and water are considered to be_____.
A. Absolute pressure D. Volume
B. Atmospheric pressure E. Shearing force
C. Fluid(s) F. None of the Above

54. Which of the following terms does water possess and air does not?
A. Absolute pressure D. Volume
B. Atmospheric pressure E. Shearing force
C. Fluid(s) F. None of the Above

55. A fluid is a substance that cannot exert any permanent forces tangential to a boundary and any force that it exerts on a boundary must be normal to the boundary.
A. True B. False

56. According to the text, a force is proportional to the_____, and is called a pressure.
A. Pascal's Principle D. Permanent forces tangential
B. Hydrostatics E. Area on which it is exerted
C. Acting on the body of the fluid F. None of the Above

57. In order for the fluid to be in equilibrium, the pressure must be the same in all directions (or the element would move in the direction of least pressure), and if no other forces are?
A. Pascal's Principle D. Permanent forces tangential
B. Hydrostatics E. Area on which it is exerted
C. Acting on the body of the fluid F. None of the Above

58. Which of the following terms does water and air have; that is, layers of them slide very easily on one another?

A. Low viscosity
B. Atmospheric pressure
C. Fluid(s)
D. Volume
E. Shearing force
F. None of the Above

59. Therefore, in this case the pressure will be the same throughout the fluid, and the same in any direction at a point _____.

A. Pascal's Principle
B. Hydrostatics
C. Acting on the body of the fluid
D. Permanent forces tangential
E. Area on which it is exerted
F. None of the Above

60. Which of the following terms that if a certain volume of fluid were somehow made solid, the equilibrium of forces would not be disturbed?

A. Axiom
B. Gravitational body force
C. Pressure
D. Displaced fluid
E. Gravitation
F. None of the Above

61. Which of the following terms is an example of a body force that disturbs the equality of pressure in a fluid?

A. Axiom
B. Gravitational body force
C. Pressure
D. Displaced fluid
E. Gravitation
F. None of the Above

62. When the barometric equation is integrated, we find the variation of pressure with?

A. Height or depth
B. Gravitational body force
C. Pressure
D. Displaced fluid
E. Gravitation
F. None of the Above

Free Surface Perpendicular to Gravity

63. Archimedes' Principle says that the buoyant force is equal to the weight of the displaced fluid, and passes through the center of mass of_____.

A. Axiom
B. Gravitational body force
C. Pressure
D. Displaced fluid
E. Gravitation
F. None of the Above

Standard Atmospheric Pressure

64. Which of the following terms is a practice that is conveniently used to measure pressure differences by measuring the height of liquid columns?

A. Barometer measurement
B. Total vacuum
C. Capillarity
D. Partial vacuum measurement
E. Manometer
F. None of the Above

Vacuum

65. Which of the following terms the pressure would range from slightly less than 14.7 psia to slightly greater than 0 psia?

A. Static pressure
B. Pressure
C. Gauge pressure
D. Total vacuum
E. Partial vacuum
F. None of the Above

66. Backsiphonage results from _____ exerted on a liquid, forcing it toward a supply system that is under a vacuum.
A. Static pressure D. Atmospheric pressure
B. Pressure E. Partial vacuum
C. Gauge pressure F. None of the Above

Water Pressure
67. The weight of a cubic foot of water is 62.4 pounds per square foot. The base can be subdivided into 144-square inches with each subdivision being subjected to a pressure of 0.433 psig. This is one of our key foundation for backflow prevention.
A. True B. False

68. Which of the following terms are stated in terms of the height of a fluid.
A. Friction D. Siphon
B. Weight E. Depth
C. Pressure(s) F. None of the Above

69. Water with a pressure head of 10 ft can provide the same _____as an equal amount of water raised by 10 ft.
A. Friction D. Siphon
B. Weight E. Energy
C. Pressure(s) F. None of the Above

70. Water flowing in a pipe is subject to head loss because of?
A. Friction D. Siphon
B. Weight E. Energy
C. Pressure(s) F. None of the Above

Pressure and Force
71. _____ and force are used extensively in the study of fluid power?
A. Absolute pressure D. Volume
B. Pressure E. Shearing force
C. Fluid(s) F. None of the Above

72. Which of the following terms means a total push or pull. It is the push or pull exerted against the total area of a particular surface?
A. Absolute pressure D. Volume
B. Pressure E. Force
C. Fluid(s) F. None of the Above

73. _____ means the amount of push or pull applied to each unit area of the surface?
A. Absolute pressure D. Volume
B. Pressure E. Force
C. Fluid(s) F. None of the Above

74. Which of the following terms maybe exerted in one direction, in several directions, or in all directions?

A. Absolute pressure
B. Pressure
C. Fluid(s)
D. Volume
E. Force
F. None of the Above

Computing Force, Pressure, and Area

75. A formula is used in computing force, volume, and area in fluid power systems. In this formula, P refers to pressure, F indicates volume, and A represents area.

A. True B. False

Section 6- Hydraulic Foundations and Theories - Introduction
Pascal Law-Continued

76. Which of the following terms to be made effective for practical applications, it was necessary to have a piston that "fit exactly?"

A. Pascal's law
B. Evangelista Torricelli
C. Blaise Pascal
D. Aristotle' law
E. Archimedes' law
F. None of the Above

77. According to the text, valves, pumps, actuating cylinders, and motors have been developed and refined to make hydraulics one of the leading methods of transmitting power.

A. True B. False

78. One characteristic of a liquid is the tendency to keep its free surface level.

A. True B. False

79. Liquids will flow in the direction that will tend to make the surface level, if the surface is not level.

A. True B. False

Section 7- Pumps and Pumping Water - Introduction
General Pumping Fundamentals

80. Here are the important points to consider about suction piping when the liquid being pumped is below the level of the pump: Sometimes suction lift is also referred to as 'positive suction head'.

A. True B. False

81. According to the text, suction lift is when the level of water to be pumped is below the?

A. Impeller
B. Suction
C. Lift water
D. Centerline of the pump
E. Bellows
F. None of the Above

82. According to the text, the ability of the pump to lift water is the result of a partial vacuum created at the_____.

A. Partial vacuum
B. Suction lift
C. Center of the pump
D. Pressure differential
E. Negative suction head
F. None of the Above

83. The suction side of pipe should be one diameter smaller than the pump inlet.

A. True B. False

84. The required eccentric reducer should be turned so that the top is flat and the bottom tapered.
A. True B. False

The Basic Water Pump –Pump Operation
85. In a centrifugal pump, the water pressure at the edge of the turning impeller rises until it is able to keep water circling with the_____.
A. Centrifugal pump(s) D. Diaphragm pump(s)
B. Impeller blade(s) E. Cylindrical pump housing
C. Bernoulli's equation F. None of the Above

86. In a centrifugal pump, as water drifts outward between the _____ of the pump, it must move faster and faster because its circular path is getting larger and larger.
A. Centrifugal pump(s) D. Diaphragm pump(s)
B. Impeller blade(s) E. Cylindrical pump housing
C. Bernoulli's equation F. None of the Above

87. As the water slows down and its kinetic energy decreases, that water's pressure potential energy increases.
A. True B. False

88. According to the text, the centrifugal pumps work by spinning water around in a circle inside a?
A. Vortex D. Center of the impeller
B. Cylinder E. Cylindrical pump housing
C. Viscous drag pump F. None of the Above

89. The pump makes the water spin by pulling it with an impeller.
A. True B. False

90. The blades of this impeller project inward from an axle like the arms of a turnstile and, as the impeller spins, the water moves through it.
A. True B. False

91. As the water spins, the pressure near the outer edge of the pump housing becomes much lower than near the center of the impeller.
A. True B. False

92. The impeller blades cause the water to move faster and faster.
A. True B. False

93. The impellers may be of either a semi-open or closed type.
A. True B. False

94. According to the text, without an inward force, an object will travel in a straight line and will not complete the_____.
A. Circle D. Center of the impeller
B. Pump pushes E. Incompressible fluid
C. Viscous drag pump F. None of the Above

95. In a centrifugal pump, the inward force is provided by high-pressure water near the outer edge of the_____.
A. Centrifugal pump(s) D. Diaphragm pump(s)
B. Impeller blade(s) E. Cylindrical pump housing
C. Pump housing F. None of the Above

96. In the operation of the pump, the water at the edge of the _____ inward on the water between the impeller blades and makes it possible for that water to travel in a circle.
A. Inward force D. Center of the impeller
B. Pump pushes E. Incompressible fluid
C. Viscous drag pump F. None of the Above

97. In the operation of the pump, when water is actively flowing through the pump, arriving through a hole near the center of the impeller and leaving through a _____ near the outer edge of the pump housing, the pressure rise between center and edge of the pump is not as large.
A. Centrifugal pump(s) D. Diaphragm pump(s)
B. Impeller blade(s) E. Cylindrical pump housing
C. Hole F. None of the Above

Positive Displacement Pumps
98. A Positive Displacement Pump has an expanding cavity on the _____of the pump and a decreasing cavity on the discharge side.
A. Plunger pump D. Discharge tube
B. Suction side E. Roots blower
C. Dynamic F. None of the Above

99. According to the text, liquid is allowed to flow into the pump as the cavity on the suction side expands and the liquid is forced out of the_____.
A. Cylinder D. Cavity
B. Chamber E. Discharge
C. Radial flow F. None of the Above

100. This principle applies to all types of positive displacement pumps whether the pump is a rotary lobe, gear within a gear, piston, diaphragm, screw, and?
A. Plunger pump D. Progressing cavity
B. Mixed flow E. Roots blower
C. Dynamic F. None of the Above

101. A Positive Displacement Pump, unlike a Centrifugal Pump, will produce the same flow at a given RPM no matter what the discharge pressure is.
A. True B. False

102. _____ cannot be operated against a closed valve on the discharge side of the pump?
A. Bicycle D. Centrifugal
B. Bellows E. Positive Displacement Pump(s)
C. Radial flow F. None of the Above

103. If a Positive Displacement Pump is allowed to operate against a closed discharge valve it will continue to produce flow that will increase the pressure in the discharge line until either the line bursts or the pump is severely damaged or both.
A. True B. False

Plunger Pump
104. The plunger pump cannot be used for heavy sludge.
A. True B. False

105. The plunger pump is a positive displacement pump that uses a _____to force liquid from the suction side to the discharge side of the pump.
A. Plunger pump D. Discharge tube
B. Mixed flow E. Plunger or piston
C. Dynamic F. None of the Above

106. According to the text, the movement of the plunger or piston inside the pump creates pressure inside the pump, never operated against any_____.
A. Inward force D. Closed discharge valve
B. Pump pushes E. Incompressible fluid
C. Viscous drag pump F. None of the Above

107. Which of the following terms must be open before the pump is started, to prevent any fast build-up of pressure that could damage the pump?
A. Inward force D. Center of the impeller
B. Discharge valves E. Incompressible fluid
C. Viscous drag pump F. None of the Above

Diaphragm Pumps
108. Which of the following terms provides the mechanical action used to force liquid from the suction to the discharge side of the pump?
A. Centrifugal pump(s) D. Diaphragm
B. Impeller blade(s) E. Cylindrical pump housing
C. Bernoulli's equation F. None of the Above

109. Which of the following terms has an advantage that this pump does not come in contact with moving metal?
A. Plunger pump D. Diaphragm
B. Mixed flow E. Plunger or piston
C. Dynamic F. None of the Above

Pump Categories
110. The key to understanding a pumps operation is that a pump is to move water and generate the _____ we call pressure.
A. Centrifugal pump(s) D. Diaphragm pump(s)
B. Impeller blade(s) E. Cylindrical pump housing
C. Delivery force F. None of the Above

111. Pump operation like with a centrifugal pump — pressure is not referred to in pounds per square inch but rather as the equivalent in elevation, called?
A. Inward force
B. Head
C. Viscous drag pump
D. Center of the impeller
E. Incompressible fluid
F. None of the Above

112. According to the text, pumps may be classified on the basis of the application they serve.
A. True
B. False

113. According to the text, all pumps may be divided into two major categories: (1) dynamic and (2) _____.
A. Centrifugal
B. Impeller
C. Displacement
D. Diaphragm
E. Rotary
F. None of the Above

Common Types of Water Pumps
114. The water production well industry almost exclusively uses turbine pumps, which are a type of centrifugal pump.
A. True
B. False

115. The most common type of water pumps used for municipal and domestic water supplies are_____.
A. Axial flow
B. Submersible
C. Rotary pump
D. Turbine pump(s)
E. Variable displacement pumps
F. None of the Above

116. Which of the following terms will produce at different rates relative to the amount of pressure or lift the pump is working against?
A. Variable displacement pump
B. Drive shaft
C. Column pipe
D. Single or multiple bowls
E. Pump's lifting capacity
F. None of the Above

117. Impellers are rotated by the pump motor, which provides the _____ needed to overcome the pumping head.
A. Spider bearing(s)
B. Horsepower
C. Impeller(s)
D. Turbine pump(s)
E. Desired pumping rate
F. None of the Above

118. The size and number of stages, horsepower of the motor and _____are the key components relating to the pump's lifting capacity.
A. Pumping head
B. Drive shaft
C. Column pipe
D. Single or multiple bowls
E. Pump's lifting capacity
F. None of the Above

119. Which of the following terms are variable displacement pumps that are by far used the most?
A. Axial flow
B. Submersible
C. Rotary pump
D. Turbine pump(s)
E. Centrifugal pumps
F. None of the Above

120. The rotating shaft in a line shaft turbine is actually housed within the column pipe that delivers the water to the surface.
A. True B. False

121. The size of the _____are selected based on the desired pumping rate and lift requirements.
A. Spider bearing(s) D. Column, impeller, and bowls
B. Horsepower E. Desired pumping rate
C. Impeller(s) F. None of the Above

122. According to the text, the turbine pump utilizes impellers enclosed in single or multiple bowls or stages to_____.
A. Lift water D. Single or multiple bowls
B. Drive shaft E. Pump's lifting capacity
C. Column pipe F. None of the Above

123. Vertical turbine pumps are commonly used in groundwater wells. These pumps are driven by a shaft rotated by a motor on the surface.
A. True B. False

124. The shaft turns the impellers within the pump housing while the?
A. Spider bearing(s) D. Water moves up the column
B. Horsepower turns the shaft E. Desired pumping rate is obtained
C. Impeller(s) F. None of the Above

125. According to the text, column pipe sections can be threaded or coupled while the drive shaft is coupled and suspended within the column by_____.
A. Oil tube D. Single or multiple bowls
B. Spider bearings E. Pump's lifting capacity
C. Column pipe F. None of the Above

126. The water passing through the column pipe serves as the lubricant for the bearings.
A. True B. False

127. Which of the following terms, provide both a seal at the column pipe joints and keep the shaft aligned within the column?
A. Spider bearing(s) D. Roller bearings
B. Keyway E. Lantern rings
C. Impeller(s) F. None of the Above

128. Some vertical turbines are lubricated by oil rather than water. These pumps are essentially the same as_____; only the drive shaft is enclosed within an oil tube.
A. Oil tube D. Single or multiple bowls
B. Water lubricated units E. Pump's lifting capacity
C. Column pipe F. None of the Above

129. The oil tube is suspended within the column by_____, while the line shaft is supported within the oil tube by brass or redwood bearings.
A. Oil tube D. Single or multiple bowls
B. Spider flanges E. Pump's lifting capacity
C. Column pipe F. None of the Above

130. A continuous supply of _____the drive shaft as it proceeds downward through the oil tube.
A. Spider bearing(s) D. Turbine pump(s)
B. Oil lubricates E. Desired pumping rate
C. Impeller(s) F. None of the Above

131. A small hole located at the top of the _____allows excess oil to enter the well. This results in the formation of an oil film on the water surface within oil-lubricated wells.
A. Pump bow unit D. Single or multiple bowls
B. Drive shaft E. Pump's lifting capacity
C. Column pipe F. None of the Above

132. Careful operation of oil lubricated turbines is needed to ensure that the pumping levels do not drop enough to allow oil to enter the pump.
A. True B. False

133. According to the text, water and oil lubricated turbine pump units can be driven by?
A. Gears D. Electric or fuel powered motors
B. Drive shaft E. Pump's lifting capacity
C. Column pipe F. None of the Above

134. Often an electric motor that is connected to the _____by a keyway and nut.
A. Drive shaft D. Sprocket
B. Rotor E. Time delay or ratchet assembly
C. Inboard F. None of the Above

There are three main types of diaphragm pumps:
135. In the first type, the _____with one side in the fluid to be pumped, and the other in air or hydraulic fluid.
A. Vapor bubbles D. Volumetric positive displacement
B. Chamber pressure E. Diaphragm is sealed
C. Drive shaft F. None of the Above

136. The diaphragm is flexed, causing the volume of the pump chamber to increase and decrease.
A. True B. False

137. A pair of _____prevents reverse flow of the fluid.
A. Strainers D. Non-return check valves
B. Diaphragms E. Check valves
C. Springs F. None of the Above

138. The second type of diaphragm pump works with volumetric positive displacement, but differs in that the prime mover of the diaphragm is neither oil nor air; but is?
A. Vapor bubbles D. Volumetric positive displacement
B. Chamber pressure E. Reverse direction
C. Electro-mechanical F. None of the Above

139. The third type of diaphragm pump has one or more springs with the fluid to be pumped on both sides.
A. True B. False

140. According to the text, when the volume of a chamber of either type of pump is increased (the diaphragm moving up), the pressure decreases, and fluid is drawn into the?
A. Chamber D. Keyway and nut
B. Diaphragm E. Time delay or ratchet assembly
C. Inertial cavitation F. None of the Above

141. Which of the following terms - pressure later increases from decreased volume (the diaphragm moving down), the fluid previously drawn in is forced out?
A. Vapor bubbles D. Volumetric positive displacement
B. Chamber E. Diaphragm
C. Drive shaft F. None of the Above

142. _____ moving up once again draws fluid into the chamber, completing the cycle?
A. Spring D. Keyway and nut
B. Diaphragm E. Time delay or ratchet assembly
C. Inertial cavitation F. None of the Above

143. According to the text, cavitation is defined as the phenomenon of formation of vapor bubbles of a flowing liquid in a region where the pressure of the liquid falls below its?
A. Vapor bubbles D. Volumetric positive displacement
B. Chamber pressure E. Vapor pressure
C. Drive shaft F. None of the Above

144. Cavitation is divided into two classes of behavior: inertial (or transient) cavitation and?
A. Vapor bubbles D. Volumetric positive displacement
B. Chamber pressure E. Non-inertial cavitation
C. Drive shaft F. None of the Above

145. _____ is the process where a void or bubble in a liquid rapidly collapses, producing a shock wave?
A. Vapor bubbles D. Volumetric positive displacement
B. Chamber pressure E. Reverse direction
C. Inertial cavitation F. None of the Above

146. _____ is the process in which a bubble in a fluid is forced to oscillate in size or shape due to some form of energy input, such as an acoustic field?
A. Strainer D. Non-inertial cavitation
B. Diaphragm E. Time delay or ratchet assembly
C. Cavitation F. None of the Above

147. According to the text, cavitation is, in many cases, an undesirable occurrence. In devices such as propellers and pumps, cavitation causes a great deal of _____, vibrations, and a loss of efficiency.
A. Cavitation
B. Turbulence
C. Driveshaft
D. Propellers and pumps
E. Noise, damage to components
F. None of the Above

148. Which of the following terms forces liquid energy into very small volumes, thereby creating spots of high temperature and emitting shock waves, the latter of which are a source of noise?
A. Suction side
B. Residual stresses
C. Shock waves
D. Cavitation bubbles collapse
E. Collapse of cavities
F. None of the Above

149. According to the text, although the collapse of a cavity is a relatively low-energy event, highly localized collapses can_____.
A. Cause water hammer
B. Cause residual stresses
C. Cause shock waves
D. Erode metals
E. Collapse of cavities
F. None of the Above

150. The pitting caused by the collapse of cavities produces great wear on components and can dramatically shorten a propeller or pump's lifetime. After a surface is initially affected by cavitation, it tends to erode at an accelerating pace.
A. True B. False

Pump Glossary
151. Which of the following definitions is any substance that can be pumped such as oil, water, refrigerant, or even air?
A. Fluid
B. Mixed flow pump
C. Energy
D. Substance
E. Flow
F. None of the Above

152. _____ is a mechanical device that seals the pump stuffing box?
A. Packing
B. Bearing
C. Seal
D. Mechanical seal
E. Lantern ring
F. None of the Above

153. _____ is a barrier that separates stages of a multi-stage pump?
A. Gasket
B. Keyway
C. Bearing
D. Inter-stage diaphragm
E. Seal
F. None of the Above

154. Which of the following definitions is a flat material that is compressed between two flanges to form a seal?
A. Gasket
B. Keyway
C. Packing
D. Seal
E. Bond
F. None of the Above

155. Which of the following definitions is a line or tube that directs sealing fluid to the stuffing box?
A. Leak-off
B. Gland sealing line
C. Horizontal line
D. Lantern ring
E. Gland follower
F. None of the Above

156. Which of the following definitions is the part of the pump that increases the speed of the fluid being handled?
A. Packing
B. Impeller
C. Inboard
D. Seal
E. Outboard
F. None of the Above

157. _____ is a rectangular piece of metal that prevents the impeller from rotating on the shaft.
A. Gasket
B. Key
C. Energy
D. Bearing
E. Seal
F. None of the Above

158. Which of the following definitions is the area on the shaft that accepts the key?
A. Gasket
B. Keyway
C. Energy
D. Inter-stage diaphragm
E. Kinetic energy
F. None of the Above

159. _____ is a pump that uses both axial-flow and radial-flow components in one impeller.
A. Bellows
B. Mixed flow pump
C. Kinetic energy
D. Dynamic
E. Diaphragm pump
F. None of the Above

160. Which of the following definitions is the end of the pump closest to the motor?
A. Packing
B. Impeller
C. Inboard
D. Bowl
E. Outboard
F. None of the Above

161. Which of the following definitions is the energy associated with motion?
A. Soft start
B. Phase
C. Energy
D. Flow
E. Kinetic energy
F. None of the Above

162. Which of the following definitions is bushing at the bottom of the stuffing box that prevents packing from being pushed out of the stuffing box into the suction eye of the impeller?
A. Strainer
B. Suction
C. Suction eye
D. Stuffing box
E. Throat bushing
F. None of the Above

163. Which of the following definitions is force, usually along the centerline of the pump?
A. Thrust
B. Pressure
C. Suction
D. Vertical power
E. Energy
F. None of the Above

164. Which of the following definitions is a metal ring located between rings of packing that distributes gland sealing fluid?
A. Leak-off
B. Gland sealing line
C. Horizontal packing
D. Lantern ring
E. Gland follower
F. None of the Above

165. _____ is the fluid that leaks from the stuffing box.
A. Leak-off
B. Gland sealing leakage
C. Horizontal leakage
D. Lantern ring
E. Gland follower
F. None of the Above

166. _____ is a bushing used to compress the packing in the stuffing box and to control leakoff?
A. Leak-off packing
B. Gland sealing line
C. Horizontal packing
D. Lantern ring
E. Gland follower
F. None of the Above

167. Which of the following definitions are pumps in which the centerline of the shaft runs vertically?
A. Thrusters
B. Vanes
C. Suction pumps
D. Vertical pumps
E. Double pumps
F. None of the Above

168. Which of the following definitions are replaceable tubular coverings on the shaft?
A. Protectors
B. Shrouds
C. Covers
D. Shaft sleeve
E. Stages
F. None of the Above

169. Which of the following definitions is the metal covering over the vanes of an impeller?
A. Slop drain
B. Shroud
C. Slurry
D. Shaft sleeve
E. Stages
F. None of the Above

170. _____ is the drain from the area that collects leak-off from the stuffing box.
A. Slop drain
B. Shroud
C. Slurry drain
D. Shaft sleeve
E. Stages
F. None of the Above

171. Which of the following definitions is the part of the pump that changes the speed of the fluid into pressure?
A. Thrust
B. Vanes
C. Suction eye
D. Vertical pumps
E. Volute
F. None of the Above

172. Which of the following definitions are the replaceable rings on the impeller or the casing that wear as the pump operates?
A. Seals
B. Vanes
C. Packing glands
D. Glands
E. Wearing rings
F. None of the Above

173. Which of the following definitions is a nut that keeps the parts in place?
A. Lock nut D. Radial bearings
B. Keyway E. Retaining nut
C. Cotter F. None of the Above

174. _____ are the rotating parts, usually including the impeller, shaft, bearing housings, and all other parts included between the bearing housing and the impeller.
A. Inboard D. Flow parts
B. Rotor E. Retaining parts
C. Mechanical F. None of the Above

175. Which of the following definitions is to cause lines, grooves, or scratches?
A. Wear D. Scratch
B. Burn E. Grover
C. Score F. None of the Above

176. _____ is a cylindrical bar that transmits power from the driver to the pump impeller.
A. Radial flow D. Gear driver
B. Shaft E. Keyway
C. Transfer F. None of the Above

177. Which of the following definitions is the place where fluid enters the pump?
A. Strainer D. Stuffing box
B. Suction E. Throat
C. Entrance F. None of the Above

178. Which of the following definitions are bearings that prevent shaft movement in any direction outward from the centerline of the pump?
A. Volute D. Radial bearings
B. Rotor E. Retaining bearings
C. Spider F. None of the Above

179. Which of the following definitions is flow at 90° to the centerline of the shaft?
A. Radial flow D. Vertical
B. Reverse E. Horizontal
C. Score F. None of the Above

180. Which of the following definitions is a device that retains solid pieces while letting liquids through?
A. Strainer D. Stuffing box
B. Lantern ring E. Throat bushing
C. Suction eye F. None of the Above

181. _____ is the area of the pump where the shaft penetrates the casing.
A. Strainer D. Stuffing box
B. Leak-off E. Throat bushing
C. Suction eye F. None of the Above

182. Which of the following definitions is the place where fluid enters the pump impeller?
A. Strainer
B. Suction
C. Suction eye
D. Stuffing box
E. Throat
F. None of the Above

183. Which of the following definitions are pumps in which the centerline of the shaft is horizontal?
A. Dynamic
B. Centrifugal
C. Horizontal pumps
D. Turbine
E. Radical flow
F. None of the Above

184. Which of the following definitions are bearings that prevent shaft movement back and forth in the same direction as the centerline of the shaft?
A. Thrust
B. Spider
C. Suction
D. Vertical
E. Thrust bearings
F. None of the Above

185. _____ are parts of the impeller that push and increase the speed of the fluid in the pump.
A. Thrusters
B. Vanes
C. Drivers
D. Bowls
E. Volutes
F. None of the Above

186. _____ is a thick, viscous fluid, usually containing small particles.
A. Slop
B. Mixed liquid
C. Slurry
D. Drawdown
E. Mud
F. None of the Above

187. Which of the following definitions are impellers in a multi-stage pump?
A. Volutes
B. Shrouds
C. Bowls
D. Shaft stages
E. Stages
F. None of the Above

188. Which of the following definitions are pumps with more than one impeller?
A. Turbine
B. Mixed flow
C. Inboard
D. Multi-stage pumps
E. Outboard
F. None of the Above

189. Which of the following definitions is the end of the pump farthest from the motor?
A. Outlet
B. Impeller
C. Inboard
D. Exit
E. Outboard
F. None of the Above

190. Which of the following definitions is the soft, pliable material that seals the stuffing box?
A. Packing
B. Rubbers
C. Gaskets
D. Glands
E. Mechanical seal
F. None of the Above

191. Which of the following definitions are pumps that move fluids by physically displacing the fluid inside the pump?
A. Bellows D. Multi-stage pumps
B. Axial E. Positive displacement pumps
C. Dynamic F. None of the Above

Section 8 - Complicated Pumps
Complicated Pumps - Introduction
192. More complicated pumps have valves check valves that open to allow _____, and close automatically to prevent reverse flow.
A. Pistons D. Passage in one direction
B. Diaphragms E. Lift pumps
C. Discharged fluid F. None of the Above

193. There are many kinds of_____, and can be the most trouble-prone and complicated part of a pump.
A. Rotors D. Air space
B. Force pumps E. Valves
C. Inlets F. None of the Above

194. Pumps are excellent examples of_____.
A. Hydrostatics D. Multi-stage pumps
B. Quasi-static E. Complicated part
C. Oscillating diaphragm F. None of the Above

195. Pumps are of two general types, _____ or positive displacement pumps, and pumps depending on dynamic forces, such as centrifugal pumps.
A. Hydrostatic D. Hydrostatic considerations
B. Quasi-static E. Complicated part
C. Oscillating diaphragm F. None of the Above

196. Positive displacement pumps have a piston (or equivalent) moving in a closely-fitting cylinder and forces are exerted on the fluid by motion of the piston.
A. True B. False

197. According to the text, the force pump has _____in the cylinder, one for supply and the other for delivery.
A. Two check valves D. Cylinders
B. Diaphragms E. Lift pumps
C. Rotors F. None of the Above

198. The supply valve opens when the cylinder_____, the delivery valve when the cylinder volume decreases.
A. Rotor D. Air space
B. Force pump E. Volume increases
C. Volume decreases F. None of the Above

199. According to the text, the lift pump has a _____and a valve in the piston that allows the liquid to pass around it when the volume of the cylinder is reduced.
A. Supply valve D. Cylinder
B. Diaphragm E. Lift pumps
C. Discharged fluid F. None of the Above

200. The delivery in this case is from the upper part of the_____, which the piston does not enter.
A. Rotor D. Air space
B. Force pump E. Cylinder
C. Volume decreases F. None of the Above

201. Diaphragm pumps are force pumps in which the oscillating diaphragm takes the place of the piston.
A. True B. False

202. Which of the following terms may be moved mechanically, or by the pressure of the fluid on one side of the diaphragm?
A. Piston D. Cylinder
B. Diaphragm E. Lift pumps
C. Discharged fluid F. None of the Above

203. Which of the following terms are typically used for pumping water?
A. Bellows D. Force and lift pumps
B. Force pumps E. Delivery pumps
C. Volume pumps F. None of the Above

204. The force pump has two valves in the cylinder, while the lift pump has one valve in the cylinder and one in the piston.
A. True B. False

205. Which of the following terms is determined by the atmospheric pressure, and either cylinder must be within this height of the free surface?
A. Suction D. Discharge
B. Diaphragm E. Force
C. Discharged fluid F. None of the Above

206. The force pump can give an arbitrarily large pressure to the _____, as in the case of a diesel engine injector.
A. Rotor D. Air space
B. Discharged fluid E. Delivery
C. Volume decreases F. None of the Above

207. The roots blower can either exhaust a receiver or provide _____under moderate pressure, in large volumes.
A. Air D. Discharge tube
B. Mixed flow E. Roots blower
C. Dynamic F. None of the Above

208. The Bellows is a very old device, requiring no accurate machining.
A. True B. False

209. The single valve is in one or both sides of the expandable_____.
A. Cylinder D. Cavity
B. Chamber E. Positive Displacement Pump(s)
C. Radial flow F. None of the Above

210. Which of the following terms uses the valve on the valve stem of the tire or inner tube to hold pressure in the tire?
A. Bellows pump D. Bicycle pump
B. Chamber pump E. Positive Displacement Pump
C. Radial flow pump F. None of the Above

211. Which of the following terms, which is attached to the discharge tube, has a flexible seal that seals when the cylinder is moved to compress the air, but allows air to pass when the movement is reversed?
A. Piston D. Cylinder
B. Diaphragm E. Sliding contact
C. Discharged fluid F. None of the Above

212. According to the text, diaphragm and vane pumps act the same way by varying the volume of a chamber, and directing the flow with_____.
A. Cylinder D. Cavity
B. Check valves E. Positive Displacement Pump(s)
C. Radial flow F. None of the Above

Centrifugal Pump Section
213. A Centrifugal pump is a machine that imparts energy to a fluid. This energy infusion can cause a liquid to flow, rise to a higher level, or both.
A. True B. False

214. The centrifugal pump is an extremely simple machine. It is a member of a family known as rotary machines and consists of two basic parts: 1) the rotary element or impeller and 2) the stationary element or_____.
A. Staging D. Lantern ring spacer
B. Eye E. Casing (volute)
C. Pressure F. None of the Above

215. In operation, a centrifugal pump "_____" liquid out of the impeller via centrifugal force.
A. Web of the ring D. Vapor bound
B. Slings E. Single-stage pump
C. Pump shaft F. None of the Above

216. A pump does not create pressure; it only provides flow. Pressure is just an indication of the amount of_____
A. Staging D. Resistance to flow
B. Eye E. Recirculation lines
C. Pressure F. None of the Above

217. Centrifugal pumps are also classified as HORIZONTAL or VERTICAL, depending upon the position of the pump shaft.
A. True B. False

218. The single-suction impeller allows liquid to enter the eye from one side only. The double-suction impeller allows liquid to enter the _____ from two directions.
A. Staging D. Volute
B. Eye E. Recirculation line
C. Pressure F. None of the Above

219. _____are also classified as Closed or Open?
A. Webs D. Impellers
B. Volutes E. Single-stage pumps
C. Dynamic pumps F. None of the Above

220. _____have side walls that extend from the eye to the outer edge of the vane tips?
A. Staging D. Closed impellers
B. Eyes E. Recirculation lines
C. Pressure vanes F. None of the Above

221. Some small pumps with single-suction impellers have only a casing wearing ring and no?
A. Staging D. Lantern ring spacer
B. Eye E. Recirculation lines
C. Impeller ring F. None of the Above

222. Which of the following terms are installed on some centrifugal pumps to prevent the pumps from overheating and becoming vapor bound?
A. Air relief D. Recirculation lines
B. Foot valve E. Single-stage pump
C. Pump shaft F. None of the Above

223. Which of the following terms is installed to cool the shaft and the packing, to lubricate the packing, and to seal the rotating joint between the shaft and the packing against air leakage?
A. Staging D. Lantern ring spacer
B. Eye E. Water jet
C. Seal piping F. None of the Above

224. Which of the following terms is inserted between the rings of the packing in the stuffing box?
A. Web of the ring D. Mechanical seal
B. Lantern ring spacer E. Bearings
C. Pump shaft F. None of the Above

225. According to the text, seal piping leads the liquid from the discharge side of the pump to the annular space formed by the?
A. Staging D. Lantern ring spacer
B. Eye E. Volute
C. Lantern ring F. None of the Above

226. According to the text, the web of the ring is perforated so that the water can flow in either direction along the shaft between the?
A. Web of the ring D. Mechanical seal
B. Shaft and the packing E. Packing ring
C. Pump shaft F. None of the Above

Let's look at the components of the centrifugal pump.
227. As the impeller rotates, it sucks the liquid into the center of the pump and throws it out under pressure through the_____.
A. Web of the ring D. Vapor bound
B. Outlet E. Single-stage pump
C. Pump shaft F. None of the Above

228. The casing that houses the impeller is referred to as the_____, the impeller fits on the shaft inside.
A. Staging D. Lantern ring spacer
B. Eye E. Recirculation lines
C. Volute F. None of the Above

Pump Casing
229. The most common type of centrifugal pump is an end-suction pump.
A. True B. False

230. Another type of centrifugal pump used is the split case.
A. True B. False

231. The line shaft turbine is a single stage centrifugal pump.
A. True B. False

232. There are many variations of split case, such as; two-stage, single suction, and?
A. Radial flow impellers D. Mixed media
B. Double suction E. Multi media
C. Parallel F. None of the Above

Impeller
233. In most centrifugal pumps, the impeller looks like a number of cupped vanes on blades mounted on_____.
A. Radial flow impellers D. Cupped vanes on blades
B. Axial flow impellers E. Disc or shaft
C. Parallel to the shaft F. None of the Above

234. As the water is being thrown out of the pump, this means you can run centrifugal pumps with the discharged valve closed for a long period.
A. True B. False

235. The impellers all cause a flow from the eye of the impeller to the outside of the impeller.
A. True B. False

236. According to the text, some impellers cause what is called_____, and they can be referred to as radial flow impellers.
A. Radial flow impellers
B. Axial flow impellers
C. Parallel to the shaft
D. Radial flow
E. Shape of the vanes
F. None of the Above

237. _____of the impeller and how it is installed in the casing will determine if it is high volume / low pressure or the type of liquid that could be pumped?
A. Shape of the vanes
B. Line shaft turbine
C. Parallel to the shaft
D. Critical distance
E. Discharge piping outlet
F. None of the Above

238. Which of the following terms looks like a propeller and creates a flow that is parallel to the shaft?
A. Radial flow impellers
B. Axial flow impellers
C. Parallel to the shaft
D. Cupped vanes on blades
E. Shape of the vanes
F. None of the Above

Progressing Cavity Pump Section
239. In the progressing cavity pump, components referred to as a rotor and an elastic stator provide the collapse of cavities used to force liquid from the suction side to the discharge side of the pump.
A. True B. False

240. The progressive cavity pump can be run dry, because there is no friction between the rotor and stator will quickly damage the pump.
A. True B. False

241. According to the text, as the rotor turns within the stator, cavities are formed which progress from the suction to the _____, conveying the pumped material.
A. Cavitation
B. Turbulence
C. Driveshaft
D. Discharge end of the pump
E. Center of rotation
F. None of the Above

242. Which of the following terms between the rotor and the stator helices that keeps the fluid moving steadily at a fixed flow rate proportional to the pump's rotational speed?
A. Suction side
B. Residual stresses
C. Shock waves
D. Pump casing
E. Continuous seal
F. None of the Above

243. Which of the following terms are used to pump material that is high in solids content?
A. Suction side
B. Residual stresses
C. Progressing cavity pumps
D. Pump casing
E. Collapse of cavities
F. None of the Above

More on the Progressive Cavity Pump

244. A progressive cavity pump is also known as a progressing cavity pump, eccentric screw pump, or?

A. Drag, or friction pump
B. Helical shaft pump
C. Cavity pump
D. High pressure pump
E. Eccentric screw pump
F. None of the Above

245. This type of pump transfers fluid by means of the progress, through the pump, of a sequence of small, fixed shape, discrete cavities, as its?

A. Flow rate
B. Hypocycloids
C. Piston pump
D. Rotor is turned
E. Peristaltic pump(s)
F. None of the Above

246. _____being proportional to the rotation rate and to low levels of shearing being applied to the pumped fluid?

A. Drag, or friction
B. Volumetric flow rate
C. Cavities
D. High pressure
E. Eccentric screw pump
F. None of the Above

247. Progressive cavity pumps have application in fluid metering and pumping of viscous or shear sensitive materials.

A. True B. False

248. With the progressive cavity pump, there no flow pulsing is caused by the arrival of_____, other than that caused by compression of the fluid or pump components.

A. Flow rate
B. Hypocycloids
C. Piston pump
D. Pump size
E. Cavities at the outlet
F. None of the Above

249. With the progressive cavity pump, the principle of this _____is due to a dynamic effect caused by drag, or friction against the moving teeth of the screw rotor.

A. Drag, or friction
B. Helical shaft
C. Cavities
D. High pressure
E. Pumping technique
F. None of the Above

250. In reality it is due to sealed cavities, being able to pump at extremely low rates, even to high pressure, revealing the effect to be purely_____.

A. Flow rate
B. Hypocycloids
C. Piston pump
D. Pump size
E. Positive displacement
F. None of the Above

251. With the progressive cavity pump, in order to produce a seal between cavities, the rotor so takes a form similar to a corkscrew, and this, combined with the off-center rotary motion

A. True B. False

252. Which of the following terms and various rotor/stator pitch ratios exist, but are specialized in that they don't generally allow complete sealing_____

A. Flow rate
B. Speeds
C. Drivers
D. Pump size
E. Different rotor shapes
F. None of the Above

253. At a high enough pressure the sliding seals between _____will leak some fluid rather than pumping it?
A. Drag, or friction D. High pressure
B. Helical shaft E. Eccentric screw pump
C. Cavities F. None of the Above

254. In operation, progressive cavity pumps are fundamentally fixed flow rate pumps, like piston pumps and_____.
A. Flow rate D. Pump size
B. Hypocycloids E. Peristaltic pump(s)
C. Piston pump F. None of the Above

255. With the progressive cavity pump, you need a fundamentally different understanding to the types of pumps to which people are more commonly first introduced, namely ones that can be thought of as generating a_____.
A. Drag, or friction D. Pressure
B. Helical shaft E. Force
C. Motor F. None of the Above

256. According to the text, pumps are often fitted with cut-off pressure switches, burst disks or a bypass pipe that allows a variable amount of a fluid to return to the inlet.
A. True B. False

257. Which of the following terms is there a fixed flow rate pump that is effectively converted to a fixed pressure one?
A. Drag, or friction D. Double pump
B. Centrifugal E. Dynamic pump
C. Bypass fitted F. None of the Above

258. Which of the following terms refers to where the rotor touches the stator, the surfaces are generally traveling transversely, in that small areas of sliding contact occur, these areas need to be lubricated by the fluid being pumped?
A. Torque D. Hydrodynamic lubrication
B. Lubrication layer E. Liquid's resistance to flow
C. Elastomer core F. None of the Above

259. Which of the following terms offer long life and reliable service transporting thick or lumpy fluids, abrasive fluids will significantly shorten the life of the stator?
A. Elastomer D. Elastomer compatibility
B. Rotor E. Progressive cavity pumps
C. Axial F. None of the Above

260. Slurries can be pumped reliably, as long as the _____ enough to maintain a lubrication layer around the particles and so provide protection to the stator.
A. Torque D. Medium is viscous
B. Lubrication layer E. Liquid's resistance to flow
C. Elastomer core F. None of the Above

261. According to the text, specific designs involve the rotor of the pump being made of a steel, coated in a smooth hard surface, normally chromium, with the body made of a molded elastomer inside a?
A. Elastomer D. Elastomer/pumped fluid compatibility
B. Rotor E. Progressive cavity pumps
C. Metal tube body F. None of the Above

262. _____of the stator forms the required complex cavities?
A. Torque D. Force
B. Lubrication layer E. Liquid's resistance
C. Elastomer core F. None of the Above

263. _____is used for the stator to simplify the creation of the complex internal shape?
A. Elastomer D. Elastomer/pumped fluid compatibility
B. Rotor E. Progressive cavity pumps
C. Helicase F. None of the Above

264. Two common designs of stator are the "equal-walled" and the_____.
A. Unequal walled D. Distort under pressure
B. Lubrication layer E. Liquid's resistance to flow
C. Elastomer core F. None of the Above

Submersible Pumps
265. Submersible pumps are in essence very similar to_____.
A. Cased wells D. Pump bowl assembly
B. Turbine pumps E. VHS or VSS motors
C. Pump's intake F. None of the Above

266. The pump shaft has a keyway in which the splined motor end shaft inserts, the motor is often bolted to the_____.
A. Motor D. Pump housing
B. Pump shrouds E. Number of stages
C. Canned configurations F. None of the Above

267. The pump's intake is located between the motor and the pump and is normally screened to prevent sediment from entering the pump and damaging the?
A. Impellers D. Pump bowl assembly
B. Shroud E. VHS or VSS motors
C. Pump's intake F. None of the Above

268. These types of pumps are often installed in such that flow through the _____can occur upwards past the motor and into the intake.
A. Well screen D. Pump housing
B. Pump shrouds E. Number of stages
C. Volute F. None of the Above

269. Which of the following terms if inserted below the screened interval or below all productive portions of the aquifer, it will not be properly cooled, resulting in premature motor failure?
A. Cased wells D. Pump bowl assembly
B. Shroud E. Motor end
C. Pump's intake F. None of the Above

270. Some pumps may have _____ installed on them to force all the water to move past the motor to prevent overheating.
A. Motor D. Pump housing
B. Pump shrouds E. Number of stages
C. Canned configurations F. None of the Above

271. Which of the following terms is a piece of pipe that attaches to the pump housing with an open end below the motor?
A. Cased wells D. Pump bowl assembly
B. Shroud E. VHS or VSS motors
C. Pump's intake F. None of the Above

272. With the turbine pump, the size of the bowls and impellers, number of stages, and horsepower of the motor are adjusted to achieve the desired production rate within the limitations of the?
A. Motor D. Pump housing
B. Pump shrouds E. Pumping head
C. Canned configurations F. None of the Above

Understanding the Operation of a Vertical Turbine Pump
273. Turbine pump efficiencies are comparable to or greater than most centrifugal pumps, these are usually more expensive than centrifugal pumps and more difficult to inspect and repair.
A. True B. False

274. According to the text, the intake for the turbine pump is continuously under water, and priming is not a concern.
A. True B. False

275. _____ are available in deep well, shallow well, or canned configurations?
A. Cased wells D. Pump bowl assembly
B. Shroud E. Vertical turbine pumps
C. Pump's intake F. None of the Above

276. Which of the following terms are also available, these pumps are also suitable industrial, municipal, commercial and agricultural applications?
A. Motor D. Submersible motors
B. Pump shrouds E. Number of stages
C. Canned configurations F. None of the Above

277. Deep well turbine pumps are adapted for use in cased wells or where the water surface is below the practical limits of a?
A. Cased wells D. Pump bowl assembly
B. Shroud E. Centrifugal pump
C. Pump's intake F. None of the Above

278. _____ are also used in surface water systems?
A. Turbine pumps D. Pump housing
B. Pump shrouds E. Number of stages
C. Canned configurations F. None of the Above

Bowl Assembly
279. The clutch assembly is the heart of the vertical turbine pump.
A. True B. False

280. The impeller and diffuser type casing is designed to deliver the energy that the system requires as efficiently as possible.
A. True B. False

281. Maximum flexibility both in the initial pump selection and in the event that future system modifications require a change in the pump rating, therefore vertical turbine pumps can be?
A. Clutch driven D. Progressive
B. Driver mounted E. Multi-staged
C. Solid shaft drivers F. None of the Above

Drivers
282. Which of the following terms is where the pump shaft extends through a tube in the center of the rotor and is connected to the driver by a clutch assembly at the top of the driver?
A. Clutch assembly D. Aligning the driver
B. Driver mounting base E. Hollow shaft drivers
C. Solid shaft drivers F. None of the Above

283. With the solid shaft driver, the _____is solid and projects below the driver mounting base.
A. Clutch assembly D. Aligning the driver
B. Rotor shaft E. Priming Capacity
C. Solid shaft drivers F. None of the Above

Discharge Head Assembly
284. The discharge head supports the driver and bowl assembly as well as supplying a discharge connection also called?
A. NUF D. An open shaft
B. Head and pump bowls E. Several bowls are stacked in series
C. Discharge head F. None of the Above

285. According to the text, a shaft sealing arrangement is located in the discharge head to seal the shaft where it leaves the?
A. Single-stage pump D. Semi-open or enclosed
B. Line shaft E. Mechanical seal assembly
C. Liquid chamber F. None of the Above

286. The shaft seal is usually a lantern ring type device.
A. True B. False

Column Assembly
287. According to the text, if there is a possibility of fine sand being pumped, select the oil lubricated pump because it will keep the _____of the bearings.
A. Single-stage pump D. Semi-open or enclosed
B. Line shaft E. Mechanical seal assembly
C. Sand out F. None of the Above

288. Line shaft bearings are commonly placed on _____ for water-lubricated pumps operating at speeds under 2,200 RPM and at 5-foot centers for pumps operating at higher speeds.
A. 10-foot centers D. An open shaft
B. Head and pump bowls E. Several bowls are stacked in series
C. Discharge head F. None of the Above

289. According to the text, oil-lubricated bearings are commonly placed on_____.
A. 10-foot centers D. An open shaft
B. Head and pump bowls E. 5-foot centers
C. Discharge head F. None of the Above

290. Which of the following terms encloses the impeller?
A. Pump bowl D. An open shaft
B. Head and pump bowls E. Several bowls are stacked in series
C. Discharge head F. None of the Above

291. Which of the following terms contains four impellers; all attached to a common shaft and will operate at four times the discharge head of a single-stage pump?
A. Single-stage pump D. Semi-open or enclosed
B. Line shaft E. Four-stage bowl assembly
C. Fine sand F. None of the Above

Column assembly will consist of:
292. According to the text, column pipe, which connects the _____to the discharge head,
A. Pumping level D. Upward adjustment
B. Bowl assembly E. Utilizes the fluid
C. Discharge head F. None of the Above

293. Shaft, connecting the bowl shaft to the?
A. Bowl shaft D. Lineshaft bearings
B. Driver E. Discharge head
C. Suction bell F. None of the Above

294. Column pipe may be either threaded or flanged.
A. True B. False

295. Some units will not require_____, having the bowl assembly connected directly to the discharge head instead.
A. Bowl shaft D. Column assembly
B. Bowls E. Discharge head
C. Suction bell F. None of the Above

Bowl Assemblies - The bowl consists of:
296. _____ are normally made by lowering the impellers to the bottom of the bowls and adjusting them upward?
A. Bowl shaft D. Lineshaft bearings
B. Bowls E. Impeller adjustments
C. Suction bell F. None of the Above

297. The amount of _____is determined by how much the line shaft will stretch during pumping.
A. Pumping level D. Upward adjustment
B. Tolerance E. Leakage
C. Discharge head F. None of the Above

298. According to the text, the adjustment must be made based on the lowest possible pumping level in the well, the proper adjustment procedure if often provided by the?
A. Pumping level D. Upward adjustment
B. Tolerance E. Pump manufacturer
C. Discharge head F. None of the Above

Stuffing Box Adjustment
299. The nuts should only be tightened about ½ turn at a time at 20 to 30 minute intervals to allow the packing to_____.
A. Run in D. Any deviation in performance
B. Stuffing box E. Gravity flow system
C. Correct alignment F. None of the Above

300. A new set of ring packing will need to be added to keep the?
A. Packing gland D. Lineshaft bearings
B. Box full E. Variances
C. Impending trouble F. None of the Above

301. According to the text, after adding two or three rings of packing, or when proper adjustment cannot be achieved, the _____should be cleaned completely of all old packing and re-packed.
A. Periodic inspection D. Any deviation in performance
B. Stuffing box E. Gravity flow system
C. Correct alignment F. None of the Above

Lineshaft Lubrication
302. Which of the following terms are lubricated by the pumped fluid on close-coupled units, and will usually not require pre or post lubrication?
A. Packing gland D. Open lineshaft bearings
B. Oil reservoir E. Enclosed lineshaft bearings
C. Driver F. None of the Above

303. Which of the following terms are lubricated by extraneous liquid, which is fed to the tension nut by either a gravity flow system or pressure injection system?
A. Packing gland D. Open lineshaft bearings
B. Oil reservoir E. Enclosed lineshaft bearings
C. Impending trouble F. None of the Above

304. According to the text, the oil reservoir must be kept filled with a good quality _____and adjusted to feed 10 to 12 drops per minute plus one (1) drop per 100' of setting.
A. Packing gland D. Lineshaft bearings
B. Oil reservoir E. Light turbine oil
C. Impending trouble F. None of the Above

305. Injection systems are designed for each installation — injection pressure and quantity of lubricating liquid will vary.
A. True B. False

General Maintenance Section
306. Which of the following terms or operation from what is expected can be traced back to some specific cause?
A. Periodic inspection D. Any deviation in performance
B. Stuffing box E. Gravity flow system
C. Correct alignment F. None of the Above

307. Which of the following terms or improper operation is essential to the correction of the trouble — whether the correction is done by the user, the dealer or reported back to the factory?
A. Packing gland D. Lineshaft bearings
B. Oil reservoir E. Variances
C. Impending trouble F. None of the Above

308. Which of the following terms from initial performance will indicate changing system conditions, wear or impending breakdown of unit?
A. Packing gland D. Lineshaft bearings
B. Oil reservoir E. Variances
C. Impending trouble F. None of the Above

309. According to the text, deep well turbine pumps must have _____ between the pump and the power unit.
A. Periodic inspection D. Any deviation in performance
B. Stuffing box E. Gravity flow system
C. Correct alignment F. None of the Above

310. _____is made easy by using a head assembly that matches the motor and column/pump assembly?
A. Packing gland D. Correct alignment
B. Oil reservoir E. Variances
C. Impending trouble F. None of the Above

311. Which of the following terms must be vertically aligned so that no part touches the well casing?
A. Periodic inspection D. Pump column assembly
B. Stuffing box E. Gravity flow system
C. Correct alignment F. None of the Above

312. Spacers are usually attached to the pump column to prevent the pump assembly from touching the well casing.
A. True B. False

313. Which of the following terms out of vertical alignment may also cause excessive bearing wear?
A. Periodic inspection D. Pump column
B. Stuffing box E. Gravity flow system
C. Correct alignment F. None of the Above

314. _____must be mounted on a good foundation at least 12 inches above the ground surface?
A. Packing gland D. Lineshaft bearings
B. Oil reservoir E. Head assembly
C. Impending trouble F. None of the Above

315. The foundation should have at least 12 inches of bearing surface on all sides of the well. In the case of a gravel-packed well, the 12-inch clearance is measured from the outside edge of the?
A. Periodic inspection D. Gravel packing
B. Stuffing box E. Gravity flow system
C. Correct alignment F. None of the Above

Section 8- Pump Operation and Performance Key Terms
316. Which of the following key terms is a measure of a liquid's resistance to flow. i.e.: how thick it is?
A. NPSH D. S.G.: Specific gravity
B. Specific Speed E. Vapor Pressure
C. Viscosity F. None of the Above

317. Which of the following key terms is the weight of liquid in comparison to water at approx. 20 degrees C?
A. NPSH D. S.G.: Specific gravity
B. Specific Speed E. Vapor Pressure
C. Viscosity F. None of the Above

318. Which of the following key terms is a number that is the function of pump flow, head, and efficiency?
A. NPSH D. S.G.: Specific gravity
B. Specific Speed E. Vapor Pressure
C. Viscosity F. None of the Above

319. Which of the following key terms determines the type of pump used, the speed it can run at, and with gear pumps, the internal clearances required?
A. NPSH D. S.G.: Specific gravity
B. Specific Speed E. Vapor Pressure
C. Viscosity F. None of the Above

320. _____ is the amount of pressure / head required to 'force' liquid through pipe and fittings?
A. NPSH D. Friction Loss
B. Specific Speed E. Vapor Pressure
C. Viscosity F. None of the Above

321. Which of the following key terms is related to how much suction lift a pump can achieve by creating a partial vacuum?
A. NPSH D. S.G.: Specific gravity
B. Specific Speed E. Vapor Pressure
C. Viscosity F. None of the Above

322. _____ is related to how a liquid is greater than the surrounding air pressure, the liquid will boil?
A. NPSH D. S.G.: Specific gravity
B. Specific Speed E. Vapor Pressure
C. Viscosity F. None of the Above

Screw or Auger Pump
323. The machine consists of a screw inside a hollow pipe. Some attribute its invention to Archimedes while others attribute it to Nebuchadnezzar II, the screw can be thought of as?
A. Casing D. An inclined plane
B. Screw E. Spiral tube
C. Stair case F. None of the Above

324. _____.is turned as the bottom end of the tube turns, it scoops up a volume of water?
A. Casing D. Equilibrium
B. Screw E. Spiral tube
C. Suction side F. None of the Above

325. According to the text, an amount of water will slide up in the spiral tube as the _____is turned, until it finally pours out from the top of the tube and feeds the irrigation system.
A. Casing D. Shaft
B. Screw E. Spiral tube
C. Suction side F. None of the Above

326. The contact surface between the screw and the pipe does not need to be perfectly water-tight because of the relatively large amount of water being scooped at each turn with respect to the?
A. Casing D. Equilibrium
B. Screw E. Angular speed of the screw
C. Suction side F. None of the Above

327. A large screw provides the mechanical action to move the liquid from the suction side to the_____.
A. Casing D. Discharge side of the pump
B. Screw E. Spiral tube
C. Suction side F. None of the Above

328. Which of the following terms can rotate in the 30 to 60 rpm range, although some pumps are faster?
A. Casing D. Equilibrium
B. Screw pumps E. Spiral tube
C. Suction side F. None of the Above

329. The slope of the _____ is normally either 30° or 38°.
A. Casing D. Equilibrium
B. Screw E. Spiral tube
C. Suction side F. None of the Above

330. The maximum lift for the larger diameter pumps is about 300 feet.
A. True B. False

NPSH - Net Positive Suction Head Section
331. NPSH (a) must exceed NPSH(r) to allow pump operation without cavitation.
A. True B. False

332. The vapor pressure of water at 95 degrees C is 84.53 kPa, there was enough suction to contain the vapor, but once the atmospheric pressure dropped at the higher elevation, the vapor was able to escape.
A. True B. False

333. NPSH(r) is the Net Positive Suction Head Required by the pump, which is read from the?
A. Pump suction D. Pump performance curve
B. Speed E. Hydraulic efficiency
C. Suction conditions F. None of the Above

Affinity Laws
334. The centrifugal pump is a very capable and?
A. Centrifugal Pump D. Atmospheric pressure
B. Transmit tension E. Flexible machine
C. Most economical F. None of the Above

335. The performance of a centrifugal pump can be varied by changing the _____ or its rotational speed.
A. Pump suction D. Rotational speed
B. Speed E. Impeller diameter
C. Suction conditions F. None of the Above

336. Reducing the impeller's diameter is probably the most common change and is usually the?
A. Most economical D. Atmospheric pressure
B. Transmit tension E. Laws of Affinity
C. Most economical F. None of the Above

337. The speed can be altered by changing _____or by changing the speed of the driver.
A. Pump suction D. Rotational speed
B. Pulley diameters E. Hydraulic efficiency
C. Suction conditions F. None of the Above

338. Which of the following terms or change in impeller diameter, the Laws of Affinity give results that are approximate?
A. Centrifugal Pump D. Speed change
B. Transmit tension E. Laws of Affinity
C. Most economical F. None of the Above

339. According to the text, the discrepancy between the _____and the actual values obtained in test are due to hydraulic efficiency changes that result from the modification.
A. Calculated values D. Rotational speed
B. Speed E. Hydraulic efficiency
C. Suction conditions F. None of the Above

340. Which of the following terms give reasonably close results when the changes are not more than 50% of the original speed or 15% of the original diameter?
A. Centrifugal Pump D. Atmospheric pressure
B. Transmit tension E. Laws of Affinity
C. Most economical F. None of the Above

341. Which of the following terms can be some of the most important factors affecting centrifugal pump operation?
A. Pump suction D. Rotational speed
B. Speed E. Hydraulic efficiency
C. Suction conditions F. None of the Above

Suction Lift

342. According to the text, atmospheric pressure at sea level is called absolute pressure (PSIA) because it is a measurement using absolute zero (a perfect vacuum) as a base.
A. True B. False

343. A pump cannot push or "force" a liquid up its suction pipe because liquids do not exhibit tensile strength.
A. True B. False

344. The vapor pressure of a liquid is the pressure necessary to keep the liquid from vaporizing at a given temperature.
A. True B. False

345. When a pump creates a suction, it is simply reducing local pressure by creating a partial vacuum.
A. True B. False

346. Atmospheric or some other external pressure acting on the surface of the liquid pushes the liquid up the suction pipe into the pump.
A. True B. False

347. According to the text, no pump can attain a suction lift of 34 ft; however, well designed ones can reach 25 ft quite easily.
A. True B. False

348. In addition to pump design and_____, there are two physical properties of the liquid being pumped that affect suction lift.
A. Pump suction D. Suction piping
B. Speed E. Hydraulic efficiency
C. Suction conditions F. None of the Above

349. Maximum suction lift is dependent upon the pressure applied to the surface of the liquid at the suction source. _____decreases as pressure decreases.
A. Centrifugal Pump D. Atmospheric pressure
B. Transmit tension E. Laws of Affinity
C. Maximum suction lift F. None of the Above

350. Which of the following terms is dependent upon the vapor pressure of the liquid being pumped?
A. Pump suction D. Maximum suction lift
B. Speed E. Hydraulic efficiency
C. Suction conditions F. None of the Above

351. Vapor pressure increases as liquid temperature increases. _____decreases as vapor pressure rises.
A. Vapor pressure D. Rotational speed
B. Speed E. Maximum suction lift
C. Suction conditions F. None of the Above

352. Maximum suction lift will increase as the external pressure on its source increases.
A. True B. False

Cavitation - Two Main Causes:
353. Due to low pressure the _____and higher pressure implodes into the vapor bubbles as they pass through the pump, causing reduced performance and potentially major damage.
A. Pump suction D. Water vaporizes (boils)
B. Speed E. Hydraulic efficiency
C. Suction conditions F. None of the Above

354. Suction or discharge recirculation. The pump is designed for a certain flow range, if there is not enough or too much flow going through the pump, the resulting _____can reduce performance and damage the pump.

A. Pump suction
B. Speed
C. Suction conditions
D. Turbulence and vortexes
E. Hydraulic efficiency
F. None of the Above

Affinity laws

355. The flow changes proportionally to speed.

A. i.e.: double the speed / multiply the pressure by 4
B. i.e.: double the speed / double the flow
C. i.e.: double the speed / multiply the power by 8
D. None of the Above

356. The pressure changes by the square of the difference.

A. i.e.: double the speed / multiply the pressure by 4
B. i.e.: double the speed / double the flow
C. i.e.: double the speed / multiply the power by 8
D. None of the Above

357. The power changes by the cube of the difference.

A. i.e.: double the speed / multiply the pressure by 4
B. i.e.: double the speed / double the flow
C. i.e.: double the speed / multiply the power by 8
D. None of the Above

Motor and Pump Calculations

358. _____is the height we are pumping to, or the height to the discharge-piping outlet that is filling the tank from the top?

A. Static head
B. Pump discharge head
C. Friction Loss
D. System or dynamic head
E. Negative suction head
F. None of the Above

359. Which of the following terms, pumping to a pressurized vessel we must convert the pressure units to head units?

A. Positive suction head
B. Pressure head
C. Friction Loss
D. Negative suction head
E. Total Dynamic Head (TDH)
F. None of the Above

360. Which of the following terms is caused by friction in the pipes, fittings, and system components?

A. Static head
B. Pump discharge head
C. Friction Loss
D. System or dynamic head
E. Negative suction head
F. None of the Above

Suction Head is Measured the Same Way.

361. If the liquid level is above the pump centerline, that level is a positive suction head.

A. True B. False

362. If the pump is lifting a liquid level from below its centerline, it is a?
A. Positive suction head D. Negative suction head
B. Friction E. Total Dynamic Head (TDH)
C. Friction Loss F. None of the Above

363. If the pump is pumping liquid from a pressurized vessel, you must convert this pressure to a positive suction head.
A. True B. False

364. A vacuum in the tank would be converted to a?
A. Static head D. System or dynamic head
B. Pump discharge head E. Negative suction head
C. Friction Loss F. None of the Above

365. Friction loss is calculated via a formula or a chart, taking into account the pipe diameter and roughness and the fluid flow rate, density, and viscosity.
A. True B. False

366. According to the text, friction in the pipes, fittings, and associated hardware is?
A. Positive suction head D. Negative suction head
B. Friction E. Total Dynamic Head (TDH)
C. Friction Loss F. None of the Above

367. Negative suction heads are added to the pump discharge head; positive suctions heads are subtracted from the?
A. Static head D. Pump discharge head
B. Pump discharge head E. Negative suction head
C. Friction Loss F. None of the Above

368. Which of the following terms is the total height in that a fluid is to be pumped, taking into account friction losses in the pipe?
A. Positive suction head D. Negative suction head
B. Friction E. Total Dynamic Head (TDH)
C. Friction Loss F. None of the Above

369. Which of the following terms is the head equivalent to the energy losses due to viscose drag of fluid flowing in the pipe?
A. Static head D. System or dynamic head
B. Pump discharge head E. Negative suction head
C. Friction Loss F. None of the Above

Electrical Motor Section - Introduction
370. The purpose of the bearing house is to hold the shaft firmly in place, yet allow it to rotate.
A. True B. False

371. The pump assembly can only be a vertical set-up.
A. True B. False

372. The power source of the pump is usually an electric motor. The motor is connected by a coupling to the_____.
A. Static head D. System or dynamic head
B. Bearings E. Pump shaft
C. Pump assembly F. None of the Above

373. Which of the following terms supports the bearings and provides a reservoir for the lubricant?
A. Static head D. System or dynamic head
B. Bearings E. Bearing house
C. Pump assembly F. None of the Above

374. An impeller is connected to the?
A. Static head D. System or dynamic head
B. Bearings E. Shaft
C. Pump assembly F. None of the Above

D-C Motors
375. The important characteristic of the D-C motor is that its speed will not vary with the amount of current used.
A. True B. False

376. There are many different kinds of D-C motors, depending on how they are wound and totally enclosed motors.
A. True B. False

A-C Motors
377. The synchronous type of A-C motor is used for smaller horsepower sizes, usually above 100 HP.
A. True B. False

378. There are a number of different types of alternating current motors, such as synchronous, induction, wound rotor, and?
A. Bubbler pipe D. Totally enclosed motors
B. Manual pump controls E. Squirrel cage
C. Wound rotor type F. None of the Above

379. Which of the following terms of A-C motor requires complex control equipment, since they use a combination of A-C and D-C?
A. Heat generated D. Speed/torque characteristics
B. Synchronous type E. Full voltage or reduced voltage
C. Motor(s) F. None of the Above

380. The induction type motor uses only alternating current.
A. True B. False

381. The squirrel cage motor provides a relatively constant speed.
A. True B. False

382. The wound rotor type could be used as a_____.
A. Bubbler pipe D. Totally enclosed motor
B. Manual pump controls E. Reduced voltage starter
C. Variable speed motor F. None of the Above

Motor Starters
383. All electric motors, except very large ones are equipped with starters, either full voltage or reduced voltage.
A. True B. False

384. Motors draw a much higher current when they are?
A. Heat generated D. Starting and gaining speed
B. Synchronous type E. Full voltage or reduced voltage
C. Motor(s) F. None of the Above

385. The purpose of the _____is to prevent the load from coming on until the amperage is low enough.
A. Bubbler pipe D. Totally enclosed motors
B. Manual pump controls E. Reduced voltage starter
C. Reduced voltage starter F. None of the Above

Motor Enclosures
386. Depending on the application, motors may need special protection.
A. True B. False

387. Some motors are referred to as “open” motors.
A. True B. False

388. Open motors allow air to pass through to remove heat generated when current passes through the windings.
A. True B. False

389. Totally enclosed motors include dust-proof, waterproof and explosion-proof motors.
A. True B. False

390. Other motors use _____for special environments or safety protection.
A. Heat generated D. Speed/torque characteristics
B. Synchronous type E. Full voltage or reduced voltage
C. Motor(s) F. None of the Above

391. _____must be provided on any motor where dangerous gases might accumulate.
A. Bubbler pipe D. Totally enclosed motors
B. Manual pump controls E. Reduced voltage starter
C. Explosion proof enclosure F. None of the Above

Motor Controls

392. Which of the following terms are provided with some method of control, typically a combination of manual and automatic?

A. Heat generated
B. Synchronous type
C. Pump motors
D. Speed/torque characteristics
E. Full voltage or reduced voltage
F. None of the Above

393. _____ can be located at the central control panel at the pump or at the suction or discharge points of the liquid being pumped?

A. Bubbler pipe
B. Manual pump controls
C. Wound rotor type
D. Totally enclosed motors
E. Reduced voltage starter
F. None of the Above

394. Two typical level sensors are the float sensor and the bubble regulator.

A. True B. False

395. The float sensor is pear-shaped and hangs in the wet well.

A. True B. False

396. As the height increases, the float tilts, and the mercury in the glass tube flows toward the end of the tube that has two wires attached to it. When the mercury covers the wires, it closes the circuit.

A. True B. False

397. A low-pressure air supply is allowed to escape from a _____ in the wet well.

A. Bubbler pipe
B. Manual pump controls
C. Wound rotor type
D. Totally enclosed motors
E. Reduced voltage starter
F. None of the Above

Motor Maintenance

398. Motors should be kept clean, free of moisture, and lubricated properly.

A. True B. False

399. Dirt, dust, and grime will plug the _____and can actually form an insulating layer over the metal surface of the motor.

A. Heat generated
B. Synchronous type
C. Ventilating spaces
D. Speed/torque characteristics
E. Full voltage or reduced voltage
F. None of the Above

Moisture

400. Moisture on windings tend to repel acid and alkali fumes, causing no damage to both insulation and metals.

A. True B. False