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Pump Primer 2 Answer Key

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Please circle, underline, bold or X only one correct answer

1.	A B C D E F	11.	A B C D E F	21.	A B C D E F
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168. A B C D E F	181. A B C D E F	194. A B C D E F
169. A B C D E F	182. A B C D E F	195. A B C D E F
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Rush Grading Service

If you need this assignment graded and the results mailed to you within a 48-hour period, prepare to pay an additional rush service handling fee of $50.00. This fee may not cover postage costs. If you need this service, simply write RUSH on the top of your Registration Form. We will place you in the front of the grading and processing line**.**

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You'll 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 manual 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.**

Understanding Pump Viscosity

1. When to use a _____ or a Positive Displacement pump is not always a clear choice.
A. Self-priming pump D. Pump
B. Priming pump E. Not self-priming pump
C. Centrifugal F. None of the Above

2. First let's examine the _____ to be pumped. The density of a substance is defined as its mass per unit volume, but here on the earth's surface, we can substitute weight for mass.
A. Specific gravity D. Density of the substance
B. Density of water E. Universal gravitational constant
C. Final velocity F. None of the Above

3. At 39-deg F, water has _____of 8.34 pounds per gallon or 62.43 pounds per cubic foot.
A. A density D. A fluid pressure
B. A weight E. The velocity
C. A specific gravity F. None of the Above

4. The term specific gravity compares the density of some substance to?
A. Specific gravity D. Density of the substance
B. The density of water E. The universal constant
C. The final velocity F. None of the Above

5. Since specific gravity is_____, the units of measure cancel themselves, and we end up with a dimensionless number that is the same for all systems of measure.
A. The HP required D. A fluid weight
B. A measurement E. The ratio of those densities
C. Specific pressure F. None of the Above

6. Which of the following terms - is important when sizing a centrifugal pump because it is indicative of the weight of the fluid and its weight will have a direct effect on the amount of work performed by the pump?
A. Specific gravity D. Density of the substance
B. The density of water E. The gravitational constant
C. The final velocity F. None of the Above

7. One of the beauties of the centrifugal pump is that the head and flow it produces has nothing to do with the?
A. HP required
B. Weight of the liquid
C. Specific gravity
D. Fluid piping system
E. Velocity that is added by the impeller
F. None of the Above

8. The final velocity attained by a falling object is actually the same as the initial velocity required for it to rise to the?
A. HP required
B. Falling object
C. Specific gravity
D. Same height from which it fell
E. Velocity that is added by the impeller
F. None of the Above

9. When this equation is applied to a centrifugal pump, h becomes the _____that it can produce. As the equation illustrates, that head depends upon the exit velocity of the liquid from the impeller vanes and the effect of gravity; it has absolutely nothing to do with the weight of the liquid.
A. Specific gravity
B. Density of water
C. Final velocity
D. Density of the substance
E. Maximum theoretical head
F. None of the Above

10. The weight of the liquid does affect the amount of work done by a pump and, therefore, ?
A. The HP required
B. A falling object
C. Specific gravity is zero
D. A fluid piping system is needed
E. The velocity that is added by the impeller
F. None of the Above

11. Heavier liquids cause a proportional increase in a pump's suction energy and those with a high suction energy level are more likely to experience?
A. Cavitation damage
B. The density of water
C. The final velocity
D. The density of the substance
E. The universal gravitational constant
F. None of the Above

Understanding Pump Friction Loss

12. To optimize _____, it is important to have a clear understanding of how the various system items interact.
A. The HP required
B. A falling object
C. The specific gravity
D. A fluid piping system
E. The velocity
F. None of the Above

13. Regardless of the methods used to gain a thorough picture of piping system operations, _____ must be performed.
A. Fanning friction factor
B. Darcy–Weisbach equation
C. Analytical methods
D. Bernoulli Equation
E. A variety of calculations
F. None of the Above

14. Among the formulas are the _____ to calculate the pressure in the system, and the Darcy-Weisbach equation, which is commonly used to calculate head loss in a pipe run.
A. Fanning friction factor
B. Darcy–Weisbach equation
C. Analytical methods
D. Bernoulli Equation
E. Fanning friction factor
F. None of the Above

15. Which of the following terms - is a way of expressing the total energy of fluid as it flows through a pipe run?

A. Fanning friction factor
B. Darcy–Weisbach equation
C. Analytical methods
D. Bernoulli Equation
E. Fanning friction factor
F. None of the Above

The Piping System

16. A piping system is configured of individual pipe runs connected in series and _____ with pumps, control valves, flowmeters and components.

A. Head loss
B. Pipe friction
C. The resistance
D. Viscous shear stresses
E. Parallel combinations
F. None of the Above

17. There are _____methods that provide an understanding of how the various items interact as a total system.

A. Fanning friction factor
B. Darcy–Weisbach equation
C. Both graphical and analytical
D. The graphical method
E. Fanning friction factor
F. None of the Above

18. The head loss is calculated using _____ for a variety of flow rates for each pipe run.

A. Fanning friction factor
B. Darcy–Weisbach equation
C. Analytical methods
D. The graphical method
E. Fanning friction factor
F. None of the Above

19. Using_____, the results are calculated directly, which eliminates the need for further graphics.

A. Fanning friction factor
B. The analytical method
C. Analytical methods
D. The graphical method
E. Fanning friction factor
F. None of the Above

20. In fluid dynamics, the _____ is a phenomenological equation, which relates the head loss — or pressure loss — due to friction along a given length of pipe to the average velocity of the fluid flow.

A. Fanning friction factor
B. Darcy–Weisbach equation
C. Analytical methods
D. The graphical method
E. Fanning friction factor
F. None of the Above

21. The Darcy–Weisbach equation contains a dimensionless friction factor, known as the Darcy friction factor. This is also called the _____or Moody friction factor.

A. Fanning friction factor
B. Darcy–Weisbach equation
C. Analytical methods
D. Darcy–Weisbach friction factor
E. Fanning friction factor
F. None of the Above

22. The Darcy friction factor is four times the _____, with which it should not be confused.

A. Fanning friction factor
B. Darcy–Weisbach equation
C. Analytical methods
D. Darcy–Weisbach friction factor
E. Fanning friction factor
F. None of the Above

Darcy-Weisbach Formula Flow of fluid through a pipe

23. The flow of liquid through a pipe is resisted by viscous shear stresses within the liquid and the turbulence that occurs along the internal walls of the pipe, created by the?

A. Head loss D. Viscous shear stresses
B. Pipe friction E. Roughness of the pipe material
C. Resistance F. None of the Above

24. This resistance is usually known as pipe friction and is measured is feet or meters head of the fluid, thus the term head loss is also used to express the?

A. Head loss D. Viscous shear stresses
B. Pipe friction E. Parallel combinations
C. Resistance to flow F. None of the Above

25. Many factors affect the _____ in pipes, the viscosity of the fluid being handled, the size of the pipes, the roughness of the internal surface of the pipes, the changes in elevations within the system and the length of travel of the fluid.

A. Head loss D. Viscous shear stresses
B. Pipe friction E. Parallel combinations
C. Resistance F. None of the Above

26. Which of the following terms - through various valves and fittings will also contribute to the overall head loss?

A. Head loss D. Viscous shear stresses
B. Pipe friction E. Parallel combinations
C. Resistance F. None of the Above

27. In a well-designed system the resistance through valves and fittings will be of minor significance to the overall head loss, many designers choose to ignore the _____for valves and fittings at least in the initial stages of a design.

A. Head loss D. Viscous shear stresses
B. Pipe friction E. Parallel combinations
C. Resistance F. None of the Above

28. Much research has been carried out over many years and various formulas to calculate _____ have been developed based on experimental data.

A. Head loss D. Viscous shear stresses
B. Pipe friction E. Parallel combinations
C. Resistance F. None of the Above

29. Among these is the Chézy formula which dealt with water flow in open channels. Using the concept of 'wetted perimeter' and the internal diameter of a pipe the _____could be adapted to estimate the head loss in a pipe.

A. Fanning friction factor D. Chézy formula
B. Darcy–Weisbach equation E. Fanning friction factor
C. Analytical methods F. None of the Above

The Moody Chart

30. In 1944 LF Moody plotted the data from the Colebrook equation and this chart which is now known as '_____" or sometimes the Friction Factor Chart, enables a user to plot the Reynolds number and the Relative Roughness of the pipe.

A. Fanning friction factor D. The Moody Chart
B. Darcy–Weisbach equation E. Fanning friction factor
C. Analytical methods F. None of the Above

31. The Moody Chart encouraged the use of the _____and this quickly became the method of choice for hydraulic engineers.

A. Fanning friction factor
B. Darcy–Weisbach equation
C. Analytical methods
D. Darcy-Weisbach friction factor
E. Fanning friction factor
F. None of the Above

32. Many forms of _____were developed to assist with the calculations, amongst these a round slide rule offered calculations for flow in pipes on one side and flow in open channels on the reverse side.

A. The system curve
B. Control valves
C. Head loss calculator
D. The manufacturer's available designs
E. The pump curve change
F. None of the Above

33. The development of the personnel computer from the 1980's onwards reduced the time needed to perform the_____, which in turn has widened the use of the Darcy-Weisbach formula.

A. Fanning friction factor
B. Darcy–Weisbach equation
C. Friction factor and head loss calculations
D. Bernoulli Equation
E. Fanning friction factor
F. None of the Above

Pipe Runs

34. A piping system is composed primarily of individual pipe runs connecting all system elements together. Because a pipe run is the basic building block of a piping system, examine the losses associated with individual pipe runs when connected in?

A. The system curve
B. Control valves
C. The head loss
D. The manufacturer's available designs
E. The pump curve change
F. None of the Above

35. Performing the head loss calculation for a range of expected flow rates helps to develop a curve showing the pipe run head loss for any flow rate within a?

A. Fanning friction factor
B. Darcy–Weisbach equation
C. Defined range
D. Bernoulli Equation
E. Fanning friction factor
F. None of the Above

36. Which of the following terms - allows for calculation of pressure anywhere in the pipe run?

A. Fanning friction factor
B. Darcy–Weisbach equation
C. Analytical methods
D. Bernoulli Equation
E. Fanning friction factor
F. None of the Above

37. Multiple pipe runs connected end-to-end form a "series" of individual pipe runs. _____through each pipe run in a series configuration is identical.

A. The control valve
B. The flow rate
C. The parallel paths
D. Its best efficiency point (BEP)
E. An assembled-to-order pump
F. None of the Above

38. When multiple pipe runs are placed in parallel, determining _____ through them becomes more difficult because the flow is distributed through the various pipe runs.

A. The system curve
B. Control valves
C. The head loss
D. The manufacturer's available designs
E. The pump curve change
F. None of the Above

39. Which of the following terms - across the parallel paths can be calculated after determining the flow rate in each pipe run and the head loss across each pipe run in a parallel configuration?
A. The control pressure D. The best efficiency point (BEP)
B. The head loss E. An engineered or assembled-to-order pump
C. The parallel paths F. None of the Above

40. The function describing the head loss across the component versus the flow rate is similar to that of _____ through valves and fittings.
A. The system curve D. The manufacturer's available designs
B. Pressure loss E. The pump curve change
C. The head loss F. None of the Above

Pump Curves
41. Which of the following terms - describes the operation of a pump for a range of flows at a defined speed?
A. The control valve D. The best efficiency point (BEP)
B. A pump curve E. An engineered plan
C. The parallel paths F. None of the Above

42. As a result, centrifugal pumps are usually selected from the manufacturer's available designs to match?
A. The system curve D. The manufacturer's available designs
B. The system requirements E. The pump curve change
C. The head loss F. None of the Above

43. An engineered or assembled-to-order pump can be specified, and _____can often provide a pump performance characteristic well suited to the specific application depending on the type of pump.
A. The control valve D. Its best efficiency point (BEP)
B. The user E. The manufacturer
C. The parallel paths F. None of the Above

44. Characteristics that can be changed by users to change the pump curve are the impeller diameter and?
A. The system curve D. The manufacturer's available designs
B. The rotational speed E. The pump curve change
C. The head loss F. None of the Above

45. Which of the following terms - will cause the pump curve to intersect the system curve at a different rate of flow?
A. The system curve D. The manufacturer's available designs
B. The pump demand change E. The pump curve change
C. The head loss F. None of the Above

46. When selected properly, the pump will operate near its best efficiency point. This relationship of speed change or diameter change is often referred to as?
A. The control valve D. Its best efficiency point (BEP)
B. The pump affinity rules E. An engineered or assembled-to-order pump
C. The parallel paths F. None of the Above

47. Control valves are inserted into _____to regulate the rate of flow or pressure in the piping system.
A. The system curve D. The manufacturer's available designs
B. A piping system E. The pump curve change
C. The head loss F. None of the Above

48. Remember, control valves control the flow by providing _____between the upstream and downstream components in the system.
A. System curve D. A variable hydraulic resistance
B. Control valves E. The pump curve change
C. Head loss F. None of the Above

49. Which of the following terms - does not change the basic shape of the system curve; it provides additional resistance to the system to enable the valve to control the flow?
A. The control valve D. The best efficiency point (BEP)
B. The user E. The engineered or assembled-to-order pump
C. The parallel paths F. None of the Above

System Curves
50. Pump and system curves can illustrate the basic interaction in?
A. The system curve D. The manufacturer's available designs
B. The total system E. The pump curve change
C. The head loss F. None of the Above

51. The point where the system curve and _____intersect is the balanced flow rate through the pump.
A. The control valve D. The manufacturer's available designs
B. The pump curve E. An engineered or assembled-to-order pump
C. The parallel paths F. None of the Above

Basic Water Pump Review
52. The water pump commonly found in our systems is centrifugal pumps. These pumps work by spinning water around in a circle inside?
A. An impeller D. A pressure rise
B. A circle E. A hole near the center of the impeller
C. A cylindrical pump housing F. None of the Above

53. The pump makes the water spin by pushing it with an impeller. _____from an axle like the arms of a turnstile and, as the impeller spins, the water spins with it.
A. The center of the impeller D. The blades of this impeller project outward
B. The cylindrical pump housing E. The arms of a turnstile
C. The appropriate contexts F. None of the Above

54. As the water spins, the pressure near the outer edge of the pump housing becomes much higher than near?
A. The center of the impeller D. The outer edge of the pump housing
B. The cylindrical pump housing E. The arms of a turnstile
C. The appropriate contexts F. None of the Above

There are many ways to understand this rise in pressure, and here are two:

55. First, you can view the water between _____ as an object traveling in a circle. Objects do not naturally travel in a circle--they need an inward force to cause them to accelerate inward as they spin.

A. An impeller
B. A circle
C. The impeller blades
D. A pressure rise
E. A hole near the center of the impeller
F. None of the Above

56. In a centrifugal pump, that inward force is provided by high-pressure water near?

A. The center of the impeller
B. The cylindrical pump housing
C. The appropriate contexts
D. The outer edge of the pump housing
E. The inner edge of the pump housing
F. None of the Above

57. Which of the following terms rises until it is able to keep water circling with the impeller blades?

A. An impeller
B. A circle
C. The impeller blades
D. The water pressure at the edge of the turning impeller
E. A hole near the center of the impeller
F. None of the Above

58. You can also view the water as an incompressible fluid, one that obeys _____ in the appropriate contexts.

A. Fanning friction factor
B. Darcy–Weisbach equation
C. Analytical methods
D. Bernoulli's Equation
E. Fanning friction factor
F. None of the Above

59. As water drifts outward between_____, it must move faster and faster because its circular path is getting larger and larger.

A. The center of the impeller
B. The impeller blades of the pump
C. The impeller blades
D. A pressure rise
E. A hole near the center of the impeller
F. None of the Above

60. When the water leaves the impeller and arrives at _____ , it slows down.

A. The center of the impeller
B. The cylindrical pump housing
C. The appropriate contexts
D. The outer edge of the pump housing
E. The outer edge of the cylindrical pump housing
F. None of the Above

61. Here is where _____ figures in. As the water slows down and its kinetic energy decreases, that water's pressure potential energy increases (to conserve energy).

A. Fanning friction factor
B. Darcy–Weisbach equation
C. Analytical methods
D. Bernoulli's Equation
E. Fanning friction factor
F. None of the Above

62. That is why the water pressure at the outer edge of the pump housing is higher than?

A. The center of the impeller
B. The cylindrical pump housing
C. The appropriate contexts
D. The outer edge of the pump housing
E. The water pressure near the center of the impeller
F. None of the Above

63. When water is actively flowing through the pump, arriving through a hole near the center of the impeller and leaving through a hole near_____, the pressure rise between center and edge of the pump is not as large.

A. An impeller
B. A circle
C. The impeller blades
D. The outer edge of the pump housing
E. A hole near the center of the impeller
F. None of the Above

Understanding Centrifugal Pump

64. Centrifugal pumps are a sub-class of dynamic?

A. Mechanical rotational energy
B. The kinetic energy
C. Impeller
D. Centrifugal force flings the liquid outward
E. Action of the centrifugal pump
F. None of the Above

65. Centrifugal pumps are used to transport liquids/fluids by the conversion of _____to the hydro dynamics energy of the liquid flow.

A. Mechanical rotational energy
B. The kinetic energy
C. The rotational kinetic energy
D. Centrifugal force
E. The action of the centrifugal pump
F. None of the Above

66. Which of the following terms - typically comes from an engine or electric motor or turbine. In the typical simple case?

A. The mechanical energy
B. Throttle Bushing
C. A tangential and radial direction
D. An inducer or recirculation of pressurized froth
E. The rotational energy
F. None of the Above

67. Common uses include water, sewage, petroleum and petrochemical pumping. _____of the centrifugal pump is the water turbine that converts potential energy of water pressure into mechanical rotational energy.

A. Mechanical rotational energy
B. The kinetic energy
C. The reverse function
D. Centrifugal force
E. The action
F. None of the Above

68. The transfer of energy from the mechanical rotation of the impeller to the motion and pressure of the fluid is usually described in terms of_____, especially in older sources written before the modern concept of centrifugal force as a fictitious force in a rotating reference frame was well articulated.

A. The mechanical energy
B. Throttle Bushing
C. A tangential and radial direction
D. An inducer or recirculation of pressurized froth
E. Centrifugal force
F. None of the Above

69. The concept of centrifugal force is not actually required to describe?

A. Mechanical rotational energy
B. The kinetic energy
C. An impeller
D. Centrifugal force flings the liquid outward
E. The action of the centrifugal pump
F. None of the Above

70. In the modern centrifugal pump, most of _____is due to the outward force that curved impeller blades impart on the fluid. Invariably, some of the energy also pushes the fluid into a circular motion, and this circular motion can also convey some energy and increase the pressure at the outlet.

A. The mechanical energy
B. The energy conversion
C. A tangential and radial direction
D. An inducer or recirculation of pressurized froth
E. An impeller capable of breaking the air bubbles
F. None of the Above

71. Modern sources say things like that the fluid "_____", or "centrifugal force flings the liquid outward".

A. Mechanical rotational energy
B. The kinetic energy
C. An impeller
D. Flows radially under centrifugal force
E. The action of the centrifugal pump
F. None of the Above

72. A centrifugal pump is one of the simplest pieces of equipment in any process plant. Its purpose is to convert energy of a prime mover first into velocity or _____and then into pressure energy of a fluid that is being pumped.

A. The mechanical energy
B. Kinetic energy
C. A tangential and radial direction
D. An inducer or recirculation of pressurized froth
E. An impeller capable of breaking the air bubbles
F. None of the Above

73. The energy changes occur by virtue of two main parts of the pump, the impeller and the volute or diffuser. The impeller is the rotating part that converts driver energy into?

A. The mechanical rotational energy
B. The kinetic energy
C. The impeller
D. The centrifugal force
E. The action of the centrifugal pump
F. None of the Above

74. Which of the following terms - is the stationary part that converts the kinetic energy into pressure energy?

A. The volute or diffuser
B. Foot valve
C. Impeller
D. NUF
E. Bowls
F. None of the Above

Generation of Centrifugal Force

75. The process liquid enters the suction nozzle and then into eye (center) of a revolving device known as?

A. Pressure
B. The kinetic energy
C. An impeller
D. Centrifugal force
E. The action of the centrifugal pump
F. None of the Above

76. When the impeller rotates, it spins the liquid sitting in the cavities between the vanes outward and provides?

A. The self-priming pump
B. A priming pump
C. Centrifugal pump
D. Centrifugal acceleration
E. Centrifugal self-priming
F. None of the Above

77. As liquid leaves _____a low-pressure area is created causing more liquid to flow toward the inlet.

A. Mechanical rotational energy
B. The eye of the impeller
C. An impeller
D. The liquid outward
E. The action of the centrifugal pump
F. None of the Above

78. Because_____, the fluid is pushed in a tangential and radial direction by the centrifugal force.

A. The mechanical energy
B. The impeller blades are curved
C. A tangential and radial direction
D. An inducer or recirculation of pressurized froth
E. An impeller capable of breaking the air bubbles
F. None of the Above

Vertical Centrifugal Pumps

79. Vertical centrifugal pumps are also referred to as cantilever pumps. They utilize a unique shaft and bearing support configuration that allows _____while the bearings are outside of the sump.

A. Mechanical rotational energy
B. The volute to hang in the sump
C. The impeller
D. Centrifugal force flings the liquid outward
E. The action of the centrifugal pump
F. None of the Above

80. This style of pump uses no stuffing box to seal the shaft but instead utilizes a "_____". A common application for this style of pump is in a parts washer.
A. The seal chamber D. Subsequent start-up lubrication
B. Stuffing box E. The driver and control equipment
C. Anchor bolts F. None of the Above

Froth Pumps
81. In the mineral processing industry, or in the extraction of oils and, froth is generated to separate the rich minerals or bitumen from the sand and clays. Froth contains air that tends to block _____and cause loss of prime.
A. The pump column D. Conventional pumps
B. Vertical alignment E. The foundation
C. The head assembly F. None of the Above

82. The industry over the years has developed different ways to deal with this problem. One approach consists of using?
A. The pump column D. Conventional pumps
B. Vertical alignment E. Vertical pumps with a tank
C. The head assembly F. None of the Above

83. Another approach is to build special pumps with an impeller capable of breaking the?
A. The vacuum D. Atmospheric pressure
B. Air bubbles E. Vapor bubbles
C. The cavitation bubbles F. None of the Above

84. Which of the following terms - escapes to the back of the impeller and a special expeller discharges the air back to the suction tank?
A. The vacuum D. Atmospheric pressure
B. Air bubbles E. Vapor bubbles
C. Air F. None of the Above

85. Some pumps may feature a large eye, an inducer or recirculation of pressurized froth from the pump discharge back to the suction to break the?
A. Vacuum D. Atmospheric pressure
B. Bubbles E. Vapor bubbles
C. Cavitation bubbles F. None of the Above

Multistage Centrifugal Pumps
86. Which of the following terms - containing two or more impellers is called a multistage centrifugal pump. The impellers may be mounted on the same shaft or on different shafts?
A. The lift pump D. The force and lift pumps
B. The force pump E. A centrifugal pump
C. The Bellows F. None of the Above

87. All energy transferred to the fluid are derived from?
A. The mechanical energy D. The mechanical energy driving the impeller
B. Throttle Bushing E. The impeller
C. A tangential and radial direction F. None of the Above

Priming

88. Most centrifugal pumps are _____. In other words, the pump casing must be filled with liquid before the pump is started, or the pump will not be able to function.

A. The self-priming pump
B. A priming pump
C. Centrifugal pumps
D. The pump and suction piping
E. Not self-priming
F. None of the Above

89. If the pump casing becomes filled with_____, the pump impeller becomes gas-bound and incapable of pumping.

A. Vacuum
B. Vapors or gases
C. Cavitation bubbles
D. Atmospheric pressure
E. Vapor bubbles
F. None of the Above

90. To ensure that a centrifugal pump remains primed and does not become gas-bound, most centrifugal pumps are located below the level of the source from which?

A. A foot valve to take its suction
B. Its air to take its suction
C. The suction line to take its suction
D. A mechanical seal to take its suction
E. The pump is to take its suction
F. None of the Above

91. The same effect can be gained by supplying liquid to the pump suction under pressure supplied by?

A. A foot valve
B. Its air to take its suction
C. The suction line
D. A mechanical seal
E. Another pump placed in the suction line
F. None of the Above

92. A centrifugal pump adds_____, but first it must get the liquid.

A. Air
B. Velocity to a liquid
C. Pressure
D. Performance or operation
E. Variances from initial performance
F. None of the Above

93. At that point, either atmospheric pressure, gravity, or a combination of the two will fill up _____with either more liquid or additional air.

A. The foot valve
B. The discharge
C. The suction line
D. The low pressure area
E. Either more liquid or additional air
F. None of the Above

94. The problem with centrifugal pumps is that a given impeller diameter and speed will throw all fluids to the same height. Since _____it will throw air to the same height as water.

A. The foot valve
B. The discharge
C. The suction line
D. The low pressure area
E. Either more liquid or additional air
F. None of the Above

95. That height is not enough to overcome atmospheric pressure, so the centrifugal pump has to have all of its air removed before it will pump a liquid, and that is what we mean?

A. By priming the pump
B. By discharging the pump
C. A centrifugal pump
D. The pump and suction piping priming
E. By not self-priming
F. None of the Above

There are several methods you can use to remove air from a centrifugal pump:

96. You can fill the pump and _____with liquid and start all over again.

A. The self-priming pump
B. Prime the pump
C. Fill
D. The pump and suction piping
E. Suction piping
F. None of the Above

97. You can attach a priming pump to the discharge side of the pump to remove any air in the pump and suction piping. Be sure this pump has?
A. The seal chamber D. Subsequent start-up lubrication
B. Stuffing box E. The driver and control equipment
C. A mechanical seal F. None of the Above

98. You never want to use packing in a priming pump because air will leak into _____ through the packing.
A. The seal chamber D. Bowl
B. The stuffing box E. A foot valve
C. A mechanical seal F. None of the Above

99. Some people install _____ at the end of the suction piping to insure that the fluid will not drain from the pump and suction piping.
A. A seal chamber D. A bowl
B. A stuffing box E. A foot valve
C. A mechanical seal F. None of the Above

100. The self-priming pump will retain enough fluid when it stops, to start again without having to worry about?
A. The self-priming pump D. The pump and suction piping
B. Re-priming E. Not being self-priming
C. Centrifugal pumping F. None of the Above

There are a couple of ways to do this:
101. Change the volute and impeller casing so that it retains the liquid in _____that is filled during the initial priming phase and retains this fluid when the pump completes its pumping task and shuts down.
A. A built in reservoir D. A fluid pressure
B. A weight E. The pump
C. A specific gravity F. None of the Above

102. Design _____above the centerline of the impeller eye insuring that the pump is always full of liquid.
A. The maximum suction lift D. A suction and discharge cavity
B. A discharge head E. VHS or VSS
C. A pump bowl assembly F. None of the Above

Understanding Suction Lift
103. Which of the following terms - deals with the maximum distance to the intake of a pump. Fire pumps and others may lift about 5' to 10' of suction?
A. Suction lift D. Static Suction Lift
B. Dynamic Discharge Head E. Static Discharge Head
C. Dynamic Suction Head F. None of the Above

104. Pumps operating at a negative minimum inlet pressure are capable of creating a?
A. Suction lift D. Static Suction Lift
B. Dynamic Discharge Head E. Static Discharge Head
C. Dynamic Suction Head F. None of the Above

105. NPSH is initialism for Net Positive Suction Head. In any cross-section of a generic hydraulic circuit, the _____ shows the difference between the actual pressure of a liquid in a pipeline and the liquid's vapor pressure at a given temperature.

A. Suction lift
B. Dynamic Discharge Head
C. Dynamic Suction Head
D. Static Suction Lift
E. Static Discharge Head
F. None of the Above

106. NPSH is an important parameter to take into account when designing a circuit: whenever the liquid pressure drops below the_____, liquid boiling occurs.

A. Vapor pressure
B. Friction loss
C. Cavitation bubble
D. Atmospheric pressure
E. Vapor bubbles
F. None of the Above

107. Which of the following terms - are particularly vulnerable especially when pumping heated solution near the vapor pressure, whereas positive displacement pumps are less affected by cavitation?

A. Progressing cavity pumps
B. Line-shaft turbine
C. Peristaltic pumps
D. Centrifugal pumps
E. Plunger pumps
F. None of the Above

108. Careful design is required to pump high temperature liquids with a centrifugal pump when the liquid is near?

A. The vacuum
B. Its boiling point
C. The cavitation bubble
D. Atmospheric pressure
E. Vapor bubbles
F. None of the Above

109. The violent collapse of the cavitation bubble creates a shock wave that can literally carve material from internal pump components and creates noise often described as?

A. Vapor pressure
B. Vapor bubbles
C. Cavitation bubbles
D. Inertial (or transient) cavitation
E. Consequence of forces
F. None of the Above

110. Additionally, the inevitable increase in _____can cause other mechanical faults in the pump and associated equipment.

A. Vacuum
B. Friction loss
C. Vibration
D. Atmospheric pressure
E. Vapor bubbles
F. None of the Above

Suction Limitations

111. Regardless of the extent of the _____, water can only be “lifted” a set distance or height due to its' vaporization pressure.

A. Vacuum
B. Friction loss
C. Vibration
D. Atmospheric pressure
E. Vapor bubbles
F. None of the Above

112. The theoretical maximum _____ for water is 33.9 feet.

A. Total Dynamic Head
B. Dynamic Discharge Head
C. Dynamic Suction Head
D. Suction lift
E. Static Discharge Head
F. None of the Above

113. From a practical standpoint, in consideration of the _____ of the piping, the altitude of the station, etc., the normal maximum lift for any pump is approximately 25 ft.

A. Vacuum
B. Friction loss
C. Vibration
D. Atmospheric pressure
E. Vapor bubbles
F. None of the Above

114. It must be remembered that _____ of the impeller increases as the suction lift increases, and therefore, the pump, where possible, should be located so that the suction line is submerged at all times.

A. Vapor pressure
B. Vapor bubbles
C. Cavitation
D. Inertial (or transient) cavitation
E. Consequence of forces
F. None of the Above

115. Pumps lift water with the help of atmospheric pressure, then pressurize and discharge the water from the casing. The practical _____, at sea level is 25 feet.

A. Total Dynamic Head
B. Dynamic Discharge Head
C. Dynamic Suction Head
D. Suction lift
E. Static Discharge Head
F. None of the Above

116. Most pump manufacturers will list this as?

A. The vacuum
B. The friction loss
C. The cavitation bubble
D. Atmospheric pressure
E. The maximum suction lift
F. None of the Above

117. Which of the following terms - exists when a liquid is taken from an open tank to an atmospheric tank where the liquid level is below the centerline of the pump suction?

A. The pump suction
B. Suction lift
C. Vaporization pressure
D. The friction loss of the piping
E. A shock wave
F. None of the Above

The following relationships may help to better understand Suction Lift:

118. Total Dynamic Head = Total discharge head + _____
Total Suction Lift = static + friction

A. Total Dynamic Head
B. Dynamic Discharge Head
C. Dynamic Suction Head
D. Static Suction Lift
E. Static Discharge Head
F. None of the Above

119. Depending on how the measurement is taken _____and head may also be referred to as static or dynamic.

A. Total Dynamic Head
B. Dynamic Discharge Head
C. Dynamic Suction Head
D. Suction Lift
E. Static Discharge Head
F. None of the Above

120. _____indicates that losses due to friction are factored into the performance. The following terms are usually used when referring to lift or head.

A. Dynamic
B. Dynamic Discharge Head
C. Dynamic Suction Head
D. Static Suction Lift
E. Static Discharge Head
F. None of the Above

121. _____ - The vertical distance from the water line to the centerline of the impeller.
A. Total Dynamic Head D. Static Suction Lift
B. Dynamic Discharge Head E. Static Discharge Head
C. Dynamic Suction Head F. None of the Above

122. _____ - The vertical distance from the discharge outlet to the point of discharge or liquid level when discharging into the bottom of a water tank.
A. Total Dynamic Head D. Static Suction Lift
B. Dynamic Discharge Head E. Static Discharge Head
C. Dynamic Suction Head F. None of the Above

123. _____ - The Static Suction Lift plus the friction in the suction line. Also referred to as a Total Suction Head.
A. Total Dynamic Head D. Static Suction Lift
B. Dynamic Discharge Head E. Static Discharge Head
C. Dynamic Suction Head F. None of the Above

124. _____ - The Static Discharge Head plus the friction in the discharge line. Also referred to as Total Discharge Head.
A. Total Dynamic Head D. Static Suction Lift
B. Dynamic Discharge Head E. Static Discharge Head
C. Dynamic Suction Head F. None of the Above

125. _____ - The Dynamic Suction Head plus the Dynamic Discharge Head. Also referred to as Total Head.
A. Total Dynamic Head D. Static Suction Lift
B. Dynamic Discharge Head E. Static Discharge Head
C. Dynamic Suction Head F. None of the Above

Understanding Affinity Laws
The Affinity Laws
126. The affinity laws are used in hydraulics and HVAC to express the relationship between variables involved in pump or fan performance (such as head, _____, shaft speed) and power. They apply to pumps, fans, and hydraulic turbines.
A. NUF D. Volumetric flow rate
B. Static Discharge Head E. Dynamic Discharge Head
C. Dynamic Suction Head F. None of the Above

127. In these rotary implements, _____apply both to centrifugal and axial flows.
A. Fanning friction factor D. Bernoulli Equation
B. Darcy–Weisbach equation E. The affinity laws
C. Analytical methods F. None of the Above

128. Which of the following terms - are useful as they allow prediction of the head discharge characteristic of a pump or fan from a known characteristic measured at a different speed or impeller diameter?
A. Fanning friction factor D. Bernoulli Equation
B. Darcy–Weisbach equation E. The affinity laws
C. Analytical methods F. None of the Above

Understanding the Operation of a Vertical Turbine Pump

129. Vertical turbine pumps are available in deep well, shallow well, or canned configurations. _____ will be provided to fulfill environmental requirements.

A. The maximum suction lift
B. The discharge head
C. The pump bowl assembly
D. Submersible motors
E. VHS or VSS motors
F. None of the Above

130. Which of the following terms - are also available. These pumps are also suitable industrial, municipal, commercial and agricultural applications.

A. The maximum suction lifts
B. The discharge heads
C. The pump bowl assemblies
D. Submersible motors
E. VHS or VSS motors
F. None of the Above

131. Which of the following terms - are adapted for use in cased wells or where the water surface is below the practical limits of a centrifugal pump?

A. Progressing cavity pumps
B. Line-shaft turbine
C. Deep well turbine pumps
D. Centrifugal pumps
E. Plunger pumps
F. None of the Above

132. Turbine pump efficiencies are comparable to or greater than most?

A. Progressing cavity pumps
B. Line-shaft turbine
C. Peristaltic pumps
D. Centrifugal pumps
E. Plunger pumps
F. None of the Above

133. The turbine pump has three main parts: (1) the head assembly, (2) the shaft and column assembly and (3)?

A. The maximum suction lift
B. The discharge head
C. The pump bowl assembly
D. Submersible motor
E. The pump bowl
F. None of the Above

134. Which of the following terms - is normally cast iron and designed to be installed on a foundation?

A. The pump bowl assembly
B. The head
C. Centrifugal pump body
D. The submerged impeller and body
E. Shaft driver
F. None of the Above

Bowl Assembly

135. Which of the following terms - is the heart of the vertical turbine pump?

A. The bowl assembly
B. The head
C. Centrifugal pump body
D. The submerged impeller and body
E. Shaft driver
F. None of the Above

136. Which of the following terms - can be multi-staged, allowing maximum flexibility both in the initial pump selection and in the event that future system modifications require a change in the pump rating?

A. Progressing cavity pumps
B. Line-shaft turbine
C. Vertical turbine pumps
D. Centrifugal pumps
E. Plunger pumps
F. None of the Above

137. Which of the following terms - changes the direction of flow from vertical to horizontal, and couples the pump to the system piping, in addition to supporting and aligning the driver?

A. The bowl assembly
B. The head
C. Centrifugal pump body
D. The discharge head
E. Shaft driver
F. None of the Above

Drivers

138. All types of drivers can be grouped into two categories: _____ 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. The bowl assembly
B. Solid shaft drivers
C. Centrifugal pump body
D. The discharge head
E. Hollow shaft drivers
F. None of the Above

139. Which of the following terms - where the rotor shaft is solid and projects below the driver mounting base?

A. The bowl assembly
B. Solid shaft drivers
C. Centrifugal pump body
D. The discharge head
E. Hollow shaft drivers
F. None of the Above

Discharge Head Assembly

140. The discharge head supports the driver and bowl assembly as well as supplying a discharge connection (the “NUF” type discharge connection which will be located on one of the column pipe sections below?

A. The bowl assembly
B. Solid shaft drivers
C. Centrifugal pump body
D. The discharge head
E. Hollow shaft drivers
F. None of the Above

141. A shaft sealing arrangement is located in the discharge head to seal the shaft where it leaves the liquid chamber. The shaft seal will usually be?

A. The seal chamber
B. Stuffing box
C. Mechanical seal assembly
D. Either a mechanical seal assembly or stuffing box
E. The driver and control equipment
F. None of the Above

Column Assembly

142. Which of the following terms - provides a connection between the head and pump bowls. The line shaft transfers the power from the motor to the impellers and the column carries the water to the surface?

A. Enclosed lineshaft bearings
B. The stuffing box
C. The packing gland
D. The shaft and column assembly
E. Variances from initial performance
F. None of the Above

143. Which of the following terms - on a turbine pump may be either water lubricated or oil lubricated?

A. The impeller
B. The pumped water
C. The line shaft
D. The line shaft couplings
E. The shaft and column assembly
F. None of the Above

144. The oil-lubricated pump has an enclosed shaft into which oil drips,_____.

A. The shaft and column assembly
B. A single-stage pump
C. Lubricating the bearings
D. An oil lubricated pump
E. The shaft and column assembly
F. None of the Above

145. The water-lubricated pump has_____. The bearings are lubricated by the pumped water.
A. An impeller D. A line shaft coupling
B. Pumped water E. An open shaft
C. A single-stage pump F. None of the Above

146. If there is a possibility of fine sand being pumped, select _____ because it will keep the sand out of the bearings.
A. The bowl assembly D. The submerged impeller and body
B. The head E. The oil lubricated pump
C. Centrifugal pump F. None of the Above

147. 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. 1-foot centers
B. 3-foot centers E. 100-foot centers
C. 5-foot centers F. None of the Above

148. Oil-lubricated bearings are commonly placed on?
A. 10-foot centers D. 1-foot centers
B. 3-foot centers E. 100-foot centers
C. 5-foot centers F. None of the Above

149. A pump bowl encloses?
A. The impeller D. The submerged impeller and body
B. The pumped water E. Semi-open impellers
C. The line shaft F. None of the Above

150. Due to its limited diameter, each impeller develops a relatively low head. In most _____installations, several bowls are stacked in series one above the other. This is called staging.
A. Progressing cavity pump D. Centrifugal pump
B. Line-shaft turbine E. Plunger pumps
C. Deep well turbine F. None of the Above

151. A four-stage bowl assembly contains four impellers; all attached to a common shaft and will operate at four times the discharge head of a?
A. Progressing cavity pump D. Centrifugal pump
B. Line-shaft turbine E. Single-stage pump
C. Deep well turbine F. None of the Above

152. Impellers used in turbine pumps may be either semi-open or enclosed. The vanes on _____ are open on the bottom and they rotate with a close tolerance to the bottom of the pump bowl.
A. The impeller D. Semi-closed impellers
B. The pumped water E. Semi-open impellers
C. The line shaft F. None of the Above

153. The tolerance is critical and must be adjusted when the _____ is new.
A. Pump D. The lantern ring
B. Single-stage pump E. The shaft and column assembly
C. Centrifugal pump F. None of the Above

154. During the initial break-in period _____ couplings will tighten, therefore, after about 100 hours of operation, the impeller adjustments should be checked.
A. The impeller
B. The pumped water
C. The line shaft
D. The packing
E. The lantern ring
F. None of the Above

155. After break-in, the _____ must be checked and adjusted every three to five years or more often if pumping sand.
A. Tolerance
B. Single-stage pump
C. Centrifugal pump
D. Oil lubricated pump
E. Shaft and column assembly
F. None of the Above

Bowl Assemblies
The bowl consists of:
156. Impellers rigidly mounted on the_____, which rotate and impart energy to the fluid,
A. Lantern ring
B. Packing gland
C. Line shaft
D. Bowl shaft
E. Suction bell
F. None of the Above

157. Which of the following terms - to contain the increased pressure and direct the fluid?
A. Packing glands
B. Lantern rings
C. Bowls
D. Impellers
E. Suction bells
F. None of the Above

158. Suction bell or case which directs the fluid into the first?
A. Bowl
B. Shaft and column assembly
C. Lantern ring
D. Impeller
E. Suction bell
F. None of the Above

159. Bearings located in the _____and in each bowl.
A. Packing gland
B. Lantern ring
C. Bowl
D. Impeller
E. Suction bell (or case)
F. None of the Above

160. Which of the following terms - may cause inefficient pump operation if they are not properly adjusted?
A. Packing gland
B. Lantern ring
C. Semi-open impellers
D. Impellers
E. Both types of impellers
F. None of the Above

161. Mechanical damage will result if the _____are set too low and the vanes rub against the bottom of the bowls.
A. Packing gland
B. Lantern ring
C. Semi-open impellers
D. Impellers
E. Both types of impellers
F. None of the Above

162. The adjustment of _____is not as critical; however, they must still be checked and adjusted.
A. Packing gland
B. Enclosed impellers
C. Semi-open impellers
D. Impellers
E. Both types of impellers
F. None of the Above

163. Which of the following terms - adjustments are made by tightening or loosening a nut on the top of the head assembly?
A. Packing gland D. Impeller
B. Lantern ring E. Both types of impellers
C. Semi-open impellers F. None of the Above

164. Which of the following terms - adjustments are normally made by lowering the impellers to the bottom of the bowls and adjusting them upward?
A. Packing gland D. Impeller
B. Lantern ring E. Both types of impellers
C. Semi-open impellers F. None of the Above

165. The amount of upward adjustment is determined by how much the _____will stretch during pumping.
A. Packing gland D. Impeller
B. Lantern ring E. Line shaft
C. Bowl F. None of the Above

166. Which of the following terms - must be made based on the lowest possible pumping level in the well?
A. Improper operation D. Any deviation in performance or operation
B. The adjustment E. Variances from initial performance
C. Variances from performance F. None of the Above

Basic Operation of a Vertical Turbine
Pre-start
167. Before starting the pump, the following checks should be made: Rotate the pump shaft by hand to make sure the pump is free and the _____are correctly positioned.
A. Packing glands D. Impellers
B. Lantern rings E. Both types of impellers
C. Semi-open impellers F. None of the Above

168. Is the _____properly locked into position?
A. The seal chamber D. Head shaft adjusting nut
B. Tightness E. Top of the driver
C. All lineshaft bearings F. None of the Above

169. Has the driver been properly lubricated in accordance with instructions furnished with the?
A. Seal chamber D. Driver
B. Stuffing box E. Driver and control equipment
C. Suction bell F. None of the Above

170. Has the driver been checked for proper rotation? If not, the pump must be disconnected from the driver before checking. The driver must rotate COUNTER CLOCKWISE when looking down at the?
A. Seal chamber D. Driver
B. Stuffing box E. Driver and control equipment
C. Top of the driver F. None of the Above

171. Check all connections to the?
A. Seal chamber D. Driver
B. Stuffing box E. Driver and control equipment
C. Top of the driver F. None of the Above

172. Check that _____connections are tight.
A. Seal chamber
B. All piping
C. All lineshaft bearings
D. The head shaft adjusting nut
E. The top of the driver
F. None of the Above

173. Check all _____ for tightness.
A. Seal chambers
B. Stuffing boxes
C. Anchor bolts
D. Head shaft adjusting nuts
E. Driver and control equipment
F. None of the Above

174. Check _____for tightness (driver mounting bolts, flanged coupling bolts, glad plate bolts, seal piping, etc.).
A. The seal chamber
B. All bolting and tubing connections
C. All lineshaft bearings
D. The head shaft adjusting nut
E. The top of the driver
F. None of the Above

175. On pumps equipped with stuffing box, make sure the gland nuts are only finger tight — DO NOT TIGHTEN _____ before starting.
A. The seal chamber
B. Stuffing box
C. Suction bell
D. Packing gland
E. The driver and control equipment
F. None of the Above

176. On pumps equipped with mechanical seals, clean fluid should be put into?
A. The seal chamber
B. All bolting and tubing connections
C. All lineshaft bearings
D. The head shaft adjusting nut
E. The top of the driver
F. None of the Above

177. With pumps under suction pressure this can be accomplished by bleeding all air and vapor out of _____ and allowing the fluid to enter.
A. The seal chamber
B. All bolting and tubing connections
C. All lineshaft bearings
D. The head shaft adjusting nut
E. The top of the driver
F. None of the Above

178. With pumps not under suction pressure, _____ should be flushed liberally with clean fluid to provide initial lubrication. Make sure the mechanical seal is properly adjusted and locked into place.
A. The seal chamber
B. All bolting and tubing connections
C. All lineshaft bearings
D. The head shaft adjusting nut
E. The top of the driver
F. None of the Above

179. NOTE: After initial start-up, pre-lubrication of the mechanical seal will usually not be required, as enough liquid will remain in _____ for subsequent start-up lubrication.
A. The seal chamber
B. All bolting and tubing connections
C. All lineshaft bearings
D. Shaft and column assembly
E. The top of the driver
F. None of the Above

180. On pumps equipped with enclosed lineshaft, lubricating liquid must be available and should be allowed to run into the enclosing tube in sufficient quantity to thoroughly lubricate _____.
A. The seal chamber
B. All bolting and tubing connections
C. All lineshaft bearings
D. The head shaft adjusting nut
E. The top of the driver
F. None of the Above

Stuffing Box Adjustment

181. On the initial starting it is very important that _____ not be tightened too much.

A. Enclosed lineshaft bearings
B. The stuffing box
C. The packing gland
D. Any deviation in performance or operation
E. Variances from initial performance
F. None of the Above

182. Which of the following terms - must be "run in" properly to prevent damage to the shaft and shortening of the packing life?

A. Enclosed lineshaft bearings
B. The stuffing box
C. The packing gland
D. New packing
E. Variances from initial performance
F. None of the Above

183. Which of the following terms - must be allowed to leak for proper operation?

A. Enclosed lineshaft bearings
B. The stuffing box
C. The packing gland
D. Any deviation in performance or operation
E. Variances from initial performance
F. None of the Above

184. Which of the following terms - can be determined by checking the temperature of the leakage; this should be cool or just lukewarm — NOT HOT?

A. Pump discharge
B. The proper amount of leakage
C. Displaced axially at a constant rate
D. Low maintenance
E. Flow rates and differential pressures
F. None of the Above

185. When adjusting the _____, bring both nuts down evenly and in small steps until the leakage is reduced as required.

A. Packing gland
B. Lantern ring
C. Bowl
D. Impeller
E. Line shaft
F. None of the Above

186. Which of the following terms - should only be tightened about ½ turn at a time at 20 to 30 minute intervals to allow the packing to "run in"?

A. Packing gland
B. Lantern ring
C. Nuts
D. Impeller
E. Line shaft
F. None of the Above

187. Occasionally a new ring of packing will need to be added to keep the box full. 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. Packing gland
B. Lantern ring
C. Bowl
D. Stuffing box
E. Line shaft
F. None of the Above

Lineshaft Lubrication

188. Open lineshaft bearings are lubricated by the _____and on close coupled units, will usually not require pre or post lubrication.

A. The mechanical energy
B. The energy conversion
C. A tangential and radial direction
D. An inducer or recirculation of pressurized froth
E. Pumped fluid
F. None of the Above

189. 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. Enclosed lineshaft bearings D. The pump column assembly
B. The stuffing box E. An indication of impending trouble
C. The packing gland F. None of the Above

190. Which of the following terms - utilizing oil is the most common arrangement. The oil reservoir must be kept filled with a good quality light turbine oil and adjusted to feed 10 to 12 drops per minute plus one (1) drop per 100' of setting.
A. The pump column D. The gravity flow system
B. Vertical alignment E. The pump column assembly
C. The head assembly F. None of the Above

191. Injection systems are designed for each installation —_____ and quantity of lubricating liquid will vary.
A. Improper operation D. Injection pressure
B. Deep well turbine pumps E. An indication of impending trouble
C. Injection systems F. None of the Above

General Maintenance Section
192. Which of the following terms - is recommended as the best means of preventing breakdown and keeping maintenance costs to a minimum?
A. Preventive maintenance D. Any deviation in performance or operation
B. Performance or operation E. Variances from initial performance
C. A periodic inspection F. None of the Above

193. Maintenance personnel should look over the whole installation with a critical eye each time the pump is inspected — a change in noise level, amplitude or _____, or performance can be an indication of impending trouble.
A. Vacuum D. Atmospheric pressure
B. Friction loss E. Vapor bubbles
C. Vibration F. None of the Above

194. Which of the following terms - from what is expected can be traced to some specific cause?
A. Preventive maintenance D. Any deviation in performance or operation
B. Performance or operation E. Variances from initial performance
C. A periodic inspection F. None of the Above

195. Which of the following terms - 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. Preventive maintenance D. Any deviation in performance or operation
B. Performance or operation E. Variances from initial performance
C. A periodic inspection F. None of the Above

196. Which of the following terms - from initial performance will indicate changing system conditions or wear or impending breakdown of unit?
A. Vacuum D. Variances
B. Friction loss E. Noise
C. Vibration F. None of the Above

197. Which of the following terms - must have correct alignment between the pump and the power unit?

A. Progressing cavity pumps
B. Line-shaft turbines
C. Peristaltic pumps
D. Centrifugal pumps
E. Deep well turbine pumps
F. None of the Above

198. Correct alignment is made easy by using _____ that matches the motor and column/pump assembly. It is very important that the well is straight and plumb.

A. The pump column
B. Mechanical seals
C. A head assembly
D. Packing gland
E. Well casing
F. None of the Above

199. The pump column assembly must be vertically aligned so that no part touches the?

A. The pump column
B. Stuffing box
C. The head assembly
D. Packing gland
E. Well casing
F. None of the Above

200. Which of the following terms - are usually attached to the pump column to prevent the pump assembly from touching the well casing?

A. The pump column
B. Mechanical seals
C. The head assembly
D. Packing gland
E. Spiders
F. None of the Above

You are finished with your assignment. Please email or fax the answer key and registration key to TLC. Please call later to confirm we received the paperwork.