*Registration form*

# HYDRAULIC PRINCIPLES CEU TRAINING COURSE $100.00

## 48 HOUR RUSH ORDER PROCESSING FEE ADDITIONAL $50.00

**Start Date: _____ Finish Date: _____**
***You will have 90 days from this date in order to complete this course***

**List hours worked on assignment must match State Requirement. _____**

**Name_____Signature_____**
*I have read and understood the disclaimer notice on page 2. Digitally sign XXX*

**Address: _____**

**City_____State_____Zip_____**

**Email_____ Fax (_____) _____**

**Phone:**
**Home (_____) _____ Work (_____)_____**

**Operator ID# _____Class/Grade_____**

**Please circle/check which certification you are applying the course CEU's/PDH's.**

Water Treatment _____ Distribution _____ Collection_____ Wastewater Treatment _____
Pump Installer_____ CSI_____ AWWA Backflow_____ Other _____

***Your certificate will be emailed to you in about two weeks.***

**Technical Learning College PO Box 3060, Chino Valley, AZ 86323**
**Toll Free (866) 557-1746 Fax (928) 272-0747 e-mail info@tlch2o.com**

**If you've paid on the Internet, please write your Customer#_____**

**Please invoice me, my PO#_____**

**Please pay with your credit card on our website under Bookstore or Buy Now. Or call us and provide your credit card information.**

***We will stop mailing the certificate of completion so we need either your fax number or e-mail address. We will e-mail the certificate to you, if no e-mail address; we will fax it to you.***

**DISCLAIMER NOTICE**
I understand that it is my responsibility to ensure that this CEU course is either approved or accepted in my State for CEU credit. I understand State laws and rules change on a frequent basis and I believe this course is currently accepted in my State for CEU or contact hour credit, if it is not, I will not hold Technical Learning College responsible. I also understand that this type of study program deals with dangerous conditions and that I will not hold Technical Learning College, Technical Learning Consultants, Inc. (TLC) liable for any errors or omissions or advice contained in this CEU education training course or for any violation or injury, death, neglect, damage caused by this CEU education training or course material suggestion or error.

I will call or contact TLC if I need help or assistance and double-check to ensure my registration page and assignment has been received and graded. In order to maintain the integrity of our courses we do not distribute test scores, percentages or questions missed. Our exams are based upon pass/fail criteria with the benchmark for successful completion set at 70%. Once you pass the exam, your record will reflect a successful completion and a certificate will be issued to you.

*You can obtain a printed version from TLC for an additional $69.95 plus shipping charges.*

**Do not solely depend on TLC's Approval list for it may be outdated.**

**Some States and many employers require the final exam to be proctored.**
http://www.abctlc.com/downloads/PDF/PROCTORFORM.pdf

**A second certificate of completion for a second State Agency $50 processing fee.**

**All downloads are electronically tracked and monitored for security purposes.**

**No refunds.**

**AFFIDAVIT OF EXAM COMPLETION**
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.

## Texas TCEQ STUDENTS ONLY

All TCEQ Students will need to sign this and date this form as well. TCEQ students will also be given special assistance if you fail the examination. You will also have access to failed or wrong questions and/or the area or topic of the assignment to complete your learning experience.

**Attention Texas TCEQ Operators, Irrigators, CSI and Backflow Testers…**
**NOTE:** Any course cannot be taken for same credit in the same renewal period. Please call TCEQ and make sure that these courses are still accepted for credit before starting. Do not retake this course for credit in the same renewal period. TCEQ rules and decisions change frequently.

**Signature** _____

## For Texas TCEQ Wastewater / Collections Operators

**Rule Changes and Updates for Domestic Wastewater Systems**
On Nov. 4, 2014, TCEQ commissioners adopted revisions to 30 Texas Administrative Code (TAC), Chapter 217, Design Criteria for Domestic Wastewater Systems, and "re-adopted" previously repealed rules in 30 TAC, Chapter 317, Design Criteria Prior to 2008.

***Some of the changes to Chapter 217 include:***

- Adding new definitions and clarifying existing definitions;
- Adding design criteria and approval requirements for rehabilitation of existing infrastructure;
- Adding design criteria for new technologies, including cloth filters and air lift pumps;
- Making changes to reflect modern practices, standards and trends;
- Modifying rule language to improve readability and enforceability; and
- Modifying the design organic loadings and flows for a new wastewater treatment facility.

**SUBCHAPTER A: ADMINISTRATIVE REQUIREMENTS §§217.1 - 217.18**
Effective December 4, 2015 §217.1. Applicability. (a) Applicability. (1) This chapter applies to the design, operation, and maintenance of: (A) domestic wastewater treatment facilities that are constructed with plans and specifications received and approved by the executive director after the effective date of the amendments to this chapter; (B) treatment units that are altered, constructed, or re-rated with plans and specifications received and approved by the executive director after the effective date of the amendments to this chapter; (C) collection systems that are constructed with plans and specifications received and approved by the executive director after the effective date of the amendments to this chapter; (D) collection system units that are altered, constructed, or re-rated with plans and specifications received and approved by the executive director after the effective date of the amendments to this chapter; (E) existing domestic wastewater treatment facilities that do not have a current Texas Pollutant Discharge Elimination System permit or a Texas Land Application Permit and are required to have an active wastewater permit; (F) existing wastewater treatment facilities and collection systems that never received approval for plans and specifications from the executive director; and (G) collection system rehabilitation projects covered in §217.56(c) and §217.69 of this title (relating to Trenchless Pipe Installation; and Maintenance, Inspection, and Rehabilitation of the Collection System). (2) Domestic wastewater treatment facilities, treatment units, collection systems, and collection system units with plans and specifications approved by the executive director that were received on or after August 28, 2008 and before the effective date of this chapter must comply with the rules in this chapter, as they existed immediately before the effective date of the amendments to this chapter.

The rules in Texas Commission on Environmental Quality Page 2 Chapter 217 - Design Criteria for Domestic Wastewater Systems effect immediately before the effective date of the amendments to this chapter are continued in effect for that purpose. (3) This chapter does not apply to: (A) the design, installation, operation, or maintenance of domestic wastewater treatment facilities, treatment units, collection systems, or collection system units with plans and specifications that were approved by the executive director on or before August 27, 2008, which are governed by Chapter 317 of this title (relating to Design Criteria Prior to 2008) or

design criteria that preceded Chapter 317 of this title; and (B) systems regulated by Chapter 285 of this title (relating to On-Site Sewage Facilities); or collection systems or wastewater treatment facilities that collect, transport, treat, or dispose of wastewater that does not have the characteristics of domestic wastewater, although the wastewater may contain domestic wastewater.

(b) The executive director may grant variances from new requirements added by the amendments of this chapter to a person who proposes to construct, alter, or re-rate a collection system or wastewater treatment facility if the plans and specifications for the project are submitted within 180 days after the date the amendments to this chapter are effective, provided the plans and specifications comply with the rules in effect immediately prior to the amendment. Adopted November 4, 2015 Effective December 4, 2015

**The link to the rules is available on the TCEQ website at**
**https://www.tceq.texas.gov/rules/indxpdf.html**

Please sign and date this notice

Printed Name

_____

Signature Date

_____

# Texas Students Only

## Acknowledgement of Notice of Potential Ineligibility for License

***You are required to sign and return to TLC or your credit will not be reported.***

Name: _____

Date of Birth: _____

Email Address: _____

By signing this form, I acknowledge that Technical Learning College notified me of the following:

- the potential ineligibility of an individual who has been convicted of an offense to be issued an occupational license by the Texas Commission on Environmental Quality (TCEQ) upon completion of the educational program;
- the current TCEQ Criminal Conviction Guidelines for Occupational Licensing, which describes the process by which the TCEQ's Executive Director determines whether a criminal conviction:
- renders a prospective applicant an unsuitable candidate for an occupational license;
- warrants the denial of a renewal application for an existing license; or
- warrants revocation or suspension of a license previously granted.
- the right to request a criminal history evaluation from the TCEQ under Texas Occupations Code Section 53.102; and
- that the TCEQ may consider an individual to have been convicted of an offense for the purpose of denying, suspending or revoking a license under circumstances described in Title 30 Texas Administrative Code Section 30.33.

Enrollee Signature: _____ Date: _____

Name of Training Provider/Organization: Technical Learning College

Contact Person: Melissa Durbin Role/Title: Dean

***Please e-mail or fax this survey along with your final exam***

## Hydraulic Principles CEU Training Course
### CUSTOMER SERVICE RESPONSE CARD

NAME: _____

***PLEASE COMPLETE THIS FORM BY CIRCLING THE NUMBER OF THE APPROPRIATE ANSWER IN THE AREA BELOW.***

1. Please rate the difficulty of your course.
   Very Easy 0 1 2 3 4 5 Very Difficult

2. Please rate the difficulty of the testing process.
   Very Easy 0 1 2 3 4 5 Very Difficult

3. Please rate the subject matter on the exam to your actual field or work.
   Very Similar 0 1 2 3 4 5 Very Different

4. How did you hear about this Course? _____

What would you do to improve the course?

_____

_____

How about the price of the course?

Poor_____ Fair ____ Average ____ Good____ Great_____

How was your customer service?

Poor___ Fair ____ Average ____ Good_____ Great_____

Any other concerns or comments.

_____

_____

_____

# Special Notice to all Texas (TCEQ) Students

§ 344.51. SPECIFIC CONDITIONS AND CROSS-CONNECTION CONTROL.
(d) If an irrigation system is designed or installed on a property that is served by an on-site sewage facility, as defined in Chapter 285 of this title (relating to On-Site Sewage Facilities), then:

(1) all irrigation piping and valves must meet the separation distances from the On-Site Sewage Facilities system as required for a private water line in §285.91(10) of this title (relating to Minimum Required Separation Distances for On-Site Sewage Facilities);

(2) any connections using a private or public potable water source must be connected to the water source through a reduced pressure principle backflow prevention assembly as defined in §344.50 of this title (relating to Backflow Prevention Methods); and

(3) any water from the irrigation system that is applied to the surface of the area utilized by the On-Site Sewage Facility system must be controlled on a separate irrigation zone or zones so as to allow complete control of any irrigation to that area so that there will not be excess water that would prevent the On-Site Sewage Facilities system from operating effectively.

## Hydraulic Principles CEU Course Answer Key

***Name*_____ *Telephone #* _____**

***You are solely responsible in ensuring that this course is accepted for credit by your State. <u>No refunds.</u> Did you check with your State agency to ensure this course is accepted for credit?***

***Method of Course acceptance confirmation. Please fill this section***

**Website __ Telephone Call___ Email____ Spoke to_____**

**Do not solely depend on TLC's Approval list for it may be outdated.**

**What is the course approval number, if applicable? _____**

**PA DEP Students are required to complete the original version of the text. _____**
Please initial

***You are responsible to ensure that TLC receives the Assignment and Registration Key. Please call us to ensure that we received it.***

***Please select one answer. You can Bold, Circle, Underline or X your answer. You can use Adobe Acrobat DC to electronically fill out this sheet.***

| | | |
|---|---|---|
| 1. A B C D E F | 15. A B C D E F | 29. A B C D E F |
| 2. A B C D E F | 16. A B C D E F | 30. A B C D E F |
| 3. A B C D E F | 17. A B C D E F | 31. A B C D E F |
| 4. A B C D E F | 18. A B C D E F | 32. A B C D E F |
| 5. A B C D E F | 19. A B C D E F | 33. A B C D E F |
| 6. A B C D E F | 20. A B C D E F | 34. A B C D E F |
| 7. A B C D E F | 21. A B C D E F | 35. A B C D E F |
| 8. A B C D E F | 22. A B C D E F | 36. A B C D E F |
| 9. A B C D E F | 23. A B C D E F | 37. A B C D E F |
| 10. A B C D E F | 24. A B C D E F | 38. A B C D E F |
| 11. A B C D E F | 25. A B C D E F | 39. A B C D E F |
| 12. A B C D E F | 26. A B C D E F | 40. A B C D E F |
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| 14. A B C D E F | 28. A B C D E F | 42. A B C D E F |

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196. A B C D E F
197. A B C D E F
198. A B C D E F
199. A B C D E F
200. A B C D E F

*You are finished, please fax or e-mail your assignment and registration page. Call us to ensure we received the assignment. Fax (928) 272-0747*

# HYDRAULIC PRINCIPLES CEU COURSE ASSIGNMENT

***The Assignment (Exam) is also available in Word on the Internet for your Convenience, please visit www.ABCTLC.com and download the assignment and e-mail it back to TLC.***

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 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.**

**Hydraulics**

1. Hydraulics is a branch of engineering concerned mainly with moving liquids.
A. True B. False

2. 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

3. 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

4. Hydraulics is applied commonly to the study of _____, other liquids, and even gases when the effects of compressibility are small.
A. Fluids D. Mechanical properties of water
B. Hydrostatics E. Flow
C. Hydrokinetics F. None of the Above

5. Hydraulics can be divided into two areas, this term and hydrokinetics.
A. Fluids D. Mechanical properties of water
B. Hydrostatics E. Flow
C. Hydrokinetics F. None of the Above

6. Hydrostatics is based on the Greek word for water, and originally covered the study of the physical behavior of water at rest and in motion.
A. True B. False

7. _____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

8. 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

9. _____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

10. Which of the following terms is an excellent example of deductive mathematical physics, and in which the predictions agree closely with experiment?
A. Pressure D. Hydraulics
B. Hydrostatics E. Flow
C. Hydrokinetics F. None of the Above

11. _____is usually stated that in a fluid is a substance that cannot resist a shearing stress, so that pressures are normal to confining surfaces?
A. Pressure D. Hydraulics
B. Hydrostatics E. Flow
C. Hydrokinetics F. None of the Above

12. According to the text, hydraulics may be the physical property that varies over the largest numerical range, competing with electrical resistivity.
A. True B. False

**Atmospheric Pressure**
13. The atmosphere is the entire mass of air that surrounds the earth.
A. True B. False

14. Which of the following terms is the layer that extends upward for about 500 miles, the section of primary interest is the portion that rests on the earth's surface and extends upward for about 7 1/2 miles.
A. Column D. Mass
B. Troposphere E. Atmospheric pressure
C. Sea level F. None of the Above

15. 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

16. _____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

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

18. _____if you could be below, example-in excavations and depressions, atmospheric pressure increases?
A. Static pressure D. Sea level
B. Pressure E. Atmospheric pressure
C. Gauge pressure F. None of the Above

19. Pressures under water differ from those under air only because the weight of the water must be added to the?
A. Barometer D. Altitude
B. Pressure(s) of the air E. Seal Level
C. Height F. None of the Above

20. Which of the following terms can be measured by any of several methods, one of these methods is the mercury column barometer?
A. Static pressure D. Sea level
B. Pressure E. Atmospheric pressure
C. Gauge pressure F. None of the Above

21. At sea level and temperature of 0° Celsius (C), the height of the mercury column is approximately 30 inches, or 76 centimeters. This represents a pressure of approximately 14.7 psi.
A. True B. False

22. Which of the following terms could be measured with the aneroid barometer?
A. Static pressure D. Sea level
B. Pressure E. Atmospheric pressure
C. Gauge pressure F. None of the Above

23. The atmospheric pressure does not vary uniformly with_____.
A. Barometer D. Altitude
B. Pressure(s) E. Equipment
C. Weight F. None of the Above

24. Atmospheric pressure is defined as the force per unit area exerted against a surface by the _____ of the air above that surface.
A. Barometer D. Altitude
B. Pressure(s) E. Equipment
C. Weight F. None of the Above

**Barometric Loop**

25. According to the text, the barometric loop, will provide protection against backsiphonage, is based upon the principle that a water column, at sea level pressure, will not rise above 33.9 feet. In general, barometric loops are fabricated, and are 35 feet high.

A. True B. False

26. Which of the following terms could be measured an absolute scale, pounds per square inch absolute (psia), or gauge scale, (psiag).

A. Static pressure
B. Pressure
C. Gauge pressure
D. Sea level
E. Atmospheric pressure
F. None of the Above

27. Absolute pressure is equal to gauge pressure plus the atmospheric pressure.

A. True B. False

28. The barometric loop consists of a continuous section of supply piping that abruptly rises to a height of approximately 233 feet and then returns back down to the originating level.

A. True B. False

29. The barometric loop is a loop in the piping system that effectively protects against backpressure.

A. True B. False

30. The barometric loop may not be used to protect against backsiphonage.

A. True B. False

31. According to the text, absolute pressure and gauge pressure?

A. Are the same
B. Referred to using pressure
C. Are related
D. That effectively protects
E. Permanent forces tangential
F. None of the Above

32. _____at sea level is 14.7 psai?

A. Static pressure
B. Pressure
C. Gauge pressure
D. Sea level
E. Atmospheric pressure
F. None of the Above

33. Which of the following terms is the total pressure?

A. Static pressure
B. Absolute pressure
C. Gauge pressure
D. Sea level
E. Atmospheric pressure
F. None of the Above

34. Gauge pressure is simply the pressure read on the gauge. If there is no pressure on the gauge other than atmospheric, the gauge will read zero.

A. True B. False

35. Which of the following terms would be equal to 14.7 psi, which is the atmospheric pressure?
A. Static pressure D. Sea level
B. Absolute pressure E. Atmospheric pressure
C. Gauge pressure F. None of the Above

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

37. 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

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

39. 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

40. 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

41. 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

42. _____ does water and air have; that is, layers of them slide very easily on one another?
A. Low viscosity D. Volume
B. Atmospheric pressure E. Shearing force
C. Fluid(s) F. None of the Above

43. Molasses and other like fluids may have high viscosity and take a long time to come to equilibrium, but they are no less?
A. Absolute pressure D. Volume
B. Atmospheric pressure E. Shearing force
C. Fluid(s) F. None of the Above

44. The coefficient of viscosity is the ratio of _____to the velocity gradient.
A. Absolute pressure D. Volume
B. Atmospheric pressure E. Shearing force
C. Fluid(s) F. None of the Above

45. Which of the following terms deals with permanent, time-independent states of fluids, so viscosity does not appear?
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

46. 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 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

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

48. _____is an example of a body force that disturbs the equality of pressure in a fluid?
A. Axiom D. Displaced fluid
B. Gravitational body force E. Gravitation
C. Pressure F. None of the Above

49. When the barometric equation, for when this equation is integrated, we find the variation of pressure with?
A. Height or depth D. Displaced fluid
B. Gravitational body force E. Gravitation
C. Pressure F. None of the Above

**Free Surface Perpendicular to Gravity**
50. 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 D. Displaced fluid
B. Gravitational body force E. Gravitation
C. Pressure F. None of the Above

**Standard Atmospheric Pressure**
51. 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 D. Partial vacuum measurement
B. Total vacuum E. Manometer
C. Capillarity F. None of the Above

52. _____uses a partially evacuated chamber of thin metal that expands and contracts according to the external pressure?
A. Aneroid barometer D. Partial vacuum
B. Total vacuum E. Barometric loop
C. Capillarity tube F. None of the Above

**Vacuum**
53. The term vacuum indicates that the absolute pressure is less than the atmospheric pressure and that the _____ is negative.
A. Static pressure D. Total vacuum
B. Pressure E. Atmospheric pressure
C. Gauge pressure F. None of the Above

54. Which of the following terms would mean a pressure of 0 psia or –14.7 psig?
A. Static pressure D. Total vacuum
B. Pressure E. Atmospheric pressure
C. Gauge pressure F. None of the Above

55. According to the text, it is impossible to produce a partial vacuum.
A. True B. False

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

57. 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**
58. 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

59. _____are normally 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

60. 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

61. 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

62. The name is Greek for the tube and is another application of pressure is the?
A. Epihydro D. Hydrostat
B. Water bearer E. Hydraulic machine
C. Siphon F. None of the Above

63. When a siphon goes below the free water levels, it is called an?
A. Epihydro D. Hydrostat
B. Water bearer E. Inverted siphon
C. Siphon F. None of the Above

64. _____can be made by filling the tube, closing the ends, and then putting the ends under the surface on both sides?
A. Epihydro D. Hydrostat
B. Water bearer E. Inverted siphon
C. Siphon F. None of the Above

**Pressure and Force**
65. Which of the following terms is the force that pushes water through pipes?
A. Absolute pressure D. Volume
B. Pressure E. Shearing force
C. Fluid(s) F. None of the Above

66. Water pressure determines the flow of water from the tap.
A. True B. False

67. Which of the following terms 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

68. 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

69. _____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

70. 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**
71. A common 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

**Development of Hydraulics**
72. 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

73. 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

74. One characteristic of a liquid is the tendency to keep its free surface level.
A. True B. False

75. Liquids will flow in the direction that will tend to make the surface level, if the surface is not level.
A. True B. False

76. Daniel Bernoulli conducted experiments to study the elements of force in the discharge of water through small openings in the sides of tanks and through short pipes.
A. True B. False

77. During the same period, Blaise Pascal, a French scientist, discovered the fundamental law for the science of_____.
A. Pressure
B. Experiments
C. Hydraulics
D. Force
E. Physics
F. None of the Above

78. Which of the following terms states that increase in pressure on the surface of a confined fluid is transmitted undiminished throughout the confining vessel or system?
A. Pascal's law
B. Evangelista Torricelli
C. Blaise Pascal
D. Aristotle' law
E. Archimedes' law
F. None of the Above

79. The mercury column was held up by horror vacui as Aristotle had supposed.
A. True B. False

80. Which of the following scientists had a barometer carried up the 1465 m high Puy de Dôme, an extinct volcano in the Auvergne just west of his home of Clermont-Ferrand in 1648 by Périer, by his brother-in-law?

A. Aristotle
B. Otto von Guericke
C. Evangelista Torricelli
D. Blaise Pascal
E. Archimedes
F. None of the Above

81. Which of the following scientists making the first vacuum pump, which he used in vivid demonstrations of the pressure of the atmosphere?

A. Aristotle
B. Otto von Guericke
C. Evangelista Torricelli
D. Blaise Pascal
E. Archimedes
F. None of the Above

82. Air, which is by no means incompressible. As we rise in the atmosphere and the pressure decreases, the air also expands.

A. True B. False

83. Which of the following terms is by no means isothermal close to the ground?

A. Stratosphere
B. Tropopause
C. Atmosphere
D. Atmospheric pressure
E. Sea level
F. None of the Above

**Meteorology**

84. Which of the following terms is of great importance in meteorology, since it determines the winds?

A. Stratosphere
B. Tropopause
C. Atmosphere
D. Atmospheric pressure
E. Sea level
F. None of the Above

85. Certain typical weather patterns are associated with relatively high and relatively low _____, and how they vary with time.

A. Stratosphere
B. Tropopause
C. Atmosphere
D. Pressures
E. Sea level
F. None of the Above

**Pascal's Law**

86. Pascal discovered that pressure in a fluid acts equally in some directions.

A. True B. False

87. According to the text, pressure acts at right angles to the containing surfaces.

A. True B. False

88. 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

89. Pressure in a _____of direction.

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

90. Pressure due to the _____, at any level, depends on the depth of the fluid from the surface.

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

91. If the exposed face of the pressure gauges are moved closer to the surface of the liquid, the indicated?

A. Depth is doubled
B. Pressure will be less
C. Pressure of a liquid
D. Column is tripled
E. Is equal
F. None of the Above

92. The indicated pressure is doubled, when the?

A. Depth is doubled
B. Pressure will be less
C. Pressure of a liquid
D. Column is tripled
E. Is equal
F. None of the Above

93. The pressure at any depth in this missing term of the column of liquid at that depth divided by the cross-sectional area of the column at that depth.

A. Depth is doubled
B. Pressure will be less
C. Pressure of a liquid
D. Liquid is equal to the weight
E. Is equal
F. None of the Above

94. _____produces the pressure referred to as the fluid head of the liquid?

A. Depth is doubled
B. Pressure will be less
C. Pressure of a liquid
D. Volume of a liquid
E. Is equal
F. None of the Above

95. Which of the following terms is due to its fluid head is also dependent on the density of the liquid?

A. Depth is doubled
B. Pressure will be less
C. Pressure of a liquid
D. Volume of a liquid
E. Is equal
F. None of the Above

**Static Pressure**

96. Static pressure exists in addition to gravity and may be present at the same time.

A. True B. False

97. Pascal's law states that a pressure set up in a fluid acts equally in all directions and at right angles to the containing surfaces.

A. True B. False

98. Pascal's law covers the situation only for fluids at rest or practically at rest. It is true only for the factors making up this term.

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

99. 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
B. Velocity of flow
C. Volume of a liquid
D. Fluid power
E. Static head
F. None of the Above

100. The dynamic factors of inertia and friction are related to the static factors. Velocity head and _____ are obtained at the expense of static head.

A. Pressure drop
B. Friction head
C. Volume of a liquid
D. Fluid power
E. Static head
F. None of the Above

101. Which of the following terms can be produced by pressure or head when dealing with fluids?

A. Pressure drop
B. Velocity of flow
C. Force
D. Fluid power
E. Static head
F. None of the Above

**Volume and Velocity of Flow**

102. Which of the following flow terms is passing a point in a given time is known as its volume of flow or flow rate?

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

103. Which of the following flow terms 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
B. Friction head
C. Volume of a liquid
D. Velocity of flow
E. Volume of flow
F. None of the Above

104. _____ is defined as the average speed at which the fluid moves past a given point. It is usually expressed in feet per second (fps) or feet per minute (fpm).

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

105. 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

106. Volume and friction head are often considered together, that is, with volume of input unchanged—the velocity of flow increases as the cross section or size of the pipe decreases.

A. True B. False

**Bernoulli's Principle**

107. Bernoulli's principle thus says that a rise (or fall) in pressure in a flowing fluid must always be accompanied by a decrease (or increase) in the speed, and conversely, if an increase (decrease) in, the speed of the fluid results in a decrease (or increase) in the pressure.

A. True B. False

108. Bernoulli's principle is responsible for the fact that a shower curtain gets "sucked inwards" when the water is first turned on. What happens is that the increased water/air velocity inside the curtain (relative to the still air on the other side) causes a pressure drop.

A. True B. False

109. _____the difference between the outside and inside, causing a net force on the shower curtain which sucks it inward.

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

110. Squeezing the bulb over the fluid creates a low _____ area due to the higher speed of the air, which subsequently draws the fluid up.

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

111. Which of the following terms explains why windows tend to explode, rather than implode in hurricanes: the very high speed of the air just outside the window causes the pressure just outside to be much less than the pressure inside, where the air is still.

A. Venturi effect
B. Bernoulli's principle
C. Velocity changes
D. Conservation of energy
E. Friction head
F. None of the Above

112. Another example of _____at work is in the lift of aircraft wings and the motion of "curve balls" in baseball. In both cases the design is such as to create a speed differential of the flowing air past the object on the top and the bottom.

A. Venturi
B. Bernoulli's principle
C. Velocity changes
D. Conservation of energy
F. None of the Above

**Understanding the Venturi**

113. It is not easy to understand the reason low pressure occurs in the small diameter area of the venturi.

A. True B. False

114. In the Venturi, the velocity is slower in the small portion of the tube.

A. True B. False

115. In the Venturi, if velocity increases the pressure energy must decrease.
A. True B. False

**Backflow Introduction**

116. Which of the following rules are required to be at least as stringent as the federal regulations as developed and enforced by the E.P.A.?
A. Enforcement responsibility
B. Federal laws
C. State program regulations
D. Cross-Connection Control
E. Local level laws
F. None of the Above

117. _____is "the link or channel connecting a source of pollution with a potable water supply."
A. Direct piping
B. Backflow
C. Direct connection
D. Cross-Connection
E. Air break
F. None of the Above

118. Which of the following definition terms, also referred to as Cross-Connection Control, addresses a serious health issue?
A. Direct piping
B. Backflow prevention
C. Direct connection
D. Cross-Connection
E. Water purveyor rules
F. None of the Above

119. Cross-Connection control was addressed by passage of the "Federal Safe Drinking Water Act" as developed by the Environmental Protection Agency (E.P.A.).
A. True B. False

120. The SDWA tasked each state with primary enforcement responsibility for a program to assure access to safe drinking water by all citizens.
A. True B. False

121. The first level of the law is protection of the _____of persons subject to such risks involving service to a single customer.
A. Internal or external piping
B. General public and the second is protection
C. Residential environment the pollutant source
D. Certainly not usually intentional
E. Certainly intentional
F. None of the Above

122. Sources of pollution that may result in a danger to health, are not always obvious and such cross-connections are?
A. Internal or external piping
B. Public and the second is protection
C. Residential environment the pollutant source
D. Certainly not usually intentional
E. Certainly intentional
F. None of the Above

123. Within a business environment, the pollutant source may involve the unintentional cross-connection of this condition with chemical processes or a heating boiler.
A. Direct piping
B. Backflow
C. Direct connection
D. Internal or external piping
E. Air break
F. None of the Above

124. _____may be an improper cross-connection with a landscape sprinkler system or reserve tank fire protection system.
A. Internal or external piping
B. Public and the second is protection
C. Residential environment the pollutant source
D. Certainly not usually intentional
E. Indirect connection
F. None of the Above

125. The following could be a cause of a cross-connection: A Situation as simple as leaving a garden hose nozzle submerged in a bucket of liquid or attached to a chemical sprayer.
A. True B. False

126. As far as a cross-connection, another potential hazard source within any environment may be a cross-connection of piping?
A. With an air gap
B. Backwater
C. Without a direct connection
D. Involving a water well located on the property.
E. Air break
F. None of the Above

127. The proper control of cross-connections is possible but?
A. Only through knowledge and vigilance
B. The key is public safety and the second is protection
C. Residential environment is always the pollutant source
D. Certainly not usually intentional
E. None of the Above

128. According to the text, public education is not essential, for many that are educated in piping and plumbing installations are able to recognize cross-connection dangers.
A. True B. False

**What is backflow? Reverse flow condition**
129. Backflow is the undesirable reversal of flow of nonpotable water or other substances through a _____and into the piping of a public water system or consumer's potable water system.
A. Backflow
B. Backpressure
C. Backsiphonage
D. Cross-connection
E. Indirect connection
F. None of the Above

130. Which of the following terms can occur when there is a stoppage of water supply due to nearby firefighting, a break in a water main?
A. Backflow
B. Backpressure
C. Backsiphonage
D. Cross-connection
E. Indirect connection
F. None of the Above

131. _____is a type of backflow caused by a downstream pressure that is greater than the upstream or supply pressure in a public water system or consumer's potable water system.
A. Backflow D. Cross-connection
B. Backpressure E. Indirect connection
C. Backsiphonage F. None of the Above

132. Which of the following terms can result from an increase in downstream pressure, a reduction in the potable water supply pressure, or a combination of both?
A. Backflow D. Cross-connection
B. Backpressure E. Indirect connection
C. Backsiphonage F. None of the Above

133. _____can have two forms-backpressure and backsiphonage.
A. Backflow D. Cross-connection
B. Backpressure E. Indirect connection
C. Backsiphonage F. None of the Above

134. The basic mechanism for preventing backflow is a mechanical _____, which provides a physical barrier to backflow.
A. High hazard installations D. Backflow
B. Air gap E. Device or method
C. Backflow preventer F. None of the Above

135. The principal types of mechanical backflow preventers are the reduced-pressure principle assembly, the_____, and the double check valve assembly.
A. High hazard installations D. Backflow
B. Air gap E. Device or method
C. Vacuum breaker F. None of the Above

136. Which of the following terms is any temporary or permanent connection between a public water system or consumer's potable water system and any source or system containing nonpotable water or other substances?
A. Backflow D. Cross-connection
B. Backpressure E. Indirect connection
C. Backsiphonage F. None of the Above

137. _____is backflow caused by a negative pressure (i.e., a vacuum or partial vacuum) in a public water system or consumer's potable water system.
A. Backflow D. Cross-connection
B. Backpressure E. Indirect connection
C. Backsiphonage F. None of the Above

138. Which of the following terms can occur whenever the amount of water being used exceeds the amount of water being supplied, such as during water line flushing, fire fighting, or breaks in water mains?
A. Backflow D. Cross-connection
B. Backpressure E. Reductions
C. Backsiphonage F. None of the Above

139. Which of the following terms is the means or mechanism to prevent backflow?
A. High hazard installations D. Backflow
B. Air gap E. Device or method
C. Backflow preventer F. None of the Above

140. According to the text, basic means of preventing backflow is an _____, which either eliminates a cross-connection or provides a barrier to backflow.
A. High hazard installations D. Backflow
B. Air gap E. Device or method
C. Backflow preventer F. None of the Above

**Types of Backflow Prevention Methods and Assemblies**
141. _____must either be physically disconnected or have an approved backflow prevention device installed to protect the public water system.
A. Backflow D. Cross-connection
B. Backpressure E. Indirect connection
C. Backsiphonage F. None of the Above

142. The type of device selected for a particular installation depends on several factors.
A. True B. False

143. When the airflow is restricted, such as the case of an air gap located near a wall, the _____ separation must be increased.
A. Open receiving vessel D. Air gap
B. Backflow preventer E. Air break
C. Barrier to backflow F. None of the Above

144. An air gap is a physical disconnection between the free flowing discharge end of a potable water pipeline and the top of an?
A. Open receiving vessel D. Air gap
B. Backflow preventer E. Air break
C. Barrier to backflow F. None of the Above

145. Which of the following terms must be at least two times the diameter of the supply pipe and not less than one inch?
A. Open receiving vessel D. Air gap
B. Backflow preventer E. Air break
C. Barrier to backflow F. None of the Above

146. According to the text, an air break is a physical separation between the free flowing discharge end of a potable water supply pipeline, and the overflow rim of an open or non pressure receiving vessel.
A. True B. False

147. According to the text, air gap separations must be vertically orientated a distance of at least twice the inside diameter of the supply, but never less than_____.
A. 1 inch D. Backflow
B. 2 inches E. Depends
C. 3 inches F. None of the Above

148. An obstruction around or near an _____ may restrict the flow of air into the outlet pipe and nullify the effectiveness of the air gap to prevent backsiphonage.
A. High hazard installations D. Air gap
B. Backflow preventer E. Air break
C. Barrier to backflow F. None of the Above

149. An air gap is acceptable for _____ and is theoretically the most effective protection.
A. High hazard installations D. Low pollutional hazards
B. Backflow preventer E. High pollutional concerns
C. Barrier to backflow F. None of the Above

**Vacuum Breakers**
150. Which of the following terms can have two types: atmospheric and pressure.
A. Downstream piping D. Hazard application(s)
B. Atmospheric vacuum breakers E. Backflow preventor(s)
C. Vacuum breaker(s) F. None of the Above

151. Both vacuum breakers devices primary purpose is to protect the water system from cross connections due to submerged inlets, such as irrigation systems and tank applications.
A. True B. False

152. The difference between the two types them is that the pressure vacuum breaker _is spring loaded to assist the device's opening.
A. True B. False

153. Both vacuum breakers devices open the pipeline to atmosphere in the event of backsiphonage only.
A. True B. False

154. Both vacuum breakers devices are approved for backpressure conditions.
A. True B. False

155. Both vacuum breakers devices are only suitable for?
A. High hazard installations D. Low hazard conditions
B. Backflow preventer E. High pollutional concerns
C. Barrier to backflow F. None of the Above

156. _____may not be installed downstream of atmospheric vacuum breakers but are allowed on pressure vacuum breakers?
A. Valve assembly D. Internally weighted
B. Test cocks E. Shut offs
C. Air inlet valve F. None of the Above

157. The devices must be installed above the highest?
A. Downstream piping D. Hazard applications
B. Atmospheric vacuum breakers E. Mountain
C. Vacuum breakers F. None of the Above

158. Which of the following terms contains a float check, a check seat, and an air inlet port?

A. Double check
B. Atmospheric vacuum breaker
C. Breaker(s)
D. RP
E. Backflow preventor(s)
F. None of the Above

159. The atmospheric vacuum breaker allows air to enter the water line when the line pressure is reduced to a gauge pressure of zero or below.

A. True B. False

160. Which of the following terms is not internally loaded?

A. Air inlet valve
B. Check valve
C. Device
D. Test cock
E. Atmospheric vacuum breakers
F. None of the Above

161. To prevent the air inlet from sticking open, the device must not be installed on the pressure side of a shutoff valve, or wherever it may be under constant pressure more than 2 hours during a 12-hour period.

A. True B. False

162. _____are designed to prevent backflow caused by backsiphonage only from low health hazards.

A. Downstream piping
B. Atmospheric vacuum breakers
C. RPs
D. Hazard application(s)
E. Backflow preventor(s)
F. None of the Above

163. Atmospheric vacuum breakers Uses: Irrigation systems, commercial dishwasher and laundry equipment, chemical tanks and laboratory sinks.

A. True B. False

164. Pressure vacuum breaker assembly (PVB) consists of a weighted check valve, an independently operating relief valve, two resilient seated shutoff valves, and two properly located resilient seated test cocks.

A. True B. False

165. The PVB needs to be installed 12 inches above the service or supply line to work correctly.

A. True B. False

166. Double check valve assembly (DC) consists of two internally loaded check valves, either spring loaded or internally weighted, two resilient seated full ported shutoff valves, and four properly located resilient seated test cocks

A. True B. False

167. The double check valve assembly is designed to prevent backflow caused by backpressure and backsiphonage from high health hazards.

A. True B. False

168. The double check valve should be installed in an _____and protected from freezing.
A. Confined space D. In a pit
B. Accessible location E. Is maintained at a lower pressure
C. Above the ground F. None of the Above

169. The DC needs to be installed 12 inches _____for testing purposes only.
A. In a Confined space D. In a pit
B. Accessible location E. Above the highest downstream outlet
C. Above the ground F. None of the Above

170. Reduced Pressure Backflow Assembly (RP) consists of two independently acting spring loaded check valves separated by a Spring loaded differential pressure relief valve, two resilient seated full ported shutoff valves, and four properly located resilient seated test cocks.
A. True B. False

171. During normal operation, the pressure between the two check valves, referred to as the air inlet zone, is maintained at a higher pressure than the supply pressure.
A. True B. False

172. If either reduced pressure backflow assembly check valve leaks, the differential pressure relief valve maintains a differential pressure of at least two (2) psi between the supply pressure and the zone between the two check valves by discharging water to atmosphere.
A. True B. False

173. According to the text, the Reduced Pressure Backflow Assembly or RP is designed to prevent backflow caused by backpressure and backsiphonage from low to high health hazards.
A. True B. False

174. According to the text, the RP needs to installed 12 inches above the ground for testing purposes only.
A. True B. False

175. The reduced pressure backflow assembly can be used for high hazard situations under backpressure only. Under normal conditions, the second check valve should never close.
A. True B. False

176. According to the text, if the second check valve fails or becomes fouled and backflow into the reduced pressure zone occurs, the relief port vents the backflow to atmosphere.
A. True B. False

177. According to the text, the reduced pressure zone port opens anytime pressure in the zone comes within 2 psi of the supply pressure.
A. True B. False

**Pump Categories**

178. The key to understanding a pump's operation is that a pump is to move water and generate the _____ we call pressure.

A. Centrifugal pump(s)
B. Impeller blade(s)
C. Delivery force
D. Diaphragm pump(s)
E. Cylindrical pump housing
F. None of the Above

179. 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

180. According to the text, pumps may be classified based on the application they serve.

A. True
B. False

181. 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

**Basic Water Pump**

182. According to the text, the centrifugal pumps work by spinning water around in a circle inside a?

A. Vortex
B. Cylinder
C. Viscous drag pump
D. Center of the impeller
E. Cylindrical pump housing
F. None of the Above

183. The pump makes the water spin by pulling it with an impeller.

A. True
B. False

184. 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

185. 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)
B. Impeller blade(s)
C. Bernoulli's equation
D. Diaphragm pump(s)
E. Cylindrical pump housing
F. None of the Above

186. 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)
B. Impeller blade(s)
C. Bernoulli's equation
D. Diaphragm pump(s)
E. Cylindrical pump housing
F. None of the Above

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

188. 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

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

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

191. 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

192. 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

193. 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

194. 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

**Venturi (Bernoulli's law):**
195. A venturi is a pipe that has a gradual restriction that opens up into a gradual enlargement.
A. True B. False

196. The area of the restriction in a venture will have a _____than the enlarged area ahead of it.

A. Inward force
B. Lower pressure
C. Viscous drag pump
D. Center of the impeller
E. Incompressible fluid
F. None of the Above

197. _____best describes a pump whose impeller has no vanes but relies on fluid contact with a flat rotating plate turning at high speed to move the liquid.

A. Submersible
B. Blower
C. Viscous drag pump
D. Rotary pump
E. Bicycle pump
F. None of the Above

**Types of Water Pumps**

198. The water production well industry almost exclusively uses turbine pumps, which are a type of centrifugal pump.

A. True
B. False

199. The most common type of water pumps which are 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

200. 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