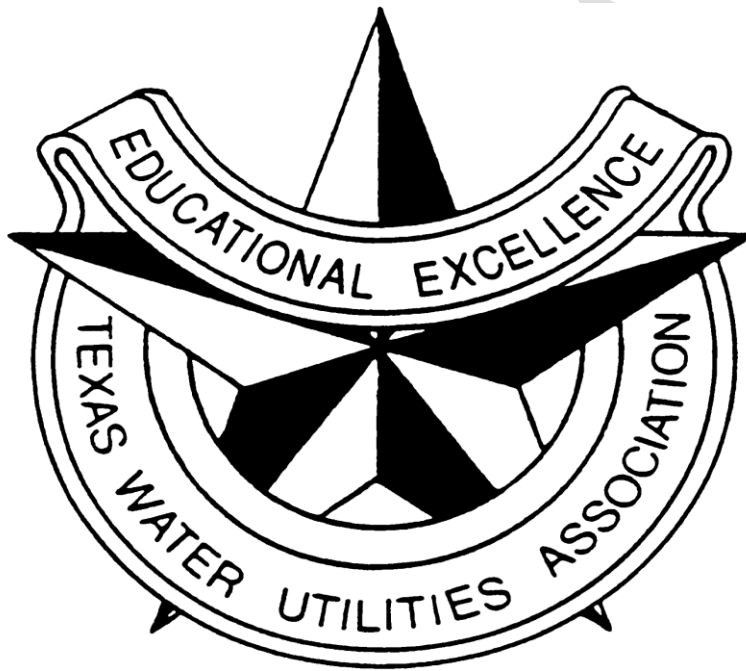


Water Operator

Study Material

“D” Water



The following study questions were developed to assist the operator in the preparation process for taking a state licensing exam.

While we feel the questions provide a broad sample of the type of questions one might expect on the state exam. TWUA and staff in no way implies, guarantees, or suggests that an operator who uses, studies, or knows the following material will pass the state exam. The following is only intended to offer an additional study tool.

While TWUA and staff have proofed the questions and answers. It is possible that some of the answers could be found in conflict with written materials. If you doubt or question the answer key PLEASE refer to written materials and use the answer that YOU feel best fits the question.

We hope that you will find this study guide useful and we wish you the best of luck on your state exam.

The following is information that is representative of the "D" Water Exam.
These ARE NOT actual test questions.

1. What is the name of the State Agency responsible for enforcing the Safe Drinking Water Program in Texas?
 - a. Texas Water Development Board
 - b. Texas Department of Water Resources
 - c. Texas Section of EPA
 - d. Texas Water Resource and Conservation Commission
 - e. Texas Commission on Environmental Quality (formally known as TNRCC)

2. What minerals are associated with water hardness?
 - a. Chlorine and Manganese
 - b. Calcium and Magnesium
 - c. Sulfates and Chlorides
 - d. Carbon and Nitrogen
 - e. Chlorine and Hydrogen

3. A public water system **MUST** at all times provide -
 - a. Adequate quantity of water
 - b. Adequate water pressure
 - c. Adequate Disinfection
 - d. All of the Above
 - e. Only a & c

4. A source of Groundwater would be -
 - a. Aquifer
 - b. River
 - c. Lake
 - d. Stream
 - e. Reservoir

5. Fecal Coliform organisms sometimes found in water supplies are an indication that –
 - a. The Water supply is contaminated
 - b. Harmful bacteria may be present
 - c. Possible pathogenic organisms are in the water
 - d. The water is unsuitable for drinking
 - e. All the above

6. A disease that May be spread by inadequately disinfected water is -
 - a. Acquired Immune Deficiency Syndrome (AIDS)
 - b. Polio
 - c. Smallpox
 - d. Dysentery
 - e. All the above

7. A common chemical used in the disinfection of a small water supply is -
 - a. Bromine
 - b. Fluoride
 - c. Sodium Hydroxide
 - d. Sodium Benzene
 - e. Calcium Hypochlorite

8. A public water supply system should maintain a system residual pressure of 20 psi and a minimum normal operating pressure of -
 - a. 35 psi
 - b. 40 psi
 - c. 45 psi
 - d. None of the above
 - e. No rule exists regarding minimum operating pressure

9. The amount of Chlorine in mg/L that is used up by reacting with iron, organics, or bacteria is called?
 - a. Demand
 - b. Disinfection
 - c. Treatment
 - d. Dosage
 - e. Residual

10. The MOST important treatment in water is?
 - a. Disinfection
 - b. Fluoride Injection
 - c. Flocculation
 - d. Organic Removal
 - e. Both a & c

11. Which of the following would be considered a part(s) of a hypo-chlorinator system?
 - a. Solution feed pump
 - b. Scale
 - c. Rotameter
 - d. 150 lb. Cylinder
 - e. All the above

12. According to state requirements, all public water supply wells shall be provided with a raised concrete sealing block, screened vents and –
 - a. Foot valve
 - b. Double check valve
 - c. Flow measuring device
 - d. Air gauge for verifying drawdown
 - e. Emergency Shut off and lock out device

13. One method to determine the drawdown of a water well is -
 - a. An air line
 - b. An electronic volt/ohm meter
 - c. An in line flow meter
 - d. An amplified sounding unit
 - e. Monitoring the discharge pressure gauge & timing pump cycles

14. The pH of water indicates -
 - a. If it is more acid or base
 - b. If the water is considered hard
 - c. If the water is considered soft
 - d. How much fluoride is naturally occurring in the water
 - e. Not important in potable water treatment

15. Assuming you collect more than one bacteriological sample monthly and your system receives notification from the lab that one of the samples taken in the distribution system comes back positive – your repeat sample(s) must be taken within _____ hours (excluding weekends) and a total of _____ repeat samples must be collected for each positive?
 - a. 48 hours & 4 repeat samples for each positive
 - b. 24 hours & 3 repeat samples for each positive
 - c. 72 hours & 1 repeat for each positive
 - d. 72 hours & 3 repeat samples for each positive
 - e. Rule not currently enforced by the state

16. Water that is considered neutral is expressed on the pH scale at -
 - a. 0.00
 - b. 14.0
 - c. 7.0
 - d. 0.7
 - e. 0.07

17. Which of the following is a required step in collecting a routine distribution sample for bacteriological testing?
 - a. Use of an approved, sterile sample container
 - b. Use of a sample site close to the storage tank
 - c. Rinse out the sample container before collecting the sample
 - d. Fill the sample container to at least 50 % of capacity
 - e. All the above

18. Potable water means the water is -
 - a. Maintained at adequate pressure
 - b. Pathogen free
 - c. Contains a chlorine residual
 - d. All the above
 - e. Both B & C

19. Should a public water supply systems distribution system drop below 20 psi what is required of the operator?
- Nothing 20 psi is simply a goal
 - Immediately correct the problem or cause of low pressure
 - Notify the Mayor & City Council
 - Notify the Regional TCEQ Office and Issue a “Boil Water Notice”
 - Both b & d
20. Before a new or repaired water line is placed into service, it must be properly disinfected by providing a chlorine dosage of _____ and proper detention time.
- 20 mg/L
 - 30 mg/L
 - 40 mg/L
 - 50 mg/L
 - Currently there is no mandated standard or requirement
21. In a ground water system if the operator knows the “standing” water level in the well when the pump is off and he/she knows the water level in the well during “pumping” – he/she will be able to determine the _____ of the well.
- Static Level
 - GPM Production of well
 - Drawn down
 - Pump Size
 - Horsepower needed for the electric motor
22. TCEQ requires community water systems to have a minimum production capacity of _____ per connection at peak demand.
- 0.3 gpm
 - 0.4 gpm
 - 0.5 gpm
 - 0.6 gpm
 - There is no TCEQ requirement – only a suggestion
23. The mesh size is an important feature of a well screen because properly sized openings should -
- Reduce the amount of sand pumped
 - Increase the water velocity through the screen
 - Eliminate the need for gravel packing
 - Eliminate over pumping
 - All the above

24. Which of the following is an acceptable disinfection residual at the far reaches of the distribution system -
- 0.2 mg/L free chlorine residual
 - 0.5 mg/L chloramine residual for a surface water supply.
 - 0.8 mg/L chloramine residual when using chloramine treatment
 - 0.5 mg/L free chlorine residual for a groundwater supply
 - All the above
25. One gallon of water weighs -
- 2.31 lbs.
 - 7.48 lbs
 - 8.43 lbs
 - 8.34 lbs
 - None of the above
26. One foot of water inside a storage vessel will raise a pressure gauge at the bottom of the vessel by –
- 2.31 lbs
 - 43.3 lbs
 - .433 lbs
 - 27.3 lbs
 - 8.34 lbs
27. Common type(s) of pump(s) for use in water wells are -
- Proportion Pump
 - Split Case
 - Vertical Turbine
 - Submersible
 - Both c & d
28. _____ is the natural exchange of water between the earth and air
- Transportation Cycle
 - Precipitation Cycle
 - Hydrological Cycle
 - Universal Cycle
 - All of the above
29. If and when a health hazard contamination event occurs in a public water System, the operator must contact the state regulatory authority within _____ hours by telephone.
- 8 working hours
 - 24 hours
 - 48 hours
 - 72 hours
 - When the supervisor returns and verifies the event

30. A physical connection between a potable water supply and a house well would be –
- Acceptable in Arkansas & Oklahoma
 - A Cross Connection
 - Considered a back up for the potable system
 - Unaccounted for water loss
 - A Class C Misdemeanor
31. Excessive nitrates in drinking water can cause a condition that affects infants under the age of 6 months. This condition is known as –
- Shaken baby
 - Crying baby
 - Blue babies
 - Hypothermia
 - Condition does not exist – only a myth
32. A public water system is required to take samples of water for bacteriological analysis. The organism that is used as an indicator is called -
- Chloroform
 - Coliform
 - Chloramine
 - Parasite
 - Amoeba
33. Chlorine dosage is demand plus desired _____.
- Residue
 - Residual
 - Demand
 - Treatment
 - Both b & c
34. A storage vessel that is the same diameter from the ground to the top and is more than 20 feet but less than 85 feet tall is called a –
- Elevated storage
 - Ground storage
 - Spherical storage
 - Stand pipe
 - Useless device
35. A water tank that uses compressed air over water to provide pressure is called a -
- Sand pressure filter
 - Bladder tank
 - Boiler
 - Hydro pneumatic tank
 - Health hazard and should be removed

36. According to the lead and copper rule, pipe and fittings may not contain more than _____ lead or solder and flux may not contain more than 0.2 % lead.
- 0.8 %
 - 8.0 %
 - 2.0 %
 - 20 %
 - None of the above
37. When testing for chlorine residual DPD is used as an indicator, when DPD is added to water containing chlorine what color does the sample turn?
- Blue
 - Red
 - Green
 - Yellow
 - There should be no change in color
38. The most common valve used for isolating a water leak is the _____ valve.
- Ball valve
 - Butterfly valve
 - Check valve
 - Gate valve
 - Pressure reducing valve
39. In the distribution system when a valve or fire hydrant is opened or closed too fast it could result in a –
- Pressure drop
 - Water hammer
 - Cross connection
 - Contamination
 - No change – this task is routinely preformed
40. The most commonly used pump in the distribution system is –
- Centrifugal
 - Positive displacement
 - Roller pump
 - Submersible
 - Hollow shaft turbine

41. A Texas Class D Certified Operator can operate a public water system up to _____ connections

- a. 250
- b. 275
- c. 500
- d. 1,000
- e. 2,500

42. All state of Texas Operator License's after issue are good for _____ years.

- a. 2 years
- b. 3 years
- c. 4 years
- d. 8 years
- e. None of the above

43. Waterlines should be installed no closer than _____ feet to any sewer lines or other possible contaminate lines.

- a. 6 feet
- b. 7 feet
- c. 8 feet
- d. 9 feet
- e. There are no recognized current standards

44. Calcium Hypochlorite (HTH) is used as a disinfectant in small systems, what percentage chlorine is this material typically?

- a. 65 – 75 %
- b. 75 – 85 %
- c. 85 – 95 %
- d. 100 %
- e. 5 % - same as household bleach

45. Flushing dead-end mains – current state regulations require that all public water systems flush dead-end mains to assure chlorine residual and water quality. What is the minimum flushing requirement?

- a. Once every month
- b. Once every quarter
- c. Annually, prior to the sanitary inspection
- d. Customers on dead-in lines should be grateful to have water
- e. State has more important things to oversee and regulate

46. The process of adding enough chlorine to a water supply to complete all reactions with reducing compounds, ammonia, and organic materials so that some free chlorine is left is called -
- Breakpoint chlorination
 - Chlorine demand
 - Chlorine dosage
 - Residual chlorination
 - Operator satisfaction
47. The primary reason(s) for main line failures in the distribution system is -
- Internal and external corrosion
 - Defective material
 - Lack of routine maintenance
 - Improper backfill and lack of proper bedding
 - Both a & d
48. Check valves on the discharge side of a pump are used to -
- Stop water flow in case of flooding
 - Stop pump cavitations
 - Assist in directing flow and velocity
 - Prevent water from flowing back through the pump when the pump is off
 - Check valves are never used on the discharge side of a pump
49. After disinfection and flushing of super chlorinated new lines and service but prior to placing the line into service, bacteriological samples are required. The current standard is _____ sample for every _____ feet of line.
- One sample for every 500 feet of line
 - Two samples for every 1,000 feet of line
 - One sample for every 1,000 feet of line
 - Only one sample regardless of the length of line
 - Not a requirement - No samples are necessary
50. For Cross Connection Control the TCEQ's preferred method is -
- Testable Double Check Valve
 - Reduced Pressure Zone (RPZ)
 - Atmospheric Breaker Valve
 - Physical Air Gap
 - All the above
51. One microorganism found in water that is resistant to chlorine is -
- Fecal Organisms
 - Deoxyribonucleic acid
 - Super Cell Amoeba
 - Cryptosporidium
 - No known microorganism is resistant to Chlorine

52. The most important federal law that impacts the water utility industry is?
- The Safe Drinking Water Act of 1974
 - The Federal Water Standards Act of 1984
 - The Federal Environmental Impact Assessment Act
 - Texas Water Use Plan 2005
 - The EPA Minimum Standards Act 1996
53. An example of a Non- Community Water System would be?
- RV Park
 - Hotel / Motel
 - Service Station
 - a, b, & c
 - None of the above
54. The EPA requires community water systems to provide customers with an annual?
- Notice of proposed rate increase
 - Consumer Confidence Report
 - Consumer Price Index Report
 - Consumer Cost of Living Analysis
 - Copy of Department Expenditure Budget
55. A groundwater well is currently producing 820 gallons per minute. Convert 820 (gpm) to million gallons per day (mgd)
- 19,680
 - 1.18
 - 1180
 - 1440
 - 4.92
56. In the distribution system where would a person expect to find a valve commonly referred to as a curb stop?
- In front of a fire hydrant
 - At the providers main line
 - At the property line and immediately in front of the water meter
 - On the discharge side of the high service pump
 - Typically used as a air relief device and found on ground water wells
57. Public water Systems in Texas are required to compile and maintain reports showing –
- Pumpage & Chemical Used
 - Date of Dead End Flushing & Storage tanks cleaned
 - Microbiological tests & Chemical analysis
 - a & c only
 - a, b, & c

58. Groundwater is generally well filtered and free of turbidity, color and organics, however it may be high in –
- Total Suspended Solids
 - Organics & Fecal Content
 - Hardness, Minerals & Inorganic's
 - Copper & Lead
 - Price, & used primarily for irrigation
59. Livestock and septic tanks must be no closer than _____ to a public well.
- 5 feet
 - 25 feet
 - 50 feet
 - 500 feet
 - 5280 feet
60. Feedlots, sewage treatment plants and landfills must be at least _____ feet from a public well.
- 50 feet
 - 150 feet
 - 500 feet
 - 5,000 feet
 - 15,000 feet
61. Red water or red stains may be caused by _____ levels in the water.
- Calcium
 - Nitrates
 - Iron
 - Lead
 - Organic Vegetation
62. A “pinging” sound or “rocks bouncing” sound coming from the pump typically indicates the pump is _____.
- Over used
 - Under used
 - Cavitating
 - Needing maintenance
 - Single phasing
63. In the distribution system where would a person expect to find a valve commonly referred to as a Corporation Stop?
- In front of a fire hydrant
 - At the providers main line
 - At the property line and immediately in front of the water meter
 - On the discharge side of the high service pumps
 - Typically used as a air relief device and found on ground water wells

64. You are treating 21 MGD water how many gallons per minute is this?
- a. 1,458
 - b. 5,833
 - c. 8,750
 - d. 14,583
 - e. 87,500

65. What is the approximate total volume in gallons of a circular tank, if it is 30 feet in diameter, and is 15 feet deep –
- a. 5,284
 - b. 10,597
 - c. 15,854
 - d. 42,390
 - e. 79,300

Hint: $\pi \times r \times r \times d \times ?$

66. In a groundwater system according to the well drillers report the hole was drilled 338 feet deep - the static level of water in the well is 108 feet – the pumping level is 171 feet. What is the drawdown?
- a. 179 feet
 - b. 279 feet
 - c. 63 feet
 - d. 167 feet
 - e. Not enough information to compute
67. At the base of an elevated storage tank a pressure gauge reads 72 psi, how far above the gauge, is the water surface?
- a. 16.6 feet
 - b. 31.1 feet
 - c. 166 feet
 - d. 1,663 feet
 - e. Not enough information to compute
68. How many pounds of 70 % chlorine (HTH) will be needed to treat the same amount of water as 9.0 lbs. of 100 % chlorine?
- a. 11.85
 - b. 12.85
 - c. 6.3
 - d. 16.3
 - e. Not enough information to compute

69. Your system is currently pumping 1.4 MGD and using 9.0 mg/L chlorine. The residual at the far end of the distribution system is 0.4 mg/L – what is the demand?
- a. 9.4 mg/L
 - b. 2.25 mg/L
 - c. 8.6 mg/L
 - d. 3.6 mg/L
 - e. Not enough information to compute
70. Your system is installing 6 miles of 10 inch Class 150 PVC water line. The pipe comes in 20 ft. sections. How many sections or joints of pipe will be installed in this project ?
- a. 120
 - b. 1584
 - c. 3,168
 - d. 10,400
 - e. 17,600

We genuinely hope that you have found this study material useful. The above questions are NOT copied from the state exam. You will NOT see the same wording or math on the state exam. This is simply a study guide.

Neither TWUA nor any staff thereof; implies that by knowing or memorizing these study questions - you will successfully pass the TCEQ state exam.

It is our position that if you read the Basic Water Manual – Listen and Participate in Class - Complete the Chapter Review Questions at the end of each chapter – and test your knowledge with this practice exam – You should do well on the state exam.

The TCEQ State Exam will be 50 Questions – Good Luck !!!