

# Water Distribution Study Guide

## Class I (Made available by: Kansas Rural Water Association)

1. If you come upon a co-worker who is not breathing, you should immediately
  - a. apply cold compresses to the worker's forehead.
  - b. check for bleeding.
  - c. run for help.
  - d. start artificial respiration.
  
2. What is the pressure at the bottom of a standpipe filled to a height of 47 ft.?
  - a. 10 psi
  - b. 15 psi
  - c. 20 psi
  - d. 25 psi
  
3. A connection from the municipal water supply directly to the packing gland of a centrifugal wastewater pump
  - a. is a hazard to the safety of the potable water supply.
  - b. is necessary to dilute the wastewater.
  - c. is undesirable because too much water is required.
  - d. reduces the power consumption of the motor driving the pump.
  
4. A waterborne disease that can be transferred to humans if proper disinfection is not provided is
  - a. gonorrhea.
  - b. malaria.
  - c. mumps.
  - d. typhoid.
  
5. Rising stem valves are most often used
  - a. before and after house meters.
  - b. in pumping stations.
  - c. on blowoffs.
  - d. on hydrants.
  
6. The device used in checking water flow to consumers is a
  - a. backflow device.
  - b. pressure sensing unit.
  - c. waterline valve.
  - d. water meter.
  
7. Which one of the following types of meters has no moving parts?
  - a. propeller
  - b. proportional
  - c. rotometer
  - d. Venturi

8. Distribution system pressure (even during fire fighting demands) should not be allowed to drop below \_\_\_\_ psi.
  - a. 0
  - b. 5
  - c. 20
  - d. 40
  
9. To determine whether an intersecting sewer line crosses over or under a water main, one would look at the
  - a. architectural detail.
  - b. elevation view.
  - c. general site.
  - d. plan view.
  
10. The chlorine residual in water may be determined using the reagent
  - a. diethyl-p-phenyldiamine (DPD).
  - b. ethylenediaminetetraacetic acid (EDTA).
  - c. polychlorinated biphenyls (PCB).
  - d. sodium thiosulfate ( $\text{Na}_2\text{S}_2\text{O}_3$ ).
  
11. Customer services are most commonly metered with \_\_\_\_ meters.
  - a. remote reading
  - b. positive displacement
  - c. rotating disc
  - d. miniturbine
  
12. A toxic substance is always
  - a. distasteful.
  - b. infectious.
  - c. poisonous.
  - d. repulsive.
  
13. The primary reason for a dry barrel fire hydrant is to
  - a. allow easy maintenance of the hydrant.
  - b. keep the barrel from rusting.
  - c. keep the hydrant from freezing.
  - d. prevent water hammer.
  
14. The rotating element in centrifugal pumps is commonly called a(n)
  - a. fan.
  - b. impeller.
  - c. rotor.
  - d. volute.
  
15. First aid for first degree burns is to
  - a. bandage tightly.
  - b. cover liberally with a salve.
  - c. immerse in warm water.
  - d. submerge the burned area in cold water.

16. Sodium hypochlorite is
  - a. a chemical compound that can be purchased in liquid solution or dry tablet form and can be used for disinfection.
  - b. a dry neutralizing powder for chlorine burns.
  - c. is classified as an acid.
  - d. the salt that is formed when hydrochloric acid is neutralized by sodium hydroxide.
  
17. What information must be on a warning tag attached to a switch that has been locked out?
  - a. directions for removing the tag
  - b. name of nearest physician to call in case of emergency
  - c. signature of person who locked out switch
  - d. telephone number of collection system supervisor
  
18. Killing of pathogenic organisms is called
  - a. disinfection.
  - b. oxidation.
  - c. pasteurization.
  - d. sterilization.
  
19. Temporary cloudiness in a freshly drawn sample of tap water may be caused by
  - a. air.
  - b. chlorine.
  - c. hardness.
  - d. silica.
  
20. Vent openings on reservoirs and storage tanks should be
  - a. chlorinated frequently.
  - b. provided with an overlapping cover.
  - c. sealed during winter.
  - d. screened.
  
21. Fire fighting may cause low pressure in an area of a distribution system. The low pressure might lead to
  - a. contamination of the system by back-siphonage.
  - b. ice formation in the pipes.
  - c. loss of chlorine residual.
  - d. muddy water.
  
22. Hydrogen sulfide gas smells like
  - a. dead fish.
  - b. fuel gas.
  - c. rotten cabbage.
  - d. rotten eggs.

23. When using "chlorine tablets" to disinfect pipelines, it is best to place the tablets
- anywhere, it makes no difference.
  - at the end you fill first.
  - on the inside top.
  - on the bottom.
24. Static head is defined as the
- energy of motion of the water.
  - pressure due to depth of elevation of the water.
  - pressure loss in the line due to friction.
  - all of the above.
25. When using the company vehicle, utility personnel should
- always use the flashing red or yellow light.
  - follow the same traffic laws as everyone else.
  - follow special traffic laws applicable to municipal vehicles.
  - maintain a speed that is at least 10 mph less than the posted limit because of the vehicle's size.
26. A connection between a safe and an unsafe water supply is called a
- cross connection.
  - intersection.
  - loss of head.
  - vacuum breaker.
27. Velocity of flow in mains is usually expressed in terms of
- feet per second.
  - gallons per minute.
  - litres per foot.
  - milligrams per litre.
28. When collecting a distribution system sample for bacteriological testing, the person collecting the sample should allow the water to run \_\_\_\_\_ before filling the sample bottle.
- as long as necessary to permit clearing of the service line
  - 1 hr.
  - 30 min
  - only a few seconds
29. When opening and closing valves in high pressure lines, the valves should be opened
- and closed as rapidly as possible.
  - and closed slowly.
  - rapidly and closed slowly.
  - slowly and closed rapidly.
30. Pressure is usually measure in
- cubic feet per second.
  - feet per second.
  - gallons per minute.
  - pounds per square inch.

31. The field service crew drives their truck 36 miles on Monday, 11 miles on Tuesday, 48 miles on Wednesday, 0 miles on Thursday, and 19.7 miles on Friday. What is the total number of miles driven this week?
- 23 miles
  - 95 miles
  - 103.7 miles
  - 114.7 miles
32. A water main should be disinfected
- when the pipe is in the storage yard.
  - after the pipe is laid in place.
  - after the pipe is delivered to the job site.
  - at the manufacturer's plant.
33. A new section of water main has just been laid. Before it is completely back-filled and put into service, several things must be done. What is the correct order for doing them?
- collect bacte samples, flush, pressure test, disinfect, flush
  - flush, disinfect, collect bacte samples, pressure test
  - pressure test, disinfect, collect bacte samples, flush
  - pressure test, flush, disinfect, flush, collect bacte samples
34. Coliform bacteria are reported in organisms per
- litre.
  - 100 millilitres.
  - millilitre.
  - plate.
35. Samples taken for routine analysis should be preserved by
- boiling.
  - filtering.
  - refrigerating.
  - sterilizing.
36. The "hydrant bury" is the
- cubic yards of cover over the hydrant branch or connecting pipe.
  - depth of the auxiliary valve.
  - depth to which the hydrant base is buried.
  - vertical distance between the ground and the bottom of the hydrant branch or pipe connection.
37. The letters or units "gpm" appearing on a flow rate indicator in a pumping station means
- gallons per man.
  - gallons per man hour.
  - gallons per mile of sewer line.
  - gallons per minute.

38. Determining the pH of water is one of the important tests of water quality. The results of the pH test indicate the
- balance between acidic and basic conditions.
  - chlorine residual.
  - presence of coliform organisms.
  - presence of iron.
39. The difference between the static level and the pumping level of a well is called the
- cone of depression.
  - drawdown.
  - radius of influence.
  - zone of saturation.
40. Which of the following is a correct statement about chlorine?
- Chlorine gas is colorless, odorless and toxic.
  - Chlorine gas is heavier than air.
  - Chlorine gas is insoluble in water.
  - Chlorine gas will liquefy if heated above the boiling point of water.
41. If you are having problems achieving adequate disinfection, possible causes include
- chlorinator over-feeding.
  - chlorine being consumed by organic matter.
  - contact time too long.
  - insufficient turbidity in water.
42. Chlorine is used in water to
- disinfect.
  - prevent corrosion.
  - raise the pH level.
  - stabilize the water.
43. When employees are working in trenches 5ft deep or more, an adequate means of exit, such as a ladder or steps, must be located no more than \_\_\_ft away from them.
- 5
  - 10
  - 25
  - 45
44. An aquifer is a(n)
- flowing well.
  - impervious stratum below bedrock.
  - structure for conveying a canal over a river or open space.
  - water-bearing stratum of rock, sand or gravel.

45. In instances where nonpotable water or toxic waste systems are found to be connected directly with a potable water system, the preferred method for prevention of contamination is
- carrying 0.5 mg/L chlorine residual in the potable water system.
  - installing physical separation (air gap) between the two systems.
  - maintaining a high pressure on the safe water system.
  - providing rapid cutoff valves in several locations.
46. A pump needs new packing
- if no more packing will fit into the stuffing box.
  - if there is any leakage from the packing gland.
  - when no more packing can be added.
  - when the gland follower is pulled all the way down.
47. The carrying capacity of water mains is often reduced by
- lining.
  - looping.
  - tuberculation.
  - vacuum breakers.
48. When installing service lines, it is a good practice to provide for movement due to settling by installing a(n)
- bend or gooseneck in the pipe.
  - expansion joint.
  - flexible coupling.
  - service line on the side of the pipe.
49. The term water table is used in reference to the
- elevation to which water would rise in a vertical fine bore tube connected to the crown (top arch) of a sewer during maximum flow.
  - level to which the soil or rock voids are saturated with groundwater.
  - "round table" or "conference" of agency representatives allocating interstate discharge permits.
  - table of charges for water service or water delivered through a customer's meter.
50. A pneumatic ejector lifts water from low points to higher levels. The device used to achieve this is a(n)
- air compressor.
  - axial flow pump.
  - centrifugal pump.
  - plunger type pump.
51. The subsurface component parts of a well include the
- rotameter.
  - sampling taps.
  - well casing.
  - well casing vent.

52. Why are fractured limbs supported with splints?
- to make sure that the fractured bone fuses together properly
  - to prevent infection
  - to relieve pain and to prevent further injury
  - a and c
53. In determining the purity of a water sample, it is usually tested for the presence of the coliform organism because
- it can be done in the field.
  - it is one of the major disease bearing organisms.
  - its presence indicates the water has been polluted.
  - its presence is indicated rapidly.
54. If your well pump broke down, your storage tank contained 1 mil gal, and water was being withdrawn at a rate of 0.5 mgd per day, how long would it take for the tank to empty?
- 1 day
  - 2 days
  - 3 days
  - 4 days
55. The first time a distribution system water sample comes back marked unsafe, you should
- increase the chlorine dose.
  - notify the public to boil their drinking water.
  - take a sample from the well.
  - take another sample from the same location.
56. When a centrifugal pump with new packing is started and the packing seems to leak air, the proper procedure is to
- stop the motor and repack the stuffing box.
  - put in some heavy oil and then gradually tighten the gland.
  - ignore the condition.
57. The component of a centrifugal pump that is sometimes installed on the end of the suction pipe to hold the priming is known as a
- casing.
  - drain.
  - foot valve.
  - ventilator.
58. A standpipe is 84 in. in diameter and 20 ft high. How many gallons are in it when the water is 16 ft deep?
- 615 gallon
  - 763 gallon
  - 4606 gallon
  - 5754 gallon



59. After using a hydrant, the hydrant should be
- closed quickly.
  - closed slowly to reduce surges.
  - closed using the hydrant guard valve.
  - left running for the next load.
60. The primary purpose of fire hydrants is
- public fire protection.
  - main flushing.
  - flow measurement.
  - all of the above.
61. When a section of water main is replaced, any organic material allowed to remain inside the pipe will increase
- alkalinity and decrease turbidity.
  - chlorine demand and decrease chlorine residual.
  - corrosion and head loss.
  - friction, scaling and decrease head loss.
62. Why is it important to thoroughly flush out a newly installed backflow-prevention device before testing?
- to allow water to flow in both directions through the unit
  - to equalize the pressures throughout the system
  - to rid the unit of corrosive chemicals
  - to rid the unit of foreign objects and particles
63. Chlorine leaks in metal containers tend to
- become larger.
  - become smaller.
  - remain the same size.
  - seal themselves.

# Answers

## Water Distribution

### Class I

|      |      |      |      |      |
|------|------|------|------|------|
| 1 d  | 14 b | 27 a | 40 b | 52 d |
| 2 c  | 15 d | 28 a | 41 b | 53 c |
| 3 a  | 16 a | 29 b | 42 a | 54 b |
| 4 d  | 17 c | 30 d | 43 c | 55 d |
| 5 b  | 18 a | 31 d | 44 d | 56 a |
| 6 d  | 19 a | 32 b | 45 b | 57 c |
| 7 d  | 20 d | 33 d | 46 d | 58 c |
| 8 c  | 21 a | 34 b | 47 c | 59 b |
| 9 b  | 22 d | 35 c | 48 a | 60 a |
| 10 a | 23 c | 36 d | 49 b | 61 b |
| 11 b | 24 b | 37 d | 50 a | 62 d |
| 12 c | 25 b | 38 a | 51 c | 63 a |
| 13 c | 26 a | 39 b |      |      |