

Water Distribution Study Guide

Class IV (Made available by: Kansas Rural Water Association)

1. How are valves checked to determine that they are holding properly?
 - a. by compressed air
 - b. by electrostatic test
 - c. by a pressure test
 - d. by a torque wrench
2. Who is ultimately responsible for being sure that your agency has a good record keeping system?
 - a. everyone
 - b. field workers
 - c. foreman
 - d. supervisor
3. Which type of pipe is most likely to be damaged by corrosion?
 - a. asbestos cement
 - b. reinforced concrete
 - c. steel
 - d. vitrified clay
4. What is the most important and all inclusive aspect of supervision?
 - a. proper utilization of people
 - b. proper utilization of finances
 - c. proper utilization of equipment
 - d. proper utilization of all resources
5. The maximum flow to be expected through a standard 5/8 x 3/4 meter is ____ gpm.
 - a. 5
 - b. 10
 - c. 20
 - d. 30
6. What does not materially affect the friction loss in a given length of pipe?
 - a. hardness of the water
 - b. number of fittings
 - c. roughness of the interior of the pipe
 - d. velocity of the flow
7. Because of local climate conditions, a system may have a specific type of fire hydrants installed, such as
 - a. cold climate, warm climate, or hot weather hydrants.
 - b. dry barrel or wet barrel.
 - c. dry top or wet top hydrants.
 - d. post or flush hydrants.

8. One opening has become available that would be an advancement to any one of three qualified eager employees. How should this situation be handled?
 - a. Hire an outsider to fill the position.
 - b. Pick one and notify all personnel of the change.
 - c. Quietly move one up; everyone will soon know.
 - d. Talk to all three as a group, explain the situation and make your selection. Then notify all personnel of the change.

9. A decrease in the gallons pumped from a well per kilowatt hour of electricity used indicates a(n)
 - a. decrease in well efficiency.
 - b. increase in electric rates.
 - c. increase in pump efficiency.
 - d. none of the above.

10. Objectives for a preventive maintenance program include
 - a. eliminate parts inventory.
 - b. get organized to unstop over-flowing storage tanks quickly.
 - c. increase use of standby equipment.
 - d. reduce emergency repairs and maintenance.

11. Which one of the following is unlikely to occur in the distribution system?
 - a. increase in color
 - b. increase in dissolved gases
 - c. increase in taste and odor
 - d. increase in turbidity

12. To be sure a dry barrel hydrant is draining after the test is completed
 - a. attach a negative pressure gauge to the nozzle.
 - b. feel for a suction through the nozzle.
 - c. hang a plumb bob into the hydrant.
 - d. use sonic leak detection listening equipment.

13. Air tanks on storage tanks require
 - a. mesh screens to prevent entry of animals or birds.
 - b. fine screens to prevent entry of animals, birds or insects.
 - c. filters to prevent entry of dirt and airborne pollutants.
 - d. grates to prevent vandalism and unauthorized access.

14. How many gallons does 1000 ft of 15-inch diameter pipe contain?
 - a. 64 gal
 - b. 1227 gal
 - c. 2295 gal
 - d. 9179 gal

15. In a parallel circuit, if one unit is burned out or disconnected, the other units will
 - a. become overloaded.
 - b. cease to function.
 - c. cease to function and then resume when the unit is replaced.
 - d. continue to function.

16. Automation of a water system should provide
 - a. constant pressure.
 - b. cross connection control.
 - c. prevention of corrosion.
 - d. prevention of main breaks.

17. The two major requirements in sizing a service are adequate
 - a. corrosion resistance and longevity.
 - b. flow rate and C factor.
 - c. flow rate and volume.
 - d. pressure and flow rate.

18. The least head loss in a pipeline would be caused by a fully open
 - a. angle valve.
 - b. check valve.
 - c. gate valve.
 - d. globe valve.

19. The location where residual pressure is measured should be
 - a. on the opposite nozzle of the flowing hydrant.
 - b. at the nearest hydrant upstream from the flowing hydrant.
 - c. between the source and the flowing hydrant.
 - d. between the flowing hydrant and the normal pressure.

20. A reduced pressure zone backflow preventer will
 - a. stop backsiphonage but not backpressure.
 - b. stop backpressure but not backsiphonage.
 - c. stop backpressure and backsiphonage.
 - d. stop air from getting into the system.

21. When excessively worn, positive displacement and other meters will usually
 - a. give erratic, unpredictable readings.
 - b. jam.
 - c. register less water than has actually passed.
 - d. register more water than has actually passed.

22. When a confined space must be entered, the minimum number of workers on the job should be
 - a. one.
 - b. two.
 - c. three.
 - d. three and a spotter or supervisor.

23. Five thousand feet of 24 inch diameter pipeline has been chlorinated. It is being flushed at a rate of 100 gpm. How long will it take to completely flush the line?
 - a. 3 hr 55 min
 - b. 12 hr 15 min
 - c. 19 hr 35 min
 - d. 25 hr 55 min

24. Plastic service lines can be thawed by
- electrical current.
 - hot air.
 - hot water.
 - all of the above.
25. When working with electrical equipment outdoors
- a ground fault interrupter power supply is required.
 - battery powered motor generators should be used instead of line voltage.
 - line power grounding should be tested with a volt-ohm meter before proceeding.
 - none of the above.
26. An organization chart shows
- the formal organization, including the overall structure.
 - the informal organization, including the personnel contact with the organization
 - both the formal and informal organization.
 - the scope of authority and responsibility of managerial positions.
27. How can the supervisor be certain that scheduled maintenance is completed?
- Ask the workers.
 - Hire someone to inspect completed work.
 - Use a form that compares work assigned with work completed.
 - Wait and see if there are any failures.
28. The most important thing a supervisor can do regarding potential personnel problems is to
- delay action in order to think about it.
 - have the personnel officer talk to the personnel involved.
 - seek advice from superiors.
 - write each incidence down, file it for reference, and talk to the personnel involved.
29. Water rates are
- \$0.50 per 100 ft³ for the first 2000 ft³
\$0.40 per 100 ft³ from 2000 to 6000 ft³
\$0.35 per 100 ft³ from 6000 to 20,000 ft³ and
\$0.25 per 100 ft³ for 20,000 ft³ and over.
- What is the charge for 1 acre-ft?
- \$108.90
 - \$133.90
 - \$154.00
 - \$163.35
30. What is the main reason for the poor accident record of operators?
- lack of equipment
 - lack of interest
 - lack of time
 - lack of training

31. The major reason why the person in charge of a public relations program should be a member of upper management is
- the ability to influence policy.
 - being in a position of telling irate customers why they are wrong.
 - that no one in the lower ranks wants it.
 - the public accepts it better.
32. The chlorine demand of a certain water is 3 mg/L. If the operator treats 250,000 gal of water with 10 lb of chlorine gas, the chlorine residual should be ____ mg/L.
- 1.0
 - 1.8
 - 3.0
 - 4.8
33. Leadership occurs as a result of
- being born with certain traits.
 - supervisory authority and position.
 - the number of years on the job.
 - the supervisor's ability to achieve employee willingness to follow.
34. Occasionally some of the people on a work crew will indulge in active horseplay. This should be
- discouraged because some of the workers might not like it.
 - encouraged because it promotes good fellowship.
 - permitted as it is a form of relaxation.
 - stopped immediately because it is likely to cause an accident.
35. Two ways to reduce the chances of freezing in a water tank are
- close air vents and increase internal tank pressure.
 - hold the water level stable and increase chlorine concentration.
 - vary the water level and increase the maximum water level.
 - vary the water level and lower the maximum water level.
36. How much chlorine would you have to apply to a reservoir containing 4 million gallon of water, to obtain a 5.0 mg/L residual when the demand of the water is 2.3 mg/L?
- 90 lb
 - 166 lb
 - 243 lb
 - 383 lb
37. Two constituents that should be regularly sampled and tested from the distribution system are
- chlorine residual and turbidity.
 - coliform bacteria and chlorine residual.
 - nitrate and coliform bacteria.
 - turbidity and coliform bacteria.

38. Areas subject to higher than normal vandalism are usually
- along heavily traveled streets.
 - secluded out of the way buildings
 - well lighted, visible areas.
 - none of the above.
39. Word has just come down from the top that operating funds are being cut. How should this be handled?
- Cut supplies and repairs to balance the budget.
 - Fire some of the less productive old employees.
 - Keep it quiet and do what you have to do - "the less said the better".
 - Let the other personnel know what the situation is and ask for their help.
40. Where no yoke is used, an operator preparing to remove a service meter should
- install a jumper wire and take care not to bridge the circuit with their body.
 - put on rubber gloves and take care not to bridge the circuit with their body.
 - shut off the household electrical power.
 - use rubber insulated tools and special rubber gloves.
41. If you were in charge of a large operation with four foreman, three whose work was exceptionally good and a fourth who was substandard, what should you do?
- Demote the person giving your reasons.
 - Find a replacement and then fire the person.
 - Fire this person and then look for a replacement.
 - Tell the person of the shortcomings that bother you and offer to help the person before any other action is taken.
42. If an older system with excessive tuberculation exhibited persistent red water problems, it would be advisable to
- alternate flow velocity and pressure changes.
 - alternate pH adjustments to vary precipitation.
 - clean the mains before attempting to apply a protective coating with the stabilization treatment process.
 - increase the chemical dosage during the stabilization treatment process.
43. In establishing permanent "ties" or references to a buried valve, what is the poorest reference point from which to measure?
- building foundation
 - manhole
 - property corner
 - tree
44. The possible corrosive action of a filtered water upon metals can be detected by the
- determination of total chloride.
 - orthotolidine test.
 - oxygen consumed test.
 - measuring of pH an pH_s .

45. An operator is caught in a room where chlorine gas is leaking. If the operator does not have a mask, what should the operator do?
- Keep mouth closed, keep head as high as possible and quickly walk out of the room, holding breath if possible.
 - Lay down on the floor and quickly crawl out of the room.
 - Pull shirt over mouth and face and quickly walk out of the room.
 - Walk out of the room quickly.
46. One of the employees in your crew complains about having to do a hard job. The proper thing to do is
- explain that all employees must do their fair share of the hard work as well as the easier tasks.
 - ignore the complaint.
 - promise that the next assignments will be easier ones.
 - take the employee off the job.
47. When an employee refuses to observe safety requirements because the employee "has learned over the years that they are useless," what action should the immediate supervisor take?
- Approve of the employee's action.
 - Initiate immediate disciplinary action.
 - Make the employee sign a hold harmless agreement.
 - Tell other employees to ignore the situation.
48. The most critical safety precaution when performing electrical thawing is
- use only specially designed thawing machines.
 - check that no current strays from the service line to the water main and beyond.
 - limit thawing current and voltage to less than 1000 VA.
 - have the customer sign a release of liability.
49. A foreman's monthly report should include
- last time supervisor read report.
 - number of complaints received and investigated.
 - number of monthly reports prepared.
 - number of qualifiable workers available.
50. The customer's most memorable image of a utility is often
- the professional public relations spokesperson.
 - the actions of the distribution field personnel.
 - radio and television reports on the utility's success.
 - bill stuffers received with the monthly water bill.
51. What is the percent unaccounted for water (water loss) when pumpage is 550,000 gpd and the total of customers meter readings is 63,800 ft³?
- 1%
 - 2%
 - 13%
 - 15%

52. If galvanized iron fittings are connected to copper pipe in moist ground, you would expect which of these to occur first?
- The copper pipe will corrode.
 - The copper pipe will scale and plug.
 - The galvanized fittings will scale and plug.
 - The galvanized iron will corrode.
53. You are getting complaints of stale water in a part of your system that is not looped. The temporary solution to this problem is to
- flush hydrants.
 - increase the chlorine dose.
 - install mains to complete a loop.
 - remove hydrogen sulfide.
54. Cathodic protection systems for tanks commonly use sacrificial anodes and
- unpowered iron cathodes.
 - an integrated circuit controller.
 - an alternating current power source.
 - a direct current power supply.
55. Two important considerations in locating storage are environmental impact and
- proximity to treatment facilities.
 - maintaining system pressure
 - distance from pumping station.
 - distance from load control center.
56. Some wells produce excessive amounts of sand in the water. There are some operating procedures that are helpful in over-coming this problem. One procedure is to reduce the pumping rate and the other procedure is to pump the well
- continuously for long periods.
 - for short periods.
 - only every other day.
 - with an air lift.
57. To properly train a new employee, you should
- allow the employee to make errors without correcting the employee, figuring the employee will learn in time.
 - have the employee wait to try a new operation until he/she can perform it perfectly
 - keep the employee away from older employees until you have had a chance to train the employee your own way.
 - pace carefully the amount of new material you give the employee to learn.
58. At the same flow, friction losses through a 12-inch line will be
- less than through a 6-inch line.
 - the same as through a 6-inch line.
 - slightly more than through a 6-inch line.
 - twice as much as through a 6-inch line.

59. What is the total head loss in a 6500 ft long 18-in. pipe, if the flow is 3.5 mgd and the head loss of the pipe is 0.28 ft/100 ft?
- 2 ft.
 - 18 ft.
 - 23 ft.
 - 115 ft.
60. If a 3.0 mgd flow is to be dosed at a rate of 1.2 mg/L, what should the chlorinator feed setting be in pounds of chlorine per day?
- 3.6 lb/d
 - 4.3 lb/d
 - 10 lb/d
 - 30 lb/d
61. A water system bills quarterly at a rate of \$0.50/1000 gallons for the first 10,000 gallons, \$0.40/1000 for the next 15,000 gallons and \$0.25/1000 gallon for all over 25,000 gallons. If a customer uses 35,000 gallons per quarter, what is the water bill?
- \$11.00
 - \$13.50
 - \$21.75
 - \$27.15
62. To test if a 110 V/AC is hot, set volt-ohm meter for
- 100 A.
 - 100 V/AC.
 - 250 A.
 - 250 V/AC.
63. Job specifications refers to
- the functional elements of a position.
 - the information gained from employees who hold various positions.
 - personal or human qualities necessary to perform the job adequately.
 - the principal duties and functions of various jobs, including the scope and kinds of authority related to these jobs.
64. Which is the correct type of valve for controlling the level of a treated water storage reservoir that is below the level of the hydraulic gradient?
- altitude valve
 - check valve
 - pressure relief valve
 - reduced pressure backflow valve

65. When two 2000 gpm high service pumps are operating, the following conditions are found

- (1) the gauges on the pump discharge lines read 95 psi; and
- (2) the difference in elevation between the gauges and the water level in the elevated tank is 139 ft.

The head loss due to friction is _____ psi.

- a. 21.2
 - b. 25.5
 - c. 29.8
 - d. 34.8
66. All water distribution systems should have a ____ that designates all arterial water mains, valves and hydrants.
- a. comprehensive map
 - b. deed plat
 - c. description
 - d. full color chart
67. The most common problem with ductile iron pipe is
- a. cutting the pipe.
 - b. pipe flexibility.
 - c. lack of being malleable.
 - d. limitation on pressure.
68. The recommended distance for horizontal separation of water mains and sewer lines is _____ ft.
- a. 5
 - b. 10
 - c. 20
 - d. 30
69. Disaster planning is
- a. a good training technique.
 - b. having manuals ready so they can be read if a disaster occurs.
 - c. something, that if properly done, will not need to be revised.
 - d. none of the above.
70. Increased funds for the year are limited. However, two or three outstanding newly employed individuals are grossly underpaid for their services. How should this situation be handled?
- a. Call a staff meeting, explain the situation, and then raise their salaries.
 - b. Don't give anyone a raise.
 - c. Pass the word that there will be no raises but change their titles, not their duties, and raise their pay.
 - d. Quietly give them a raise and say nothing.

Answers Water Distribution Class IV

1	c	15	d	29	b	43	d	57	d
2	d	16	a	30	d	44	d	58	a
3	c	17	d	31	a	45	a	59	b
4	d	18	c	32	b	46	a	60	d
5	c	19	b	33	d	47	b	61	b
6	a	20	c	34	d	48	b	62	d
7	b	21	c	35	d	49	b	63	d
8	d	22	c	36	c	50	b	64	a
9	a	23	c	37	b	51	c	65	d
10	d	24	c	38	b	52	d	66	a
11	b	25	a	39	d	53	a	67	a
12	b	26	a	40	a	54	d	68	b
13	a	27	c	41	d	55	b	69	a
14	d	28	d	42	c	56	a	70	a