

Water Distribution Study Guide

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

1. Which machine is used to make an 8-inch fire line connection on a 12-inch cast iron or ductile-iron water main under pressure?
 - a. drilling machine
 - b. inserting machine
 - c. reaming machine
 - d. tamping machine
2. Which one of the following types of pumps is considered most satisfactory for distribution systems?
 - a. centrifugal
 - b. jet
 - c. reciprocating
 - d. rotary
3. The water level in an elevated tank is 100 ft above the ground surface. The resultant pressure at a tap on a line on the ground below the tank is about
 - a. 15.0 psi.
 - b. 32.5 psi.
 - c. 43.5 psi.
 - d. 75 psi.
4. The "free chlorine residual" in water is the amount of
 - a. chlorine in the water.
 - b. chlorine applied as measured in milligrams per litre.
 - c. chlorine in raw water as it comes from the stream, well or spring.
 - d. uncombined chlorine that remains in the water after chlorine has been applied and allowed to react.
5. Before pumping a well, the static water level is 15 ft below the ground surface. During pumping, the water level is 45 ft below the ground surface. The drawdown is _____ ft.
 - a. 15
 - b. 30
 - c. 45
 - d. 60
6. A temperature reading of 59° F would equal to what value on the Centigrade scale?
 - a. -4° C
 - b. 15° C
 - c. 27° C
 - d. 45° C

7. A centrifugal pump, when operating normally shows a discharge pressure of 100 psi and the Venturi meter shows a flow rate of 20,000 gpm. Suddenly the pressure gauge drops to 90 psi and the flow rate increases to 23,000 gpm. You would suspect
- a faulty gauge and manometer tube
 - a large leak in the pump discharge line.
 - foreign matter caught in the Venturi tube throat.
 - the packing is sucking air.
8. The distance between the static water level and the pumping water level of a well is referred to as the
- cone of influence.
 - drawdown.
 - freeboard.
 - zone of influence.
9. Multiple taps for a single service line are used to
- minimize friction loss in the main.
 - prevent clogging of the service line.
 - prevent weakening the main.
 - protect metering equipment.
10. One pound per square inch pressure will support a column of water that is ___ high?
- 1.55 ft.
 - 2.31 ft
 - 7.5 ft
 - 8.34 ft
11. How many cubic yards of sand will be needed to provide 6-inches of bedding for 600 ft of water line if the width of the trench is 24 inches?
- 11.1 yd³
 - 22.2 yd³
 - 300 yd³
 - 600 yd³
12. A temperature reading of 35° C would be equal to _____ on the Fahrenheit scale.
- 37.2° F
 - 56.6° F
 - 67° F
 - 96° F
13. Air release valves should be located on the _____ of a water main.
- bottom
 - invert
 - side
 - top

14. When a single water sample is reported as safe, this may be interpreted to mean
 - a. that the water supply is adequately protected.
 - b. that the water supply may be regarded as safe until additional samples are requested by the city health officer.
 - c. that the water supply was safe at the sampling point at the time of the sample.
 - d. none of the above.

15. A new section of water main has just been laid. Before it is completely backfilled and put into service, several things must be done. What is the correct order for doing them?
 - a. pressure test, disinfect, collect bacti samples, flush
 - b. flush, disinfect, collect bacti samples, pressure test
 - c. pressure test, flush, collect bacti samples, disinfect
 - d. pressure test, flush, disinfect, flush, collect bacti samples

16. Deposits in cast iron mains are called
 - a. tubers.
 - b. tubercules.
 - c tuberculosis.
 - d. tumors.

17. A sanitary well seal is used to seal the
 - a. clearwell.
 - b. elevated tank.
 - c. top of a well casing.
 - d. well screen.

18. A device that can be used to repair a cracked water main is a
 - a. cast coupling.
 - b. flanged adaptor.
 - c. split sleeve.
 - d. taper screw plug.

19. The proper first aid treatment for poisonous spider bite is to
 - a. apply fresh raw meat to the bite.
 - b. cover the bite with a soothing cream.
 - c. cut an "X" over the bite.
 - d. pack the wound in ice and seek medical attention.

20. A black stain on plumbing fixtures may be caused by _____ in the water.
 - a. calcium
 - b. iron
 - c. magnesium
 - d. manganese

21. An operator heard a pinging sound coming from a pump. What is a possible cause?
 - a. algae
 - b. cavitation
 - c. corrosion
 - d. turbidity

22. The packing around the shaft of a centrifugal pump should be
 - a. in good condition indefinitely.
 - b. kept as tight as possible.
 - c. replaced once a month.
 - d. tightened just enough to allow an occasional drop of liquid to escape.

23. If a valve in a pipeline is closed too rapidly it will cause the water in that pipeline to come to a sudden stop, causing waves of high pressure that oscillate back and forth in the pipeline. This reaction is commonly known as
 - a. hydraulic gradient.
 - b. pipeline dynamics.
 - c. static oscillation.
 - d. water hammer.

24. The term for the pressure against which a pump must operate is
 - a. foot pounds.
 - b. head.
 - c. negative pressure.
 - d. pounds.

25. Reverse water flow in a distribution system caused by a vacuum in a water supply main is called
 - a. backsiphonage.
 - b. indirect cross connection.
 - c. surge pressure.
 - d. water hammer.

26. Why must the relief port of a reduced pressure principle backflow prevention device never be plugged or extended?
 - a. so the device will function as designed
 - b. the plug may interfere with the inspection and testing
 - c. to prevent excessive pressure build up in the consumer's home
 - d. none of the above

27. An artesian system means that the water
 - a. flow out of the ground at some point below the water table.
 - b. is pure and free from chemical contaminants.
 - c. is under natural pressure due to the aquifer being enclosed by impervious strata.
 - d. must flow above the surface of the land.

28. When vandals are observed by a crew, the crew should
 - a. chase vandals away before more serious damage is done.
 - b. contact their supervisor or the police, so the police can respond promptly.
 - c. retain the vandals until the police arrive, even if force is necessary.
 - d. yell at the vandals and try to make them go away.

29. Static suction head plus friction suction head plus static discharge head plus friction discharge head makes up the _____ of a pump.
- operating pressure
 - pump curve
 - total dynamic head
 - velocity head
30. Hydrant seal leakage should be checked
- only when the hydrant is disassembled.
 - visually.
 - with a listening device.
 - with a pressure gauge.
31. Disc type meters are
- compound.
 - positive displacement.
 - remote.
 - velocity.
32. Vertical turbine pumps that are used in wells may be oil lubricated or water lubricated. Operators should use extreme care not to start any water lubricated pump before making sure that the
- bearings are dry.
 - bearings are wet.
 - valve on the discharge side is closed.
 - valve on the suction side is closed.
33. The total dynamic head against which a pump must operate
- is the friction head.
 - is the static head.
 - is the sum of the static head and the head due to friction loss.
 - must always be above the shutoff head.
34. The chlorine room should be constructed so it can be entered only from the
- inside of the building.
 - laboratory.
 - outside and inside of the building.
 - outside of the building.
35. Indications of corrosive water include high concentrations of
- algae odors.
 - carbon dioxide.
 - carbonates.
 - total dissolved solids.
36. The drain hole in a hydrant is designed to
- let air out when hydrant is opened.
 - relieve excessive pressure when closing hydrants.
 - remove water from hydrant to prevent freezing.
 - none of the above.

37. Which one of the following meters is used if the water demand varies considerably?
- Venturi
 - Pitot tube
 - orifice
 - compound
38. Groundwater may best be described as water taken from
- pools, ponds, lakes and reservoirs on the ground.
 - rivers and streams that flow along the ground.
 - wells or springs.
 - none of the above.
39. A water tank has an overflow 115 ft above a nearby fire plug. Disregarding friction losses, the pressure at the fire plug when the tank is overflowing is _____ psi.
- 25
 - 50
 - 133
 - 266
40. When a citizen wants information from you regarding some phase of your work, you should
- always refer the citizen to someone higher up.
 - explain that you are not authorized to give information to outsiders.
 - give as much factual information as possible.
 - give out as few facts as possible, so you won't be responsible for any mistakes.
41. The outlet of a forced ventilation system for a chlorinator room should be located
- above the window.
 - near the floor.
 - on the roof.
 - 6 ft above the floor.
42. Water leaking to the surface after operating an old valve probably is caused by
- a broken stem.
 - dried out packing.
 - plugged weep holes.
 - none of the above.
43. A centrifugal type pump should never be run empty except momentarily because
- a serious counter-pressure would be built up by excessive vacuum.
 - it is useless to run a pump without getting water.
 - the excessive end thrust of the shaft would damage the thrust bearing.
 - the parts lubricated by water would be damaged.
44. In a distribution system, which type of valve is usually used for isolation of a section?
- check
 - gate
 - globe
 - needle

45. Over a four year period, the hour meter on an instrument air compressor had the following readings at the end of each year; first year-976.3, second year-1325.8, third year-2007.1, and fourth year-2371.4. How many hours does the meter show the compressor ran during the third year?
- 349.5 hr.
 - 363.3 hr.
 - 681.3 hr.
 - 830.2 hr.
46. If air is being blown out and sucked in through a chest wound, you should
- apply hand pressure to the wound to stop the bleeding.
 - make the wound airtight as soon as possible.
 - treat operator for shock and seek medical aid.
 - turn the patient so that he lies on his uninjured side.
47. Many mechanical devices, such as dishwashers, washing machines and flush-meters, do not operate satisfactorily at water pressure below which approximate level?
- 10 psi
 - 30 psi
 - 50 psi
 - 100 psi
48. Shut off valves should be located in a water main of a residential district at least every _____ ft.
- 300
 - 500
 - 800
 - 1200
49. Larger size gate valves in a distribution system normally have a bypass valve. The purpose of this bypass is to
- equalize pressure on both sides an a larger gate.
 - prevent the backward flow of water.
 - allow for drainage of suplus water.
 - none of the above.
50. A reduced pressure zone backflow preventer will stop
- back pressure but not backsiphonage.
 - backsiphonage but not back pressure.
 - back pressure and backsiphonage.
 - air from getting into the system.
51. Operators working in confined spaces should wear
- bright orange jackets, rubber boots and gloves.
 - safety harnesses and hard hats.
 - tool belts with flashlights attached.
 - utility belts with full complement of tools.

52. The minimum number of bacteriological samples that should be collected from a distribution system and examined each month is
- arbitrarily determined by the water superintendent.
 - based on the population or number of services.
 - dependent on the location of the system.
 - the same for all size systems.
53. To facilitate check valve repairs, a gate valve should be placed
- between the pump and the check valve.
 - in parallel to the check valve.
 - on the discharge side of the check valve.
 - on the suction side of the pump.
54. The most effective means of reducing atmospheric hazards in a confined space is through the use of
- enzymes.
 - explosimeters.
 - portable blowers.
 - none of the above.
55. The pressure exerted by a column of water when at rest is the ____ pressure.
- dynamic
 - residual
 - static
 - theoretical
56. Before a sample is collected, faucets should be
- allowed to run for at least 1 min.
 - allowed to run for at least 10 min.
 - flushed until the water temperature stabilizes.
 - run long enough to flush all stagnant water from the service line.
57. In instances where non-potable water or toxic wastes are connected directly with potable water systems, the preferred method of correction for such a cross connection is by
- installing multiple check valves on the safe water side.
 - 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.
58. Two conditions under which backflow can occur are
- back pressure and cross pressure.
 - back pressure and backsiphonage.
 - backflow and backsuction.
 - actual and potential.

59. A main has failed and 127 ft of 8-inch pipe must be replaced. How many 5 ft sections of pipe will be required?
- 15 sections
 - 20 sections
 - 26 sections
 - 32 sections
60. According to a commonly used rule of thumb, how many pounds of gaseous chlorine can be removed from a 150 lb. chlorine cylinder per day?
- 40 lb
 - 60 lb
 - 80 lb
 - 100 lb
61. Cavitation is a problem with pumps. What can be done to prevent it from occurring?
- clear the blowoff valve
 - place another pump on the line
 - reduce the suction head
 - reduce the suction lift
62. As the impeller wears on a pump, the pump efficiency will
- decrease.
 - improve.
 - increase.
 - not change.
63. Gate valves are normally used in a distribution system because they
- are easier to install.
 - have less friction loss.
 - hold tighter.
 - operate easier.

Answers Water Distribution Class II

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