

1) A pump is delivering less than the expected rate of discharge. What can cause this to happen?

- A) Discharge head too low
- B) Discharge head too high
- C) Check valve open
- D) Pump is primed

2) A map with a scale of 0.875 in. = 100 feet indicates that manhol "A" is 11.20 in. from manhole "B". What is the actual distance between manholes?

- a) 980.0 ft.
- b) 781.3 ft.
- c) 1,280.0 ft.
- d) 2,343.8 ft.

3) If a repair job can be done by 7 people in 8.5 hours, how long will it take for 4 people to do a similar job?

- a) 4 Hours, 30 min.
- b) 14 Hours, 9 min.
- c) 4 Hours, 51 min.
- d) 14 Hours, 53 min.

4) In sewer maintenance, what is a pig?

- A) A bullet shaped object passed through a force main
- B) A power rod
- C) Any foul smelling equipment
- D) The hydraulic rodding truck

5) A crew surveys a sewer from STA. 11+ 3.00 to STA 23+ 58.35. If the elevation of the manhole (farthest to the treatment plant) is 665.3 feet, what is the elevation of the second manhole if the grade is 0.0011 FT/FT,

- a) 1.4 Feet
 b) 663.9 Feet
 c) 666.7 Feet
 d) 6.6 Feet

6) Mechanical ventilation of a lift station is required to

- A) Ensure safe working access
 B) Reducing chlorine demand
 C) Reduce corrosion
 D) Increase dissolved oxygen (DO) in raw wastewater

7) If a pump outputs 625 GPM against a total dynamic head of 211 feet, and the pump is 71% efficient, what is the brake HP if the fluid being pumped has a specific gravity of 1.12?

- a) 26.5 HP
 b) 32.3 HP
 c) 4.2 HP
 d) 41.8 HP

8) A sewer jet with a 1475 gallon tank has a 80 Gal./Min. pump. If the operator has to fill the truck 5 times in an 8 hour day, how much time is spent actually cleaning sewers during that day?

- a) 11 Hrs. 31 Min.
 b) 3 Hrs. 50 Min.
 c) 1 Hrs. 32 Min.
 d) 2 Hrs. 28 Min.

9) The following flows were recorded for the months of February, March, and April, ...
February, 197.3 cu. ft./sec. March, 100,186.2 Gal./Min. April, 255.7 MGD

What was the average daily flow for this three-month period?

- a) 5.9 MGD
- b) 527.2 MGD
- c) 127.3 MGD
- d) 4.7 MGD

10) A contractor is building a house with a basement elevation of 884.6 ft. The stub-out connection elevation is 876.5 ft. If the minimum allowable slope is $\frac{3}{8}$ in. /ft. How far from the road can the builder place the house?

- a) 246.5 ft.
- b) 259.2 ft.
- c) 331.7 ft.
- d) 27.4 ft.

11) When opening a power rodder properly, do the following

- A) Push the rodding tool into an obstruction and hold it there
- B) Rotate rod in one position
- C) Make sure all the torque is out of a broken rod
- D) Rod past dropped joints or through a crushed pipe

12) A common name appurtenance used to keep an accidental flow of wastewater from entering a building is called

- A) Barrel
- B) Cleanout
- C) Backwater valve
- D) Catch basin

13) A degreasing agent is added to a 11.5 ft. diameter wet well that is 9.5 ft. deep. 4.5 lbs. is required for every 1 ft² of surface area. If the degreaser weighs 3.5 lbs. per gallon and has a concentration of 16.4 mg/l, how many lbs. Of chemical must be added to the well?

- a) 4,438.1 lbs.
- b) 0.48 lbs.
- c) 3,494.5 lbs.
- d) 467.2 lbs.

14) The most important traffic safety consideration is the

- A) Time of day
- B) Size of the job
- C) Wearing of hard hats and safety vests
- D) Location of the job

15) Which of these chemicals may be used for odor control in sewers?

- A) Chlorine
- B) Muriatic acid
- C) Potassium chloride
- D) Sodium chloride

16) A(n) 4 cylinder positive displacement pump has a cylinder bore of 4.5 in. with a stroke of 5.5 in. The pump operates at 1,700 RPMs. How long will it take to empty a 72 in. diameter wet well, 33.0 ft. deep, if it has an inflow of 2,500 Gal./Min.?

- a) 1 hr(s), 44 min.
- b) 0 hr(s), 3 min.
- c) 1 hr(s), 87 min.
- d) 1 hr(s), .74 min.

17) Sources of excessively clear water in a collection system include

- A) A problem at the wastewater treatment plant
- B) A sanitary sewer leak
- C) Exfiltration from a high water table
- D) Infiltration from a high water table

18) Given the following information, would it be less expensive to finish the job in 2 days, or finish the job in one day by working overtime?

Actual job time = 13.00 hrs
 Travel time & set-up time = 1.25 hrs
 Average Work day = 8.00 hrs
 Hourly pay rate = \$ 21.25
 Overtime is 1.50 times the normal hourly rate

- a) Cheaper to do the work with O.T.
- b) Cheaper to do the work in two days
- c) Costs the same either way
- d) None of the above

19) A(n) 11 ft. wide x 2,650 ft. long trench must be excavated and the spoils removed from the premises. The spoil weighs 3,600 lbs./cu. yd. and each truck can carry 11 tons. How many truck loads are required if the trench is 14.0 feet deep?

- a) 4,946 Trucks
- b) 2,474 Trucks
- c) 7,420 Trucks
- d) 2,473 Trucks

20) Grease in sewers is mechanically removed by

- A) High-pressure jets
- B) Sawing
- C) Not usually a problem in sewers
- D) Power rodders

21) A kilowatt (KW) is equivalent to

- A) .67 amperes at a voltage of 120
- B) 746 watts
- C) 1.34 horsepower
- D) 1,000 megacycles

22) If the grade of a sanitary sewer has a slope of 0.10% for 1,200 feet, what is the rise of the pipe?

- | | |
|--------------------------|----------------|
| <input type="checkbox"/> | a) 1201.2 Feet |
| <input type="checkbox"/> | b) 1.20 Feet |
| <input type="checkbox"/> | c) 0.01 Feet |
| <input type="checkbox"/> | d) 0.12 Feet |

23) Convert 425 degrees Fahrenheit to Celsius

- | | |
|--------------------------|-----------|
| <input type="checkbox"/> | a) 457 °C |
| <input type="checkbox"/> | b) 797 °C |
| <input type="checkbox"/> | c) 218 °C |
| <input type="checkbox"/> | d) 236 °C |

24) 31 mg/l. of chemical was previously used to treat a flow of 7,525,000 gal./day. The chemical cost is \$1.37 /lb. A chlorine residual test determined that 17 mg/l. of chemical would be satisfactory. How much money would be saved per month by using the 17 mg/l. dose instead of the 31 mg/l. dose?

(1 mo. = 30 days)

- | | |
|--------------------------|---------------------|
| <input type="checkbox"/> | a) \$32,387.54 /mo. |
| <input type="checkbox"/> | b) \$36,111.24 /mo. |
| <input type="checkbox"/> | c) \$79,960.60 /mo. |
| <input type="checkbox"/> | d) \$43,849.36 /mo. |

25) Infiltration may result from

- A) Bad joints
- B) Improper closed circuit television operation
- C) Poor ventilation
- D) Direct downspout and drain connections

26) Which one of the following is a property of chlorine gas?

- A) Heavier than air
- B) Harmless to humans
- C) Highly flammable
- D) Lighter than air

27) 51 mg/l. of root control must be added to a 54 in. sewer that is 2,127 feet long. If the root control chemical is in a solution that consists of only 41% of the chemical, how many lbs. of the solution must be added to the sewer?

- a) 262.37 lbs.
- b) 44.10 lbs.
- c) 292.54 lbs.
- d) 6,351.06 lbs.

28) What is a mechanical means to remove material from a sewer?

- A) Herbicides
- B) Cutting
- C) Pumping
- D) Sweeping

29) The purpose of a lift station sign-in log is to

- A) Budget lift station visits
- B) Identify who makes changes in station operation
- C) Track employee movement for disciplinary actions
- D) All of the above

30) An automatic chemical feeder treats 17 MGD at a concentration of 54 mg/l.
How many lbs./day of chemical is required?

- a) 1,024 lbs./day
- b) 6,867 lbs./day
- c) 7,656 lbs./day
- d) 823 lbs./day

31) What tools are used with a power rodder?

- A) Finger grips
- B) Pruning shears
- C) Spring blades
- D) Videotape camera

32) The minimum scouring velocity normally used for sanitary collection lines is

- A) 1.0 ft/sec
- B) 2.0 ft/sec
- C) 5.0 ft/sec
- D) 10.0 ft/sec

33) Calculate the water horsepower if the pump it operates provides 1,475 GPM
against 125 feet total dynamic head (TDH)?

- a) 63 HP
- b) 88 HP
- c) 12 HP
- d) 47 HP

34) If the pump in problem 33 is 72% efficient, then what is the brake HP?

- a) 64.7 HP
- b) 122.6 HP
- c) 16.4 HP
- d) 63.6 HP

35) What equipment is effective in removing an emergency stoppage?

- A) Strip chart recorder
- B) Ultrasonic meter
- C) Front-end loader
- D) Hand rodder

36) If a pump outputs 450 GPM against a total dynamic head of 650 feet, and the pump is 81% efficient, what is the brake HP?

- a) 59.8 HP
- b) 91.2 HP
- c) 53.7 HP
- d) 62.9 HP

37) The formula for calculating the volume of a cylinder is;

- A) $V = L \times W \times H$
- B) $V = \text{Distance}/\text{time}$
- C) $V = D^2 \times .785 \times D$
- D) $V = D^2 \times 746 \times D$

39) The power factor of a motor is .79 and the pump has an efficiency of 79% . If the motor consumes 7,900 watts, what is the water horsepower?

- a) 10.6 HP
- b) 17.0 HP
- c) 8.4 HP
- d) 6.6 HP

40) Employers must provide employees with information about possible health effects from contact with hazardous materials. This is called “right-to-know” legislation. Which document provides “right-to-know”?

- A) Material Safety Data Sheet
- B) NPDES permit
- C) Sewer ordinance
- D) Clean Water Act

41) The interior of 1,275 ft. of 60 in. pipe is uniformly coated with 2.75 in. of grease. How many gallons will this pipe hold when filled with water?

- a) 154,423 Gal.
- b) 33,810,668 Gal.
- c) 172,178 Gal.
- d) 26,541,375 Gal.

42) Who must review plans for final approval before a new sewer can be constructed?

- A) County commissioner
- B) City sewer Inspector
- C) Ohio EPA
- D) Water Commission

43) What will happen if the discharge valve on a centrifugal pump is partially closed?

- A) Amperage will increase, discharge head will increase
- B) Amperage will decrease, discharge head will increase
- C) Amperage will decrease, discharge head will remain constant
- D) Amperage will decrease, discharge head will decrease

44) One cubic foot per second flow is equal to _____ gallons per hour.

- A) 2,794
- B) 3,500
- C) 6,000
- D) 26,928

45) Colored dye is dumped into a manhole. The dye first appears 3 min., 17 sec. later in a manhole 1,850 feet downstream and disappears 21 min. and 49 sec. after the dye was first dumped into the manhole. What is the velocity of the flow in the sewer?

- a) 1.41 Ft./Sec.
- b) 2.46 Ft./Sec.
- c) 9.39 Ft./Sec.
- d) 0.81 Ft./Sec.

46) "Schedule 40" refers to pipe

- A) flow capacity
 B) friction loss
 C) tubing strength
 D) wall thickness

47) A wastewater treatment plant receives the following:

Pump Station	=	3,250 GPM
Sewer "A"	=	12,500 People @ 95 GPCD
I&I	=	24,000 gal/day
Ind. Waste	=	67,000 gal/day
Sewer "B"	=	?

If the plant receives 7.3 MGD, what percentage of the total flow is contributed by sewer "B"?

- a) 77.5%
 b) 22.5%
 c) 81.6%
 d) 18.4%

48) Employee hazards in collection system operations include

- A) Noxious or toxic gasses or vapor.
 B) Oxygen deficiency.
 C) Physical injuries.
 D) All of the above

49) A wet well is 9 feet deep by 21 feet in diameter. When the pump is not running, the water rises 33.0 in. in 2 min. 52 sec. If the level falls 5.2 in. in 14.0 min. while the pump is running, what is the pump rate in GPM?

- a) 2,404 Gal./Min.
 b) 2,564 Gal./Min.
 c) 2,680 Gal./Min.
 d) 11,740 Gal./Min.

50) If a sewer must have a flow rate of 27 MGD with a velocity between 1.50 ft./sec. and 2.75 ft./sec. What must the minimum size be?

- | | |
|--------------------------|-----------|
| <input type="checkbox"/> | a) 53 in. |
| <input type="checkbox"/> | b) 72 in. |
| <input type="checkbox"/> | c) 71 in. |
| <input type="checkbox"/> | d) 52 in. |