

Operator Certification Math Review - Distribution

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- Convert 81.67% to decimal form.
 - 0.8167
 - 8.167
 - 81.67
 - 816.7
- What percent is 15,325 of 21,611 to the nearest tenth of a percent?
 - 6.3%
 - 14.1%
 - 36.9%
 - 70.9%
- Convert 0.118 to percent.
 - 0.118%
 - 1.18%
 - 11.8%
 - 118%
- What percent is 34,411 of 74,818?
 - 34.411%
 - 45.993%
 - 74.818%
 - 217.42%
- Your plant's current annual budget for salaries is \$450,000. A 3% raise will be given to all employees next year. Calculate the salary budget for next year.
 - \$463,500
 - \$470,000
 - \$483,500
 - \$490,000
- What is the circumference of a tank that is 75.0 ft in diameter?
 - 150 ft
 - 236 ft
 - 563 ft
 - 626 ft
- What is the diameter of a tank with a circumference of 408.2 ft?
 - 31 ft
 - 130 ft
 - 260 ft
 - 1,282 ft
- Find the area in square feet for a rectangular-shaped basin that is 672 ft in length and 68.5 ft in width.
 - 215 sq ft
 - 2,110 sq ft
 - 1,895 sq ft
 - 46,032 sq ft

9. What is the cross-sectional area of a pipe that is 10 in. in diameter?
 - a. 0.24 sq ft
 - b. 0.54 sq ft
 - c. 0.65 sq ft
 - d. 0.79 sq ft
10. What is the internal surface area of a cylindrical tank (bottom, top, and cylinder wall), if it is 125.0 ft in diameter and 48.5 ft high?
 - a. 6,063 sq ft
 - b. 19,036 sq ft
 - c. 24,531 sq ft
 - d. 43,567 sq ft
11. What is the area of a trench that is 22.4 ft long and 3.3 ft wide ?
 - a. 26 sq ft
 - b. 74 sq ft
 - c. 143 sq ft
 - d. 187 sq ft
12. Calculate the volume of a trench that is 363 ft in length, 3.5 ft in width, and 6.0 ft in depth.
 - a. 373 cu ft
 - b. 2,723 cu ft
 - c. 7,623 cu ft
 - d. 9,529 cu ft
13. A tank is conical at the bottom and cylindrical at the top. The diameter of the cylinder is 21 ft with a depth of 42 ft and the cone depth is 14.2 ft. What is the volume of the tank in cubic feet?
 - a. 1,639 cu ft
 - b. 12,901 cu ft
 - c. 14,540 cu ft
 - d. 16,179 cu ft
14. If a trench is 644 ft long, 3.5 ft wide, and 5 ft deep, approximately how many cubic yards of soil were excavated?
 - a. 140 cu yd
 - b. 300 cu yd
 - c. 420 cu yd
 - d. 450 cu yd
15. A trench is 430 ft long, 4 ft wide, and 5.5 ft deep. How many cubic yards of soil are excavated?
 - a. 215 cu yd
 - b. 350 cu yd
 - c. 788 cu yd
 - d. 9460 cu yd
16. How many gallons are there in a pipe that is 18 in. in diameter and 216 ft long?
 - a. 1,908 gal
 - b. 2,246 gal
 - c. 2,430 gal
 - d. 2,861 gal

17. Two columns of water are completely filled at sea level to a height of 88 ft. Column A is 0.5 in. in diameter. Column B is 5 in. in diameter. What will the two pressure gauges, each attached to the bottom of each column read?
- | | Column A | Column B |
|----|-----------------|-----------------|
| a. | 3.8 psi | 38.0 psi |
| b. | 8.8 psi | 8.0 psi |
| c. | 20.3 psi | 20.3 psi |
| d. | 38 psi | 38 psi |
18. Calculate the pounds per square inch pressure at the bottom of a tank, if the water level is 33.11 ft deep?
- 14.3 psi
 - 28.6 psi
 - 33.1 psi
 - 76.5 psi
19. The pressure head at a fire hydrant is 195 ft. Calculate the pounds per square inch.
- 51.5 psi
 - 84.4 psi
 - 101 psi
 - 195 psi
20. What is the pressure head at a fire hydrant in feet, if the pressure gauge reads 121 psi?
- 52 ft
 - 86 ft
 - 141 ft
 - 280 ft
21. The pressure at the lowest bottom point of a clear well is 13.2 psi. What is the total water depth of the clear well at its lowest point?
- 23.1 ft
 - 30.5 ft
 - 61.0 ft
 - 69.3 ft
22. Find the total head, in feet, for a pump with a total static head of 19 ft and a head loss of 3.7 ft.
- 5.1 ft
 - 15.3 ft
 - 22.7 ft
 - 70.3 ft
23. What is the pressure head on a system exerting a static pressure of 62 psi?
- 27 ft
 - 89 ft
 - 143 ft
 - 175 ft
24. Calculate the average pH given the following data:
- | Reading | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|----------------|----------|----------|----------|----------|----------|----------|----------|----------|
| pH | 7.45 | 7.49 | 7.56 | 7.63 | 7.60 | 7.54 | 7.52 | 7.41 |
- 7.4
 - 7.5
 - 30.1
 - 60.2

25. Given the following data, calculate the average in pounds per day for chlorine used:
- | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|--------|---------|-----------|----------|--------|----------|--------|
| 34 | 28 | 26 | 29 | 31 | 32 | 35 |
- 26.0 lb/day
 - 30.7 lb/day
 - 107.5 lb/day
 - 214.9 lb/day
26. Records on a pump indicate that it pumped 1,228,400 gal during the 31 days of May. Calculate the average gallons pumped per day.
- 12,284
 - 39,626
 - 122,840
 - 390,626
27. Given the following data for lead concentrations find the 90th percentile.
- | | | | | |
|------------|------------|------------|------------|------------|
| 0.010 mg/L | 0.017 mg/L | 0.009 mg/L | 0.005 mg/L | 0.006 mg/L |
| 0.019 mg/L | 0.011 mg/L | 0.010 mg/L | 0.008 mg/L | 0.013 mg/L |
- 0.006 mg/L
 - 0.010 mg/L
 - 0.017 mg/L
 - 0.019 mg/L
28. An employee receives an hourly wage of \$13.25 plus overtime pay of 1.5 times the hourly wage. Overtime is given for each hour worked over 40 hours per week. If an employee works 48 hours during a week, what is the compensation before taxes?
- \$159.00
 - \$530.00
 - \$689.00
 - \$848.00
29. What is the difference in temperature in degrees Fahrenheit between the water source and the processed water in a storage tank, if the temperature of the water source is 12.6 °C and the water in the storage tank is 16.3 °C?
- 3.7 °F
 - 6.7 °F
 - 35.7 °F
 - 38.7 °F
30. If a flow through a 10 in. pipe is 722 gpm, what is the velocity in feet per second?
- 2 fps
 - 3 fps
 - 5 fps
 - 8 fps
31. Water is flowing in a pipeline at 2.15 cfs. What is the flow in gallons per minute?
- 16 gpm
 - 21 gpm
 - 161 gpm
 - 968 gpm

32. A meter indicates that water is flowing from a hydrant at 2.6 cfm. How many gallons will flow from the hydrant if it is flushed for 35 minutes?
- 20 gal
 - 91 gal
 - 683 gal
 - 910 gal
33. A 6-in pipeline needs to be flushed. If the desired length of pipeline to be flushed is 316 ft, how many minutes will it take to flush the line at 31 gpm?
- 10 minutes
 - 15 minutes
 - 30 minutes
 - 60 minutes
34. A water tank with a capacity of 3.0 million gallons is being filled at a rate of 4,810 gpm. How many hours will it take to fill the tank?
- 1.4 hours
 - 3.0 hours
 - 10.4 hours
 - 28.8 hours
35. Chlorine is fed at a rate of 25 lb/day for a flow rate of 7 cfs. To maintain the same dosage, what adjustment to the chlorinator should be made when the flow rate is increased to 12 cfs?
- 30 lb/day
 - 43 lb/day
 - 50 lb/day
 - 63 lb/day
36. A solution is 5.8% hypochlorite. What is the milligrams per liter of hypochlorite in the solution?
- 58 mg/L
 - 580 mg/L
 - 5,800 mg/L
 - 58,000 mg/L
37. The velocity through a channel is 2.10 fps. If the channel is 6.5 ft wide and has a water depth of 2.8, what is the flow in cubic feet per second?
- 6 cfs
 - 14 cfs
 - 28 cfs
 - 38 cfs
38. A water tank has a volume of 2.0 million gal and the flow from the tank is 5.36 mgd. What is the detention time in hours?
- 8.96 hr
 - 12.34 hr
 - 23.56 hr
 - 53.6 hr
39. An 8-in line needs to be flushed. The length of pipeline to be flushed is 250 ft. How many minutes will it take to flush the line at 25 gpm?
- 7 minutes
 - 13 minutes
 - 26 minutes
 - 31 minutes

40. A water treatment plant injects chlorine at a dosage rate of 3.00 mg/L after the filters. The chlorine residual is 1.45 mg/L at a distant point in the distribution system. Calculate the chlorine demand between the two sampling points.
- 1.45 mg/L
 - 1.55 mg/L
 - 2.90 mg/L
 - 4.45 mg/L
41. A 2.0 ft diameter pipe that is 1.4 miles long is disinfected with chlorine; 44 lbs of chlorine are used. Calculate the dosage in mg/L.
- 1.7 mg/L
 - 3.1 mg/L
 - 17 mg/L
 - 31 mg/L
42. An operator mixes 125 lb of HTH (64.50% available chlorine) with 250 gal of water. What percent is the calcium hypochlorite solution?
- 4%
 - 6%
 - 8%
 - 10%
43. The static water level in a well is 84.5 ft. The pumping level is 104.2 ft. What is the drawdown?
- 19.7 ft
 - 36.6 ft
 - 45.1 ft
 - 188.7 ft
44. A pump discharges 680 gpm. How many gallons will it discharge on 8 hours?
- 5,440 gal
 - 130,560 gal
 - 326,400 gal
 - 408,00 gal
45. A hypochlorite solution is being pumped from a small tank that is 2.0 ft in diameter. The level in the tank drops 2.25 ft in 4 hours. How many gallons per minute of hypochlorite solution were used?
- 0.22 gpm
 - 0.53 gpm
 - 2.2 gpm
 - 5.3 gpm
46. How many pounds of high test hypochlorite (HTH) are needed to make 500 gal of a 10.0% HTH solution?
- 50 lb
 - 243 lb
 - 375 lb
 - 417 lb
47. A solution was found to be 63.5% calcium hypochlorite. What is the milligrams per liter of calcium hypochlorite in the solution?
- 1,000
 - 10,000
 - 63,500
 - 635,000

48. What is the motor horsepower (mhp) for a pump with the following parameters?
- Motor efficiency: 87%
Total Head (TH): 107 ft
Pump efficiency: 79%
Flow: 2.54 mgd
- 25 mhp
 - 69 mhp
 - 79 mhp
 - 87 mhp
49. A motor with 89% efficiency is supplied with 24 hp. Calculate the brake horsepower.
- 3 bhp
 - 22 bhp
 - 25 bhp
 - 28 bhp
50. Given the following data, calculate the total kilowatts needed to operate the following small utility when everything is running.
- Raw water pump = 300 hp
5 Flocculators = 60 hp
Filter pump for backwashing = 100 hp
Chlorination = 25 hp
Clear water pump = 100 hp
Lighting = 11 hp
Instrumentation = 4 hp
- 260 kW
 - 448 kW
 - 600 kW
 - 1,386 KW
51. What is the percent lime in a slurry, if 12 lb of lime are mixed in a 55-gal drum that contains 52 gal of water?
- 2.7%
 - 4.5%
 - 5.4%
 - 9.0%
52. A trench that averages 4.2 ft wide and 5.4 ft in depth is dug for the purpose of installing a 24-in. diameter pipeline. If the trench is 1,287 ft long, how much soil in cubic feet will be put in the trench after the pipe is in place, assuming that the only soil left over is that which the pipe now occupies?
- 1,300 cu ft
 - 4,000 cu ft
 - 25,000 cu ft
 - 29,000 cu ft
53. Your department uses 80 units of an item per week. You are required to maintain a 10 week reserve of this item at all time and it requires a 4 weeks to obtain a new supply. What is the minimum reorder point?
- 320 units
 - 800 units
 - 1,120 units
 - 2,240 units

**Operator Certification Math Review - Distribution
Answer Section**

MULTIPLE CHOICE

1. A
2. D
3. C
4. B
5. A
6. B
7. B
8. D
9. B
10. D
11. B
12. C
13. D
14. C
15. B
16. D
17. D
18. A
19. B
20. D
21. B
22. C
23. C
24. B
25. B
26. B
27. C
28. C
29. B
30. B
31. D
32. C
33. B
34. C
35. B
36. D
37. D
38. A
39. C
40. B

- 41. D
- 42. B
- 43. A
- 44. C
- 45. A
- 46. D
- 47. D
- 48. B
- 49. B
- 50. B
- 51. A
- 52. C
- 53. C