Formulas for Distribution and Cross-Connection Exams

These formulas are intended to serve as a general resource and are not intended to be an all-inclusive list.

Basic Math Operations

Full Pipe Flow

$$Q_{cfs} = V_{fps} \times A_{sft}$$

Time and Distance

$$dist = speed \times time$$

Ohm's Law

$$E_{volts} = I_{amps} \times R_{\Omega} \qquad R = \frac{E}{I} \qquad I = \frac{E}{R}$$

Pipe Grade

$$Slope = \frac{Rise}{Run} \qquad \% \, Slope = \frac{Rise}{Run} \times 100\%$$

Areas, Perimeters & Volumes

Rectangle

$$Area = b \times h \qquad Perimeter = 2 \times (b + h)$$

Square

$$Area = b \times b \qquad Perimeter = 4 \times b$$

Circle

$$Area = 0.785 \times D^2 \qquad Circumferance = 3.14 \times D$$

Right Triangle

$$Area = \frac{1}{2} \times b \times h$$

Cylinder

$$Volume = 0.785 \times D^2 \times h$$

$$Surface \, Area = [2 \times 0.785 \times D^2] + (3.14 \times D \times h)$$

Cone

$$Volume = \frac{1}{3} \times Volume \, of \, a \, Cylinder$$

Prism

$$Volume = b \times h \times l$$

$$Surface \, Area = 2 \times [(b \times h) + (b \times l) + (h \times l)]$$

Dosing

Static Dosing

$$HTH_{required} = \frac{MG_{water} \times 8.34 \times ppm}{Purity}$$

Contact Dosing

$$HTH_{required} = \frac{MGD_{water} \times 8.34 \times ppm}{Purity}$$

Contact Time $T_c = \dfrac{V}{Q}$

Water Pressure

Pressure $P = h \times 0.433 \, \sfrac{psi}{ft}$

Meter Testing

Meter Accuracy $Accuracy = \dfrac{Meter\ Reading}{Actual} \times 100\%$

Horsepower

Power $P = \dfrac{lb \times ft}{sec} = \sfrac{ft \cdot lb}{sec}$

Work Horsepower $HP = \dfrac{P}{550 \, \sfrac{ft \cdot lb}{sec}}$

Water Horsepower $WHP = \dfrac{Q \times H_{total\ dynamic\ head}}{3960_{constant}}$

Brake Horsepower $BHP = \dfrac{WHP}{\eta_{pump}}$

Motor Horsepower $MHP = \dfrac{BHP}{\eta_{motor}}$

Overall Efficiency $\eta_{overall} = \dfrac{WHP}{MHP}$

Temperature

Fahrenheit to Celsius $°C = (°F - 32)\left(\dfrac{5}{9}\right)$

Celsius to Fahrenheit $°F = \left(\dfrac{°C \times 9}{5}\right) + 32$

CONSTANTS

1. 2.54 centimeters = 1 inch

2. 3.28 feet = 1 meter

3. 43,560 square feet = 1 acre

4. 640 acres = 1 square mile

5. 7.48 gallons = 1 cubic foot

6. 1.0 gallon of water = 8.34 lbs

7. 1.0 liter = 1,000 cubic centimeters

8. 1.0 liter = 1,000 milliliter (ml)

9. 1.0 gallon = 3.785 liters

10. 1.0 pound = 7,000 grains

11. 1.0 pound = 453.5 grams

12. 1.0 grain per gallon = 17.1 parts per million (p.p.m.)

13. 1.0 grain - 0.0648 grams

14. 1.0 p.p.m. = 8.34 lbs. per million gallons of water

15. 1.0 cubic foot of water weighs 62.4 pounds

16. 1.0 gram = 15.43 grains

17. 1.0 ounce = 28.35 grams

18. 1.0 ounce = 29.57 milliliter (ml)

19. 1.0 quart = 0.9464 liters

20. 1.0 foot of water = .433 psi

21. 1.0 psi = 2.31 feet of water

22. 1.0 inch of mercury = 1.13 feet of water

23. 1.0 Horsepower = 33,000 ft. lbs. per minutes

24. 1.0 Horsepower = 746 watts

25. 1.0 million gallons per day = 1.55 cubic feet per second

26. 1.0 million gallons per day 694 gallon per minute

27. 1 day = 1440 minutes

28. π = 3.14

29. 1 meter = 100 centimeters

30. 1.0 kilograms = 2.205 lbs

31. 1 mile = 5,280 ft.