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 \[ E_{volts} = I_{amps} \times R_{\Omega} \]

Pipe Grade \[ \text{Slope} = \frac{\text{Rise}}{\text{Run}} \]

Areas, Perimeters & Volumes

Rectangle \[ \text{Area} = b \times h \]

Square \[ \text{Area} = b \times b \]

Circle \[ \text{Area} = 0.785 \times D^2 \]

Right Triangle \[ \text{Area} = \frac{1}{2} \times b \times h \]

Cylinder \[ \text{Volume} = 0.785 \times D^2 \times h \]

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

Cone \[ \text{Volume} = \frac{1}{3} \times \text{Volume of a Cylinder} \]

Prism \[ \text{Volume} = b \times h \times l \]

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

**Dosing**

Static Dosing \[ HTH_{\text{required}} = \frac{MG_{\text{water}} \times 8.34 \times \text{ppm}}{\text{Purity}} \]

Contact Dosing \[ HTH_{\text{required}} = \frac{MGD_{\text{water}} \times 8.34 \times \text{ppm}}{\text{Purity}} \]
Contact Time \[ T_c = \frac{v}{q} \]

**Water Pressure**

Pressure \[ P = h \times 0.433 \text{psi/ft} \]

**Meter Testing**

Meter Accuracy \[ Accuracy = \frac{\text{Meter Reading}}{\text{Actual}} \times 100\% \]

**Horsepower**

Power \[ P = \frac{lb \times ft}{sec} = \frac{ft \cdot lb}{sec} \]

Work Horsepower \[ HP = \frac{p}{550 \frac{ft \cdot lb}{sec}} \]

Water Horsepower \[ WHP = \frac{Q \times \text{Total dynamic head}}{3960 \text{constant}} \]

Brake Horsepower \[ BHP = \frac{WHP}{\eta_{pump}} \]

Motor Horsepower \[ MHP = \frac{BHP}{\eta_{motor}} \]

Overall Efficiency \[ \eta_{overall} = \frac{WHP}{MHP} \]

**Temperature**

Fahrenheit to Celsius \[ ^\circ C = \left( ^\circ F - 32 \right) \left( \frac{5}{9} \right) \]

Celsius to Fahrenheit \[ ^\circ F = \left( \frac{^\circ C \times 9}{5} \right) + 32 \]
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. \( \pi = 3.14 \)
29. 1 meter = 100 centimeters
30. 1.0 kilograms = 2.205 lbs
31. 1 mile = 5,280 ft.