ABC Formula/Conversion Table
for Plant Maintenance Exams

$$\text{Amps} = \frac{\text{Volts}}{\text{Ohms}}$$

Area of Circle = (0.785) (Diameter^2) or (Π) (Radius^2)

Area of Cone (lateral area) = (Π) (Radius) $\sqrt{\text{Radius}^2 + \text{Height}^2}$

Area of Cone (total surface area) = (Π) (Radius) (Radius + $\sqrt{\text{Radius}^2 + \text{Height}^2}$)

Area of Cylinder (total outside surface area) = [Surface Area of End #1] + [Surface Area of End #2] + [(Π) (Diameter) (Height or Depth)]

Area of Rectangle = (Length) (Width)

$$\text{Area of a Right Triangle} = \frac{(\text{Base})\,(\text{Height})}{2}$$

$$\text{Average (arithmetic mean)} = \frac{\text{Sum of All Terms}}{\text{Number of Terms}}$$

Circumference of Circle = (Π) (Diameter)

$$\text{Degrees Celsius} = (\text{Degrees Fahrenheit} - 32)\ (5/9) \text{ or } \frac{(^{\circ}\text{F} - 32)}{1.8}$$

Degrees Fahrenheit = [(Degrees Celsius) ($9/5$) + 32] or [(Degrees Celsius) (1.8) + 32]

Electromotive Force (E.M.F), volts = (Current, amps) (Resistance, ohms) or E =IR

$$\text{Filter Backwash Rate, gpm/sq ft} = \frac{\text{Flow, gpm}}{\text{Filter Area, sq ft}}$$

Flow Rate, cfs = (Area, sq ft) (Velocity, ft/sec) or Q = AV where: Q = flow rate, A = area, V= velocity

Force, pounds = (Pressure, psi) (Area, sq in)

$$\text{Horsepower, Brake (bhp)} = \frac{(\text{Flow, gpm})\,(\text{Head, ft})}{(3{,}960)\,(\text{Decimal Pump Efficiency})}$$

$$\text{Horsepower, Motor (mhp)} = \frac{(\text{Flow, gpm})\,(\text{Head, ft})}{(3{,}960)\,(\text{Decimal Pump Efficiency})\,(\text{Decimal Motor Efficiency})}$$

$$\text{Horsepower, Water (whp)} = \frac{(\text{Flow, gpm})\,(\text{Head, ft})}{3{,}960}$$

$$\text{Leakage, gpd} = \frac{\text{Volume, gallons}}{\text{Time, days}}$$

$$\text{Reduction in Flow, \%} = \frac{(\text{Original Flow} - \text{Reduced Flow})\,(100\%)}{\text{Original Flow}}$$

$$\text{Slope, \%} = \frac{\text{Drop or Rise}}{\text{Distance}} \times 100$$

$$\text{Specific Gravity} = \frac{\text{Specific Weight of Substance, lbs/gal}}{\text{Specific Weight of Water, lbs/gal}}$$

$$\text{Velocity, ft/sec} = \frac{\text{Flow Rate, cu ft / sec}}{\text{Area, sq ft}} \text{ or } \frac{\text{Distance, ft}}{\text{Time, sec}}$$

Volume of Cone = (1/3) (0.785) (Diameter^2) (Height)

Volume of Cylinder = (0.785) (Diameter^2) (Height)

Volume of Rectangular Tank = (Length) (Width) (Height)

Watts (DC circuit) = (Volts) (Amps)

Watts (AC circuit) = (Volts) (Amps) (Power Factor)

$$\text{Wire-to-Water Efficiency, \%} = \frac{\text{Water Horsepower, HP}}{\text{Power Input, HP or Motor HP}} \times 100$$

$$\text{Wire-to-Water Efficiency, \%} = \frac{\text{(Flow, gpm) (Total Dynamic Head, ft) (0.746 kw/hp) (100)}}{\text{(3,960) (Electrical Demand, kilowatts)}}$$

Conversion Factors:

1 acre = 43,560 square feet
1 acre foot = 326,000 gallons
1 cubic foot = 7.48 gallons
1 cubic foot = 62.4 pounds
1 cubic foot per second = 0.646 MGD
1 foot = 0.305 meters
1 foot of water = 0.433 psi
1 gallon = 3.79 liters
1 gallon = 8.34 pounds
1 grain per gallon = 17.1 mg/L
1 horsepower = 0.746 kW or 746 watts or 33,000 ft. lbs./min.
1 million gallons per day = 694 gallons per minute
1 million gallons per day = 1.55 cubic feet per second
1 mile = 5,280 feet
1 pound = 0.454 kilograms
1 pound per square inch = 2.31 feet of water
1 ton = 2,000 pounds
1% = 10,000 mg/L
Π or pi = 3.14

Abbreviations:

cfs	cubic feet per second
ft	feet
g	grams
gpd	gallons per day
gpg	grains per gallon
gpm	gallons per minute
in	inches
kW	kilowatt
lbs	pounds
mg/L	milligrams per liter
MGD	million gallons per day
mL	milliliter
psi	pounds per square inch
Q	flow