Useful Physics Formula

1. Magnitude of Resultant Vector $R = \sqrt{(A^2 + B^2 + 2AB \cos \Theta)}$
2. Work $W = Fd \cos \Theta$ (J)
   Where d is the distance moved and Θ is the angle between *F* and the direction of motion.
3. Acceleration due to gravity on the surface of the Earth $g = \frac{GM}{R^2}$
   Acceleration due to gravity at height *h* from the surface of the Earth $g = \frac{GM}{(R+h^2)}$
4. Kinetic Energy = $\frac{1}{2}mv^2$
   Potential Energy = *mgh*
5. Newton's Second Law of Motion *F = ma (N)*
6. Surface Tension = Force / Length (*N/m*)
7. Pressure = Force / Area (N/m^2 or Pascal)
8. Equation of State or Ideal Gas Equation *PV = RT*
9. Kinetic Energy of Ideal Gas $E = \frac{3}{2}RT$
10. Entropy *d*S = Heat absorbed by the system/ Absolute temperature, $ds = \frac{dQ}{dT}$
11. Wave Velocity $v = n\lambda$
12. Power $P = VI = I^2R = V^2/R$ *Watts*
13. Grouping of Capacitor
    (a) Series Grouping $\frac{1}{C_{eq}} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} + --- + \frac{1}{C_n}$
    (b) Parallel Grouping $C_{eq} = C_1 + C_2 + C_3 +$ ---------- $+ C_n$
14. Ohm's Law *V = IR; V* = Voltage across resistance *R, I* = Current
15. Current Density $J = \frac{I}{A}\left(\frac{A}{m^2}\right)$
16. Resistance of a conductor $R = \rho \frac{L}{A}$
    ρ = Material constant called resistivity
    L = Length of Conductor (*m*)
    A =Cross sectional area of the conductor (m^2)
17. Grouping of Resistor
    (a) Series Grouping $R_{eq} = R_1 + R_2 + R_3 +$ ---------- $+ R_n$
    (b) Parallel Grouping $\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + --- + \frac{1}{R_n}$
18. Faraday's law of Electromagnetic Induction $E = n\frac{d\emptyset}{dt}$
19. Efficiency of transformer $\eta = \frac{p_{out}}{p_{in}} \times 100$
20. de-Broglie wavelength $\lambda = \frac{h}{p}$
    where *h* is plank's constant (6.62×10^{-34} J-sec)
    p = momentum
21. Energy of photon *E = hv*
22. Snell's law $\frac{\sin i}{\sin r} = n_{21} = \frac{n_2}{n_1}$
23. Centripetal force $F = mv^2/r$

24. Period of simple harmonic motion $T = 2\pi\sqrt{\frac{m}{k}}$
25. Refractive index of prism $\mu = \frac{\sin[\frac{(A+\delta m)}{2}]}{\sin\frac{A}{2}}$
26. Image magnification = Size of image / size of object = v/u
27. Brewster's Law $\mu = \tan i_p$
    Where i_p = Polarizing angle

Useful Chemistry formula

1. No. of moles atom/molecule = $\frac{\text{Weight of substance (in gm)}}{Atomic\ weigth\ or\ molecular\ weight}$
2. Molarity (M) = $\frac{No.of\ moles\ of\ solute}{Volume\ of\ solution\ (in\ litre)}$
3. Normality (N) = $\frac{No.of\ gm\ equivalent\ wrigth\ of\ solute}{Volume\ of\ solution\ (in\ liter)}$
4. Equivalent weight of Acid = $\frac{Molecular\ weight\ of\ acid}{Basicity}$
5. Equivalent weight of Bases = $\frac{Molecular\ weight\ of\ base}{Acidity}$
6. Equivalent weight of Element = $\frac{Atomic\ weight\ of\ Element}{Valency}$
7. Nernst Equation $E_{cell} = E^{o}_{cell} - \frac{RT}{nf} ln \frac{[P]}{[R]}$
8. Work done from cell, $-\Delta G = nFE$ (ΔG = Gibb's free energy)
9. Avogadro's Constant = 6.023×10^{23}

Oxidation	Reduction
Loss of electron	Gain of electron
Loss of hydrogen	Gain of hydrogen
Gain of oxygen	Loss of oxygen
Increase in oxidization number	Increase in oxidization number