Page No.
Date:

Ch-1: Measurement and Experimentation

(i) Physical Quantity = Numerical Value × Unit

(ii) L.C of V.C = $\frac{\text{Value of 1 M.S.D}}{\text{Total No. of division on Vernier}}$

(iii) L.C of Screw gauge = $\frac{\text{Pitch of screw gauge}}{\text{Total division on Circular Scale}}$

(iv) Zero error ⇒ Correct Reading = Observed Reading - Zero error

(v) $f = \frac{1}{T}$ or $T = \frac{1}{f}$

(vi) $g = \frac{4\pi^2}{\text{Slope of } T^2 \text{ Vs } l\text{-graph}}$

(vii) $T = 2\pi\sqrt{\frac{l}{g}}$ or $T^2 = 4\pi^2\frac{l}{g}$

(viii) $l = \frac{gT^2}{4\pi^2}$

Ch-2: Motion in One Dimension

(i) Distance = Speed × Time

(ii) Displacement = Initial position − Final position

(iii) Instaneous speed = Distance travelled in a short time interval / Time interval

(iv) Speed = $\frac{\text{Distance}}{\text{Time}}$

(v) Average speed = Total distance / Total time taken

(vi) Velocity = Displacement / Time.

(vii) Instaneous velocity = Displacement / Total time taken

(viii) Acceleration (a) = $\frac{\text{Final velocity (v) - Initial velocity (u)}}{\text{Time (t)}}$

(ix) Equations of Motion: → $v = u + at$

→ $s = ut + \frac{1}{2}at^2$

→ $v^2 - u^2 = 2as$ or $v^2 = u^2 + 2as$

Ch-3: Laws of Motion

(i) Force = $m \times a$ [m = mass, a = acceleration]

(ii) Linear Momentum (P) = mv [v = velocity]

(iii) Change in momentum ⇒ $\Delta P = m\Delta v$

(iv) Rate of change of Momentum ⇒ $m\left(\frac{v-u}{t}\right) = ma$ or $F = ma$

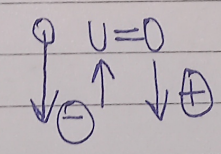
(v) Universal Law of Gravitation

⇒ $F = \frac{GmM}{r^2}$ [$G = 6.67 \times 10^{-11} Nm^2/kg^2$]

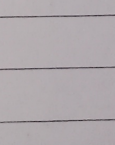
(vi) Acceleration due to Gravity ⇒ $g = \frac{GM}{R^2}$ [$g_e = 9.8 m/s^2$]

(vii) Free fall

- $v = gt$
- $s = \frac{1}{2}gt^2$
- $v^2 = 2gs$



- $v = u - gt$
- $s = ut - \frac{1}{2}gt^2$
- $v^2 = u^2 - 2gs$



(viii) Mass and Weight ⇒ $W = mg$ [N]

Page No.
Date:

Ch-4: Pressure in Fluids and Atmospheric Pressure

(i) Thrust = Force
With Pressure ⇒ Thrust = Pressure × Area

(ii) Pressure = $\frac{\text{Thrust (Force)}}{\text{Area}}$

(iii) Pressure (P) = depth (h) × density of liquid (ρ) × acceleration due to gravity (g)

(iv) Pressure exerted inside the fluid
$\Rightarrow P = \rho g h \Rightarrow P = P_0 + \rho g h$ [P_0 = Atmospheric Pressure]

(v) Pascal's Law $\Rightarrow \frac{F_1}{A_1} = \frac{F_2}{A_2}$ or $\frac{F_2}{F_1} = \frac{A_2}{A_1}$

Ch-5: Upthrust in Fluids, Archimedes' Principle and Floatation

(i) Upthrust $= F_B = V\rho g$

(ii) Upthrust = Weight of the liquid displaced by the submerged part of the body

(iii) Density = $\frac{\text{Mass}}{\text{Volume}}$ [$1 Kg\,m^{-3} = 10^{-3} g\,cm^{-3}$, or $1 g\,cm^{-3} = 1000 Kg\,m^{-3}$]

(iv) R.D $\Rightarrow \frac{\rho_s}{\rho_w} = \frac{m_s}{m_w}$

(v) R.D = $\frac{W_{air}}{W_{air} - W_{water}}$ [W = Weight, in]

(vi) R.D = $\frac{W_{air} - W_{liquid}}{W_{air} - W_{water}}$

(vii) W = Volume of body × Density of body × g

(viii) F_B = Volume of submerged part of body × ρ_{liquid} × g

(ix) $\rho_s = 1000 \cdot RD$

(x) Buoyancy
- $F_B > W \rightarrow$ Body will float
- $F_B = W \rightarrow$ Body will sink
- $F_B < W \rightarrow$ Body will sink
- $a = \frac{W - F_B}{M}$
- $Ma = W - F_B$

(xi) Upthrust (Force) $= \frac{P_2 - P_1}{A}$ [P_2 = Lower face; P_1 = Upper face]

Ch-6: Heat and Energy

(i) $T_K = t°C + 273$ [°C to K]

(ii) $T_F° = 9/5 \times t°C + 32$ [°C to °F]

(iii) $T_C° = 5/9 \times °F - 32$ [°F to °C]

(iv) $T_C° = K - 273$ [K to °C]

Ch-7: Reflection of Light

(i) Image formed in Two-inclined mirrors
- $n = \frac{360}{\theta}$ [odd] $\rightarrow n-1$] Symmetrical Placement
  [even] $\rightarrow n-1$]
- $n = \frac{360}{\theta}$ [odd] $\rightarrow n$] Asymmetrical Placement

(ii) $R = 2f$

(iii) On Next Page.

(iii) Spherical mirror formula:

Mirror formula → $\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$ [f = Focal length of mirror, v = image distance from pole, u = object distance from pole].

(a) Sign Convension rules :

(i) Concave Mirror

* u is always -ve ($u<0$), f is -ve ($f<0$), for real image ($v<0$) and for virtual image ($v>0$).

(ii) Convex Mirror

u is always -ve ($u<0$), f is +ve ($f>0$), v is always +ve ($v>0$).

[Image is always formed behind the mirror]

(b) Magnification Relation

(i) [redacted] Formula: $m = \frac{h_i}{h_o} = -\frac{v}{u}$.

(ii) Nature of image from sign of m:

(a) If m is -ve → Image is real and inverted.

(b) If m is +ve → Image is virtual and erect.

(c) Important Points

(i) Concave Mirror

(a) Real Image: (1) $u<0$.

(2) $v<0$

(3) $m<0$

(4) Image is real and inverted.

(b) Virtual [redacted] Image: (1) $u<0$.

(2) $v>0$

(3) $m>0$

(4) Image is virtual and erect.

(c) For distant object: (1) Image form near focus.

(2) m is small and negative.

(iii) Convex Mirror

(a) $u < 0$. (b) $v > 0$.

(c) $m > 0$. (d) Image is always virtual and erect.

(e) $|m|$ is always less than 1 ($|m| < 1$).

(f) Image is always diminished.

(d) Size relation using (m)

$|m| > 1 \rightarrow$ magnified image.

$(m) = 1 \rightarrow$ same size

$|m| < 1 \rightarrow$ diminished image.

Ch-8: Propagation of Sound Waves

(i) $f = \frac{1}{T}$ or $T = \frac{1}{f}$

(ii) $V = f\lambda$ (V = speed of sound, f = frequency, λ = wavelength)

(iii) $d = \frac{vxt}{2}$ (for echo condition)

(iv) Higher frequency → shriller sound.
Lower frequency → deeper sound.

(v) Speed of sound $(v) = \frac{D}{T}$

Ch-9: Current Electricity

(i) Current $(I) = \frac{\text{Charge } (Q)}{\text{time } (t)}$

(ii) Charge = Current × Time

(iii) Voltage $(V) = \frac{\text{Work } (W)}{\text{Charge } (q)}$

(iV) Resistance (R) = Potential Difference (V) / Current (I)

(V) $V = IR$

(vi) $V = \frac{W}{q}$ [W = Amount of work]

(vii) Factors on (R) Depends :-

(i) $R \propto l$.

(ii) $R \propto \frac{1}{A}$.

(iii) $V \propto I$.

(iV) $I \propto V$.