HSE Practical Exam-Physics-Theory Key Points

1. Vernier Calipers

L.C= $\frac{1\ m.s.d}{n}$=.01cm

Total Reading=M.S.R + (V.S.R xL.C)

Possible Results

Volume of Sphere=..... $\times 10^{-9}m^3$

Surface Area of Sphere=.....$\times 10^{-4}m^2$

Volume of Cylinder =.....$\times 10^{-6}m^3$

2. Screw Gauge

L.C=$\frac{P}{N}$=.01mm

If Zero Coincidence: 96, Zero

Correction is: +4

If Zero Coincidence: 6, Zero

Correction is: -6

Total Reading=P.S.R + (H.S.R x L.C)

Possible Results

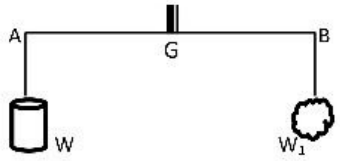
Diameter of wire =.....$\times 10^{-4}m$

Volume of wire =..... $\times 10^{-8}m^3$

Thickness of glass=..... $\times 10^{-3}m$

Volume of glass =.....$\times 10^{-6}m^3$

3. Moment Bar



Mass of given Body, W1=$\frac{W \times AG}{BG}$

4. Concurrent Forces-1

Chosen Scale 1 cm= 25gwt or 50gwt

Weight of Body W= diagonal X Scale Factor

$W = \sqrt{P^2 + Q^2 + 2PQ\ Cos\ \theta}$

5. Concurrent Forces-II

Weight of Body W= diagonal X Scale Factor

Relative density of solid=$\frac{W_a}{W_a - W_w}$

Relative density of Kerosene=$\frac{W_a - W_k}{W_a - W_w}$

W_a – Wt of body in air

W_w – Wt of body in water

W_l – Wt of body in liquid

6. Helical Spring-Load Extension method

Spring Constant K =$\frac{Mg}{l}$

Weight of Body = K l

Weight of Body = K ($X-X_0$) Newton

Helical Spring-Vertical Oscillation method

Period of vertical oscillation, $2\pi\sqrt{\frac{M}{K}}$

$\therefore K = 4\pi^2\left[\frac{M}{T^2}\right]$

7. Simple Pendulum

$T = 2\pi\sqrt{\frac{l}{g}}$

$g = 4\pi^2\frac{l}{T^2}$ $\qquad \frac{l}{T^2} \sim 25\ {}^{cm}/_{s^2}$

8. Sonometer-I

Frequency of vibration of a stretched string,

$n = \frac{1}{2l}\sqrt{\frac{T}{m}}$, T → Tension

m→ linear density

$n \propto \frac{1}{l}$ or n X l = K

9. Sonometer –II

Frequency of vibration of a stretched string, $n = \frac{1}{2l}\sqrt{\frac{T}{m}}$, T → Tension

m→ linear density

$l^2 \propto T$ but T=mg

$\frac{M}{l^2}$ = K

Mass of Body, M =Kl^2

10. Resonance Column-1

Velocity of Sound at Room Temp

$V_t = 2n(\ell_2 - \ell_1)$

Velocity of Sound at 0°C→ $V_0 = V_t - 0.6t$

t→room temperature

Unknown Frequency, N =$\frac{V_t}{2(\ell_2 - \ell_1)}$

11. Common Balance

Sensibility, S=$\frac{10}{(Ro-R1)}$ mg/division

$= \frac{.01}{(Ro-R1)}$ g/division

Correct mass of body = W + S (R - R_0)

12. Meterbridge

$\frac{X}{R} = \frac{\ell}{100 - \ell}$

$\therefore$ unknown resistance , $X = \frac{R\ell}{100 - \ell}$

resistivityof material, $\rho = \frac{\pi r^2 X}{L}$

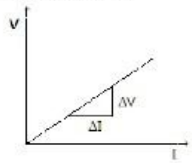
13. Potentiometer-I

Comparison of emf of two cells, $\frac{E_1}{E_2} = \frac{\ell_1}{\ell_2}$

14. Potentiometer-II

Internal resistance of a cell, $r = R\frac{\ell_1 - \ell_2}{\ell_2}$

15. Ohm's Law



Slop will give you *resistance* of the wire

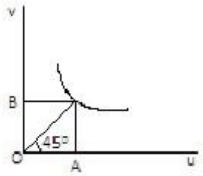
$R = \frac{V}{I}\Omega$

Resistivity ρ= $\frac{RA}{\ell}$

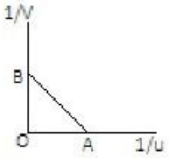
16. Convex Lens

$\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$

$f = \frac{uv}{u+v}$



U-V Graph→ $f = \frac{OA+OB}{4}$



$\frac{1}{u} - \frac{1}{v}$ Graph→ $f = \frac{2}{OA+OB}$

17. Concave Lens

Lenses in Contact:-

Focal legth of concave lense, $f_2 = \frac{Ff_1}{f_1 - F}$

f_1 → *Focal legth of convex lense alone*

F → *Focal length of combination of lense*

Lenses out of Contact:-

Focal legth of concave lense, $f_2 = \frac{uv}{u-v}$

18 Concave Mirror

$\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$

$f = \frac{uv}{u+v}$

U-V Graph→ $f = \frac{OA+OB}{4}$

$\frac{1}{u} - \frac{1}{v}$ Graph → $\frac{1}{f} = \frac{2}{OA+OB}$

19. Refraction through Prism

Refractive index of Prism

$n = \frac{\sin\left(\frac{A+D}{2}\right)}{\sin\left(A/2\right)}$ A-Angle of Prism,

D-Angle of minimum deviation

20. Frequency of AC-Sonometer

Frequency of AC, $F = {}^{1}/_{2l}\sqrt{{}^{T}/_{m}}$

T = mg

Frequency of AC = $\sqrt{{}^{g}/_{4m} \times {}^{M}/_{l^2}}$

21. Surface Tension–Capillary Rise method

Surface Tension, T = $\frac{hr\rho g}{2}$