Indian School Al Wadi Al Kabir
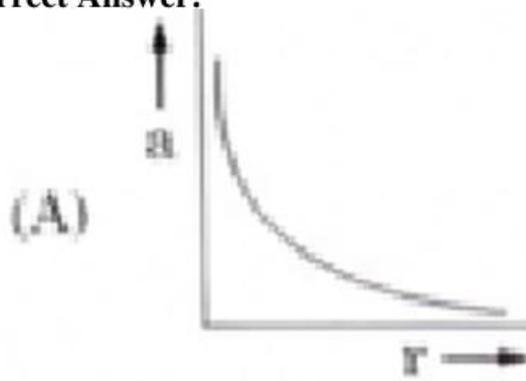## Second Rehearsal Examination (2025-2026)

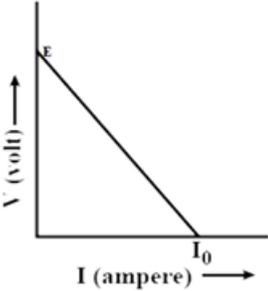**Class: XII**　　　　　**Subject: Physics (042)**　　　　　**Max. Marks: 70**
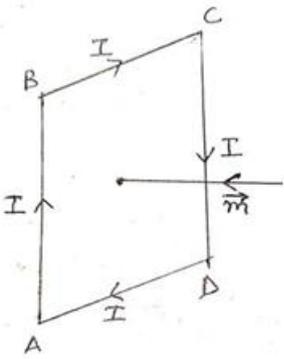
Marking scheme

1	**Correct Answer:** A	1
2	D. T1 < T2	1
3	A 1/ 2	1
4	B. a semicircular path in XY plane	1
5	D. 69 V	1
6	A. 10 V	1
7	D. 6750	1
8	B have wavelength smaller than that of ultraviolet radiations	1
9	B. Concave and real	1
10	A. Bandwidth increases	1
11	(C) nf = 2 and ni = 4	1
12	C $r_n \propto n^2$	1

13.	Answer(c) Assertion is true but Reason is false.	1
14.	Correct Answer: (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).	1

15.	Correct Answer: (C) Assertion (A) is true and Reason (R) is false	1
16.	Correct Answer: (D) Assertion (A) is false and Reason (R) is also false.	1

<div align="center">SECTION B</div>

17	$\emptyset = \emptyset_L + \emptyset_R$ $= EA \cos 180 + EA \cos0 = 5 \times L^2[-1] + [10L +5] L^2[1] = 10L^3$	2
18.	(a) Current drawn from the cell $(I) = \dfrac{E}{r+R}$ Potential difference $(V) = IR$ $V = \dfrac{ER}{r+R}$ (b) Slope of the graph is equal to internal resistance of the cell. The intercept on Y-axis gives the emf of the cell.	2
19[I]	State Ampere's circuital law [1/2] Fig.[1/2] Steps [1/2] Final answer [1/2] OR	
19.[II]	the force between conductors Fig.[1/2] Steps [1] Final answer [1/2]	2

20	displacement current –[1] Change in electric flux[1/2] Expression [1/2]	2
21[I]	Total energy Fig.[1/2] Steps [1] Final answer [1/2] OR	2
21[II]	radius of the orbit is proportional to n^2 Fig.[1/2] Steps [1] Final answer [1/2]	2

SECTION C		
22.	electron mobility –[1] Fig.[1/2] Steps [1] Final answer [1/2]	3
23.[I]	working of a moving coil galvanometer Fig.[1] Working --[1/2] Steps [1] Final answer [1/2] OR	3

23[II]	(i) $m = IA$	[1]

Fig.[1/2]

Steps [1]
Final answer   [1/2] | |
| 24. | [b]case:1

$E1 = -\frac{d\emptyset}{dt} = -[2.25 \times 10^{-2}]$ volt

$I1 = \frac{E1}{R} = = \frac{-2.25 \times 10^{-2}}{8.5} = -2.7$ mA

[b]case:2

$E2 = -\frac{d\emptyset}{dt} = -A[\frac{1-1}{4-2}] = 0$ volt

$I2 = \frac{E2}{R} = 0 volt$

b]case:3

$E3 = -\frac{d\emptyset}{dt} = -[-2.25 \times 10^{-2}]$ [volt

$I3 = \frac{[2.25 \times 10^{-2}]}{8.5} = +2.7 mA$

 | 1+1/2 +1/2

Graph[1] |
| 25. | | 1 |

	$$\sin C = \frac{n_{\text{medium}}}{n_{\text{prism}}}$$ - For an equilateral prism, the angle of incidence inside the prism is: $$r = \frac{A}{2} = \frac{60°}{2} = 30°$$ - The critical angle C is given by: $$\sin C = \frac{1}{n}$$ Since $C = 60°$: $$\sin 60° = \frac{n_{\text{medium}}}{n_{\text{prism}}}$$ $$\frac{\sqrt{3}}{2} = \frac{n_{\text{medium}}}{n_{\text{prism}}}$$ $$n_{\text{medium}} = \frac{\sqrt{3}}{2} n_{\text{prism}}$$ Thus, the refractive index of the medium is $\frac{\sqrt{3}}{2} n_{\text{prism}}$.	1 1
26.	State Huygen's principle and verify laws of reflection using Wave theory .	[1] Fig.[1/2] Derivation 1+1/2

27	Formula – [1/2] Δm = {6.015126amu + 1.008655amu} - {4.002604amu + 3.01604amu} = .005138amu-----------------------[1+1/2]] B.E= .005138x931Mev [1/2] = 4.78Mev [1/2]	
28.	[a] What are majority and minority charge carriers of P type and N type semiconductors? [b] Explain briefly the formation of diffusion current and drift current in a PN junction diode	2

(a) In p-type semiconductor Majority charge carriers - holes Minority charge carriers - electrons In n-type semiconductors Majority charge carriers - electrons Minority charge carriers – holes **(b)** Diffusion current – during the formation of p n junction , and due to the concentration gradient across p and n – sides , holes diffuse from p side to n side (p→n) and electrons diffuse from n – side to p – side (n→p). This motion of charge carriers gives rise to diffusion current across the junction. Drift current –Due to electric field at junction, an electron on p – side of the junction moves to n- side and a hole on n – side of the junction moves to p- side. This motion of charge carriers due to electric field gives drift current.		[1/2] [1/2]

SECTION - D

Question numbers **29** and **30** are case study based questions. Read the following paragraphs and answer the questions that follow.

29	[i]Ans [D]1.1 x10^{-26} Kgm/s. [ii] (A) 1 x10^{16} [iii] [d] 0.55 x10^{-19}J [iv] [b] 5.3 x10^{14}Hz OR [iv] [a] $f_B = 2\ f_A$	1 Mark each

30.	[i] formation of depletion layer and potential barrier in a PN junction diode- explanation [ii]diode conducts only when it is forward biased circuit diagram	2 1 1

SECTION E

31(I)

(i) $C_0 = \dfrac{\varepsilon_0 A}{d}$

$C = \dfrac{\varepsilon_0 A}{(d-t) + \dfrac{t}{K}}$

$t = d/4$

$C = \dfrac{\varepsilon_0 A}{\left(d - \dfrac{d}{4}\right) + \dfrac{d}{4K}} = \dfrac{\varepsilon_0 A}{d\left(\dfrac{3}{4} + \dfrac{1}{4K}\right)}$

$= C_0 \dfrac{4K}{(3K+1)}$ -----[3]

(ii) Each capacitance can withstand 200V

No. of capacitors in each row $= \dfrac{1200}{200} = 6$

Net capacitance of each row $= 1/6$ μF

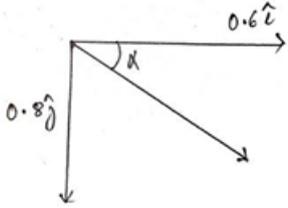Number of rows $= n$

$C_{eq} = C_1 + C_2 + _____ + C_n$

$C_{eq} = \dfrac{1}{6} + \dfrac{1}{6} + _____ n$

$2 = \dfrac{n}{6}$ [1]

$\therefore n = 12$

Total no. of capacitors in the arrangement $= 6 \times 12$

$= 72$ [1]

31(II)	Fig. [1/2] Steps [1] Final answer [1/2] Equatorial line Fig. [1/2] Final answer [1/2] (ii) $\vec{\tau} = \vec{p} \times \vec{E}$ $\quad = (0.8\hat{i} + 0.6\hat{j}) \times 10^{-29} \times (1 \times 10^{7})\,\hat{k}$ $\quad = \left[0.8(-\hat{j}) + 0.6\hat{i} \right] \times 10^{-22}$ $\tau = \left[\sqrt{(0.8)^2 + (0.6)^2} \right] \times 10^{-22}$ $\quad = 10^{-22}\ Nm$ $\tan\alpha = \dfrac{|0.8|}{0.6}$ $\alpha = \tan^{-1}\left(\dfrac{4}{3}\right)$ $\alpha = 53^{0}$ [1+1]	5
32(I)	Fig. [1/2] Steps [2] Final answer [1/2] $I_0 = 10$ units [1/2] $\omega = 314$ rad/ S [1/2] (i) Effective value , $I_{eff} = \dfrac{I_0}{\sqrt{2}}$ $= 5\sqrt{2}$ ---- [1/2] [ii] $f = \dfrac{\omega}{2\pi} = 50$Hz [1/2]	5
32(II)	Fig. [1/2] Steps [2] Final answer [1/2] ac generator. [ii] Fig. [1/2] Steps [1] Final answer [1/2]	5

33(I)	Fig. [1/2] Steps [2] Final answer [1/2] (ii) $\dfrac{n_2}{v} - \dfrac{n_1}{u} = \dfrac{n_2 - n_1}{R}$ R= - 6 cm, u = - 3cm , n_1 =1.5 n_2 = 1 $\dfrac{1}{v} + \dfrac{1.5}{3} = \dfrac{1 - 1.5}{-6}$ $\dfrac{1}{v} = \dfrac{0.5}{6} - \dfrac{1.5}{3}$ $\dfrac{1}{v} = \dfrac{0.5 - 3}{6}$ $\dfrac{1}{v} = \dfrac{-2.5}{6}$ v = - 2.4 cm from the left surface inside the sphere formula -1/2 Steps -1 Ans -1/2 **OR**	5
33(II)	[i] Fig. [1] Steps [1+ 1/2] Final answer [1/2]	5

(ii) Image is formed at least distance of distinct vision

$$20 = m_o \times m_e$$

$$m_o = \frac{20}{5} = 4$$

$$m_e = 1 + \frac{D}{f_e}$$

$$f_e = \frac{25}{4}\ cm$$

$$\frac{1}{v_e} - \frac{1}{u_e} = \frac{1}{f_e}$$

$$\frac{1}{-25} - \frac{1}{u_e} = \frac{4}{25}$$

$$u_e = -5 cm$$

$$L = v_0 + |u_e|$$

$$v_0 = 9\ cm$$

Given, $\dfrac{v_0}{u_0} = 4$

$$\frac{1}{v_0} - \frac{1}{u_0} = \frac{1}{f_0}$$

$$\frac{1}{f_0} = \frac{1}{9} - \left(-\frac{4}{9}\right)$$

$$f_0 = \frac{9}{5}\ cm$$

M.P = m0 xme --formula -1/2

Ue = -5cm   [1/2]

V0 = 9 cm –[1/2]

F0 =9/5 cm   [1/2]