ANSWER KEY

Second YEAR HIGHER SECONDARY EXAMINATION .....March.. 2024

PART-I/II/III

SUBJECT: .....PHYSICS.....

CODE NO: SY.524 VERSION:...T...

..60.. SCORES ....2.... HOURS

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
		Section - A		
1		(c) Nm^2C^{-1}		1
2		(a) zero		1
3		(d) D		1
4		True		1
5		$\lambda = \frac{h}{p} = \frac{h}{mv}$ or $\lambda = \frac{h}{\sqrt{2mK}} = \frac{h}{\sqrt{2mE}}$		1
6		Iron or Fe or $^{56}_{26}Fe$ or ^{56}Fe		1
7		Semiconductor in it's pure form		1
		Section - B		
8		A surface which has same potential everywhere. (1 Score) eg:- Any suitable example/figure/equation (1 Score)		2
9		Definition (1 Score) $V_d = \frac{eE}{m}\tau$ (1 Score) or $V_d = \frac{I}{nAe}$ or $\frac{j}{ne}$ or $I = nAV_de$		2

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
10		Statement / equation		2
11		Definition or equation		2
12		$V_{rms} = \frac{V_m}{\sqrt{2}} = \frac{V_0}{\sqrt{2}}$, $V_m = V_{rms} \times \sqrt{2}$ (1 Score) $V_m = 220 \times 1.414 = 311\ V$ (1 Score)		2
13		Definition / explanation / correct graph		2
14		Definition / explanation (1 Score) Suitable example (1 Score)		2
		Section - C		
15		Statement of Coulomb's law (2 Score) Equation (1 Score) or Like charges repel and unlike charges attract (1½ Score)		3
16		Derivation of $F = \frac{\mu_0}{4\pi} \frac{2 i_1 i_2 L}{d}$ $= \frac{\mu_0 i_1 i_2 L}{2\pi d}$ or		3

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
		Equation of magnetic field (1 Score) Equation of force (1 Score) Final equation (1 Score)		
17.		Comparison or figure with one example each		3
18.		Definition of Self Induction (1½ Score) Definition of Self Inductance or equation (1½ Score)		3
19		Explanation or electromagnetic waves in an order		3
20		Three Postulates (1 Score each)		3
21		Explanation/Definition (1 Score) Circuit Diagram (1 Score) Input & Output wave (1 Score)		3

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
		Section - D		
22	a.	Proper marking of direction	1	4
	b.	Derivation of $E = \frac{\lambda}{2\pi\varepsilon_0 r}$ or figure (1 Score) Equation of Gauss's law (1 Score) final equation (1 Score)	3	
23	a.	Statement / $V = IR$	1	4
	b.	Derivation of $\frac{R_1}{R_2} = \frac{R_3}{R_4}$ or figure (1 Score) final equation (1 Score)	3	
24	a.	Statement or equation $\frac{\sin i}{\sin r} = n$	1	4
	b.	Explanation of Critical angle (1½ Score) Explanation of total Internal reflection (1½ Score) or figure (1 Score) Conditions for TIR (1+1 Score)	3	

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
25	a.	Definition	1	
	b.	$\beta = \frac{D\lambda}{d}$, $d = \frac{D\lambda}{\beta}$		4
		$d = \frac{5\times10^{-7}\times5\times10^{-2}}{1\times10^{-3}} = 0.025\,mm$	3	
		or		
		Attempt for (a) or (b) or both give full score for part (b) (3 score)		
		For part (a) eligible score only		
		Section - E		
26	a.	Principle / $C = \frac{Q}{V}$ / figure	1	
	b.	Derivation of $C = \frac{\varepsilon_0 A}{d}$	2	
	c.	$U = \frac{1}{2}CV^2$ (1 Score)		5
		$= \frac{1}{2}\times12\times10^{-12}\times50^2$	2	
		$U = 1.5\times10^{-8}\,J$ (1 Score)		
27.	a.	Right hand thumb rule / grip rule / right hand screw rule	1	
	b.	Statement or equation	1	5
	c.	Derivation of $B = \frac{\mu_0 I R^2}{2(x^2+R^2)^{3/2}}$	3	
		or		

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
		figure (1½ Score) Equation of Biot Savart's law (½ Score) final equation (1 Score)		
28	a.	$\mathcal{E} = \mathcal{E}_0 \sin\omega t$ / $V = V_0 \sin\omega t$	1	
	b.	A - Resistor B - Inductor C - Capacitor	1	
	c.	Phasor diagram (1 Score) $Z = \sqrt{R^2 + (x_L - x_c)^2}$ (1 Score) R - Resistance x_L - Inductive Reactance x_c - Capacitive Reactance } (1 Score)	3	5
29.	a.	Correct Derivation of $\frac{1}{f} = (n-1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$ or figure (1 Score) final equation (1 Score)	3	

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
	b.	Diagram of image formation	1	5
	c	$D \simeq 25\,cm$	1	

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