ANSWER KEY

SECOND YEAR HIGHER SECONDARY EXAMINATION MARCH 2022

PART-I/II/III

SUBJECT: PHYSICS

CODE NO: ~~SY 524~~ S.4-24 VERSION:

60 SCORES 2 HOURS

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
		PART I		
A 1		(a) NC^{-1}	1	1
2.		Magnetic Lorentz force / Lorentz force	1	1
3.		Eddy Current / Foucalt Currents	1	1
4.		(a) 0	1	1
5.		(b) $c = \frac{1}{\sqrt{\mu_0 \varepsilon_0}}$	1	1
6.		Transverse	1	1
7.		(a) neutral	1	1
8.		(c) +13.6 eV	1	1
9.		(b) $^{A-4}_{Z-2}Y$	1	1
B 10		True	1	1
11		Mobility / $\mu = \frac{V_d}{E}$ / $V = \frac{eE}{m}\tau$	1	1

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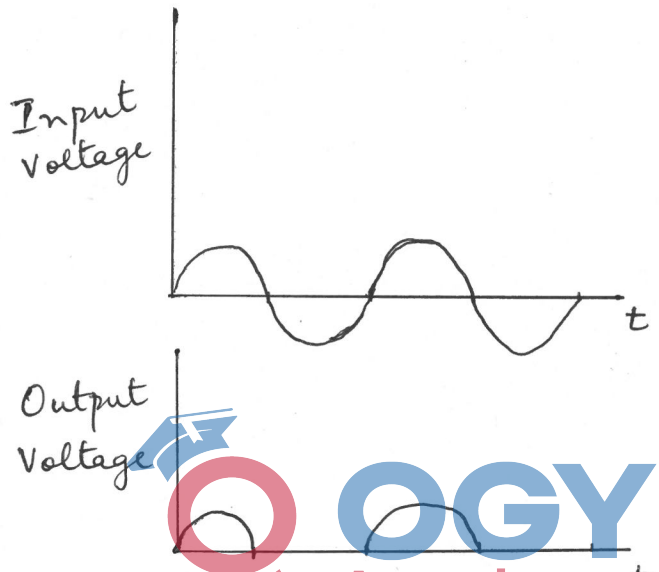
Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
12.		(c) Curie Temperature	1	1
13.		Total Internal Reflection	1	1
		PART II		
A 14.			1 1	2
15		As we rotate the polaroid P_1, the intensity of polarised light will vary as $I = I_0 \cos^2\theta$ where I_0 – intensity of polarised light after passing through P_1 and θ – angle between polariser and analyser Equation only – 1	2	2
16		Angle that the total magnetic field of earth makes with the surface of earth / horizontal / diagram	2	2
17.		$R = \frac{V^2}{P} = \frac{(220)^2}{100} = 484\,\Omega$	1 + ½ + ½	2

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Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
B 18		They heat up and heat their surroundings / It produces heat / It causes Green House Effect	2	2
19.	(i)	Long wire wound in the form of a helix / cylinder / figure	1	2
	(ii)	$B = \mu_0 n I$	1	
20.		Process of sharing the charges with earth / Explanation showing sharing of charges with earth.	2.	2
		Part III		
A 21		Any three properties of equipotential surface. 1 Score for each property.	3	3
22	(i)	Ohm ~~or Ω~~	1	3
	(ii)		½	
		$I R_{eq} = I R_1 + I R_2$	½	
		$R_{eq} = R_1 + R_2$	1	
23.	(i)	Magnetic declination or declination	1	3.
	(ii)	higher, smaller	2	
24	i	Power = +2 Dioptre $P = \frac{1}{f}$ only → ½	1	3
	ii	$\frac{1}{f} = (n-1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$	1	
		$\frac{1}{12} = (n-1)\left(\frac{1}{10} - \frac{1}{-15}\right)$ / $n = 1.5$	1	

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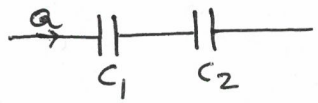
Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
B 25	(i)	Energy level diagram of H_2 atom with transitions corresponding to Balmer series / Energy level diagram only (1)	2	3
	(ii)	Lyman Series	1	
26.	(i)	Definition of threshold frequency	2	3.
	(ii)		1	
27.		Fuel, Moderator, Control rods Coolant, Reflector, Safety Shield	3	3
A 28		Part IV		
	(i)	Farad or F or Coulomb volt^{-1} or CV^{-1}	1	4
	(ii)	 figure	1	
		$\frac{Q}{C} = \frac{Q}{C_1} + \frac{Q}{C_2}$	1	
		$\frac{1}{C} = \frac{1}{C_1} + \frac{1}{C_2}$	1	
29	(i)	Biot - Savart's law	1	4
	(ii)	$B = \frac{\mu_0 n I}{2R}$	1	
		$= \frac{4\pi \times 10^{-7} \times 10^{2} \times 1}{2 \times 10 \times 10^{-2}}$	1	
		$= 2\pi \times 10^{-4}\ T$ or $6.28 \times 10^{-4}\ T$	1	

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Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
30	(i)	Electromagnetic Induction	1	4
	(ii)	Schematic diagram of a.c. generator	1½	
		Working of a.c. generator	1½	
31	(i)	NAND gate	1	4
	(ii)	A B Y 0 0 1 0 1 1 1 0 1 1 1 0	2	
	(iii)	We can realise other basic gates like OR, AND and NOT gates using NAND gates	1	
B 32.		Diagram Derivation of Huygen's principle	1 3	4.
33	(i)	Mutual Induction	1	4
	(ii)	Explanation of any three energy losses in a transformer	3	
		PART V		
A 34	(i)	$\frac{R_1}{R_2} = \frac{R_3}{R_4}$ / $\frac{P}{Q} = \frac{R}{S}$	1	6
	(ii)	derivation of the eqn $R = S\left(\frac{l}{100-l}\right)$	2	
	(iii)	$R = 12 \times \frac{40}{60}$ $= 8\ \Omega$	1 1	
	(iv)	No Current	1	

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Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
35	(i)	Statement of Gauss's law / Equation	2	
	(ii)	Explanation of Gaussian Surface	1	6
	(iii)	Correct diagram	1	
		derivation	2	
		$E = \frac{1}{4\pi\varepsilon_0}\frac{q}{r^2}$ or $E = \frac{\sigma R^2}{\varepsilon_0 r^2}$ → (1)		
36	(i)	Laws of refraction	2	
	(ii)	Ray diagram	1	6
		derivation	3	

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