# 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)<br>eg:- Any suitable example/figure/equation (1 score) | | 2 |
| 9 | | Definition (1 score)<br>$V_d = \frac{eE}{m}\tau$ (1 score)<br>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 | | $V_{rms} = \frac{V_m}{\sqrt{2}} = \frac{V_0}{\sqrt{2}}$ ,<br>$V_m = V_{rms} \times \sqrt{2}$ (1 Score)<br>$V_m = 220 \times 1.414 = 311\ V$ (1 Score) | | 2 |
| 13 | | Definition / explanation / correct graph | | 2 |
| 14 | | Definition / explanation (1 Score)<br>Suitable example (1 Score) | | 2 |
| | | Section - C | | |
| 15 | | Statement of Coulomb's law (2 Score)<br>Equation (1 Score)<br>or<br>Like charges repel and unlike charges attract (1½ Score) | | 3 |
| 16 | | Derivation of $F = \frac{\mu_0}{4\pi} \frac{2 i_1 i_2 L}{d}$<br>$= \frac{\mu_0 i_1 i_2 L}{2\pi d}$<br>or | | 3 |

| Qn. No | Sub Qns | Answer Key/Value Points | Score | Total Score |
|---|---|---|---|---|
| | | Equation of magnetic field (1 Score)<br>Equation of force (1 Score)<br>Final equation (1 Score) | | |
| 17. | | Comparison or figure with one example each | | 3 |
| 18. | | Definition of Self Induction (1½ Score)<br>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)<br>Circuit Diagram (1 Score)<br>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 $E = \frac{\lambda}{2\pi\varepsilon_0 r}$ | 3 | |
| | | or | | |
| | | figure (1 Score) | | |
| | | Equation of Gauss's law (1 Score) | | |
| | | final equation (1 Score) | | |
| 23 | a. | Statement / $V = IR$ | 1 | 4 |
| | b. | Derivation of $\frac{R_1}{R_2} = \frac{R_3}{R_4}$ | 3 | |
| | | or | | |
| | | figure (1 Score) | | |
| | | final equation (1 Score) | | |
| 24 | a. | Statement or equation $\frac{\sin i}{\sin r} = n$ | 1 | 4 |
| | b. | Explanation of Critical angle (1½ Score) | 3 | |
| | | Explanation of total Internal reflection (1½ Score) | | |
| | | or | | |
| | | figure (1 Score) | | |
| | | Conditions for TIR (1+1 Score) | | |

| 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)<br>Equation of Biot Savart's law (½ Score)<br>final equation (1 Score) | | |
| 28 | a. | $\mathcal{E} = \mathcal{E}_0 \sin\omega t$ / $V = V_0 \sin\omega t$ | 1 | 5 |
| | b. | A - Resistor<br>B - Inductor<br>C - Capacitor | 1 | |
| | c. | Phasor diagram (1 Score)<br>$Z = \sqrt{R^2 + (x_L - x_C)^2}$ (1 Score)<br>R - Resistance<br>$x_L$ - Inductive Reactance<br>$x_C$ - Capacitive Reactance } (1 Score) | 3 | |
| 29. | a. | Correct Derivation of<br>$\frac{1}{f} = (n-1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$<br>or<br>figure (1 Score)<br>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 | |

1. Sebastian Mathew
2. MUHAMMED IRSHAD P
3. VINIL KUMAR . T
4. Rafeev M. Nair
5. Sametha. P. S
6. Abdul Hameed. P
7. THOYYIB ABOOBACKER. TP
8. HARIPRASAD. K
9. LEENA PHILIP
10. Pavizha Sreedharan
11. Dr. Augustine Jose. V.F
12. JOSE WILFRED
13. Kavitha. V.G.