

SECOND YEAR HIGHER SECONDARY EXAMINATION JUNE 2018

SUBJECT : PHYSICS

CODE. NO: 2015

Qn No	Sub Qns	Answer Key/Value Points	Score	Total
1.	(i) (ii)	Electric dipole moment Electrical Resistivity OR (ii) Electrical Resistivity only OR (i) Electric dipole moment/distance $\rightarrow \frac{1}{2}$ only	1 1	1 1
2.	iii	2.5 Ω or iii	1	1
3.		$\vec{F} = q_v (\vec{v} \times \vec{B})$	1	1
4.		Zero or (iv)	1	1
5.		$I_1 < I_2 < I_3$	1	1
6.		$3 \frac{h}{2\pi}$ or (iv)	1	1
7.		Solar cell	1	1
8.		equation $r = \frac{mv}{qB}$ Substitution ; $r = \frac{9.11 \times 10^{-31} \times 3 \times 10^7}{6 \times 10^{-4} \times 1.6 \times 10^{-19}}$ Answer $r = 0.285 \text{ m}$ OR only Answer with SI unit	1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	2

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9.	(a)	True	1	2
	(b)	Definitian of Ampere OR SI unit is Ampere give 1/2 score	1	
10		Current flows in clockwise direction OR Figure with correct direction of current OR Lenz's Law only	2 2 1	2
11	(a)	$B_y = B_m \sin(kz - \omega t)$ or $B = B_m \sin(kz - \omega t) \hat{j}$	1	2
	(b)	: Reciprocal of velocity or (iii)	1	
12	(a)	${}^6_6\text{C} \rightarrow {}^5_5\text{B} + e^+ + \bar{\nu}$	1	2
	(b)	${}^{32}_{15}\text{P} \rightarrow {}^{32}_{16}\text{S} + e^- + \bar{\nu}$ OR If (a) ${}^5_5\text{B} \rightarrow \frac{1}{2}$ score (b) ${}^{32}_{16}\text{S} \rightarrow \frac{1}{2}$ score		

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total															
13		<table border="1"> <thead> <tr> <th>A</th> <th>B</th> <th>Y</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> </tr> </tbody> </table>	A	B	Y	0	0	0	0	1	1	1	0	1	1	1	1	$\frac{1}{2} \times 4$	2
A	B	Y																	
0	0	0																	
0	1	1																	
1	0	1																	
1	1	1																	
14		$d_{max} = \sqrt{2Rh}$ $A = \pi d^2 = 2\pi Rh$ $A = 2 \times 3.14 \times 6400 \times 0.1 = 4019 \text{ km}^2$ <p style="text-align: center;">OR</p> $A = 4019 \text{ km}^2 \text{ only give } \frac{1}{2} \text{ score}$	$\frac{1}{2}$ } $\frac{1}{2}$ } $\frac{1}{2}$ }	2															
15.	(a)	The Dipole moment is parallel or antiparallel with the Magnetic field.	$\frac{1}{2}$ } $\frac{1}{2}$ }	2															
	(b)	Dipole Q																	
		<p style="text-align: center;">OR</p> <p style="text-align: center;">Any one correct give 2 score</p>																	

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total
16	(a) (b)	Wheatstone's Principle or (iii) $x = 6 \Omega$, $R = 1.5 \Omega$ $\frac{P}{Q} = \frac{R}{S}$ or $\frac{x}{R} = \frac{l}{100-l}$ OR $\frac{6}{l} = \frac{1.5}{100-l}$ $l = 80 \text{ cm}$ OR $l = 80 \text{ cm}$ only give $\frac{1}{2}$ score	1 1 } 2 1 } 2 2	3 3
17		$T = 2\pi \sqrt{\frac{I}{mB}}$ OR $B = \frac{4\pi^2 I}{mT^2}$ Give 1 score $T = 0.67 \text{ s}$ $B = 0.012 \text{ T}$	1 1 1	3

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total
18		<p>Ray Diagram calculation of angle of incidence and angle of refraction Final result using Snell's law</p> <p>OR</p> <p>Snell's Law $\frac{\sin i}{\sin r} = \frac{n_2}{n_1}$ give 1 score</p>	1 1 1 1	3
19	(a)	<p>Correct graph with threshold frequency</p> <p>OR</p> <p>Graph only with correct X and Y axes</p> <p>OR</p> <p>Correct graph, ^{shape} without X and Y axes give 1 score</p>	2 2 1	3
	(b)	<p>If $\nu < \nu_0$, KE becomes negative</p> <p>OR</p> <p>Einstein's photo electric equation only give 1 score</p>	1	

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total
20	(a)	A	1	3
	(b)	Energy level diagram only 1 score Marking Balmer Series 1 score	1	
		OR correct energy diagram with Balmer Series give 3 score	3	
21	(a)	becquerel (Bq) or Curie (Ci)	1	3
	(b)	$R = \lambda N$ or $R = \frac{0.693}{T_{1/2}} \times N$ $R = 11550 \text{ Bq}$	1 } 2 }	
		OR $\lambda = \frac{0.693}{T_{1/2}}$ only give 1 score	1	
22	(a)	correct circuit diagram	2 }	3
	(b)	$I = I_Z + I_L$	1 }	
		OR Voltage across resistor = 6V Current through the Resistor = 24 mA Series resistance = 250 Ω OR $R = \frac{V}{I}$ give $\frac{1}{2}$ score	1	

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total
23	(a)	$F = \frac{1}{4\pi\epsilon_0} \times \frac{q_1 q_2}{r^2}$	1	4
	(b)	$q = ne \text{ only give } 1 \text{ score}$	2	
		$F = \frac{1}{4\pi\epsilon_0} \frac{q^2}{r^2} \text{ OR } F = \frac{1}{4\pi\epsilon_0} \frac{(ne)^2}{r^2}$		
		$n = 4$	1	
24	(a)	$V = \frac{1}{4\pi\epsilon_0} \frac{q}{r}$	1	4
		$W = qV$	1	
		OR		
		$PE = \frac{1}{4\pi\epsilon_0} \frac{q_1 q_2}{r} \text{ only}$	1	
	(b)	$\therefore V = \frac{1}{4\pi\epsilon_0} \frac{q}{r}$	1	
		$k \frac{q_1}{r} = k \frac{q_2}{15-r}$	2	
		$r = 9 \text{ cm from } 3 \times 10^{-8} \text{ C}$		
		OR Final answer only <u>give</u> <u>1 score</u>		

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total
25	(a)	$I_1 = I_2 + I_3$ <p>OR $\sum I = 0$ OR statement of first law give <u>$\frac{1}{2}$ score</u></p>	1	4
	(b)	statement or equation	2	
	(c)	$-I_2 R_3 - I_1 R_2 - I_1 R_1 + E_1 = 0$	1	
26	(a)	$dB = \frac{\mu_0}{4\pi} \frac{(I d\vec{l} \times \vec{r})}{r^3}$ <p>OR</p> $dB = \frac{\mu_0}{4\pi} (I \frac{d\vec{l} \times \hat{r}}{r^2})$ <p>OR</p> $dB = \frac{\mu_0}{4\pi} \frac{I dl \sin\theta}{r^2}$	1	4
	(b)	<p>Diagram</p> <p>Derivation</p> <p>OR</p> <p>Equation only (for circular loop) give <u>1 score</u></p>	2	

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total
27.	(a)	$X_L = X_C$ $X_L = L\omega$ $X_C = \frac{1}{C\omega}$ <p style="text-align: center;">OR</p> <p>Derivation of $f = \frac{1}{2\pi\sqrt{LC}}$</p>	$\left. \begin{matrix} 1 \\ \frac{1}{2} \\ \frac{1}{2} \end{matrix} \right\} 2$ 2	
	(b)	$Q = \frac{L\omega}{R} \text{ or } Q = \frac{L}{R} \times \frac{1}{\sqrt{LC}}$	1	5
	(c)	$Q = 25$	1	
	(c)	<p>current lags the applied voltage current and applied voltage are in the same phase</p>	1	
	(c)	<p style="text-align: center;">OR</p> <p>Any one correct <u>give 1 score</u></p>		

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total
28	(a)	$f_o + f_e$	1	5
	(b)	Ray diagram of a telescope	2	
	(c)	Any two advantage	2	
29	(a)	Perpendicular	1	5
	(b)	Explanation only OR Figure only give <u>1 score</u>	2	
	(c)	Figure and proof OR (c) Figure only give 1 score	2	

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