INDIAN SCHOOL MUSCAT

FINAL TERM EXAMINATION

NOVEMBER 2018

SET A

CLASS XII

Marking Scheme – PHYSICS [THEORY]

(with split up) 1. $\Phi = \pi/3$ 2. Less wavelength scattered least 3. (i) Spherical (ii) plane OR Width of slit less than or equal to wavelength of light used 4. Neutrinos are charge less and hardly interact with matter 5. 5V OR 1.5 eV 6. Part AB represents repulsive force and Part BCD represents attractive force. 1 Any two charactertics of nuclear force OR Definition of Activity SI unit- Becquerel(= 1 disintegration/second)	Q.NO.	Answers	Marks
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OR Definition of Activity SI unit Bacquarel(= 1 disintegration/second)		r (fm)	1/2, 1/2
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	N_0	1		
7.	Derivation of $v_d = -(e\tau/m)E$ OR	2		
	Graph resistivity vs temperature semiconductor	1		
	With the rise of temperature of semiconductor, number density of free	1		
	electrons increase and hence resistivity decreases			
8.	$K = (1/4\pi\epsilon_0)(2e.Ze/d)$	1		
	$d = 2ze^2/4\pi\epsilon_0 K$			
	$d = (2ze^2/4\pi\epsilon_0 K)$	1		
9.	(i) X-rays used as a diagnostic tool in medicine as a treatment for cancer	1		
10.	(ii) Microwaves- used in radar systems for aircraft navigation $\lambda = q/l$	1		
10.	$q = \lambda l$			
	$\Phi = q/\epsilon_0$	1		
	$\Phi = \lambda l/\epsilon_0$	1		
11.	$V_d = V/(ne\rho l)$			
	(i) when V is halved the drift velocity is halved			
	(ii) when l is doubled the drift velocity is halved	1		
12.	Electric potential due to electric dipole at axial point:-			
	Diagram	1½ 1½		
	Derivation: $V = k p/r^2$			

13.	$U = W_1 + W_2 + W_3$		
	U = -0.630 J (with expression and calculation)	2	
	Work done to dissociate the system of charges $= +0.630 \text{ J}$		
	OB		
	$U_1 = 12 \times 10^{-6} J$	1/2	
	Common potential = 100 V	1	
	$U_2 = 6 \times 10^{-6} J$	1	
	Energy lost = $6 \times 10^{-6} \text{ J}$	1/	
14.) Graphical variation of (BE/A) for nucleons with mass number A .	1/2	
	The variation of binding energy per nucleon versus mass number is shown in figure 9.0 8.0 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1	1½	
	0.0 20 40 60 80 100 120 140 160 180 200 220 240 Mass Number →		
	Three main inferences from graph	11/2	
15.	R/S = 40/60		
	$R/S = 2/3 \dots (i)$	1	
	Equivalent resistance of 12 Ω and S Ω in parallel is (12S/12 +S) Ω		
	R = 12S/12+S(ii)		
	From two equations $S = 6 \Omega$ $R = 4 \Omega$	1/2 , 1/2	
16.	6. Verification of laws of refraction by Huygens' principle:		
	Diagram showing incident and refracted wavefront verification		
17.	Derivation of equivalent emf and equivalent internal resistance		

	$E = (E_1 r_2 + E_2 r_1) / r_1 + r_2$	2
	$R_{eq} = r_1 r_2 / r_1 + r_2$	1
18.	AC Generator:	
		1/
	Working principle	1/2
	Diagram	1
	Derivation for alternating emf	11/2
	OR Transformer:	
	Diagram	
	Working	1/2
	Derivation of expression	1½ 1
		1
19.	Distinguish between diamagnetic and ferromagnetic materials in respect of their (i) intensity of	
	magnetization (ii) behavior in non-uniform magnetic field and	1
	(iii) susceptibility.	1
20.	(i) $X_L = 100 \Omega$	1/2
20.		/2
	$X_{\rm C} = 500 \ \Omega$	1/2
	$Tan\phi = -1$	
	Φ = - $\pi/4$	1/2
	Hence current leads voltage	
	(ii) to make power factor unity	
	$X_{L} = X_{C}$	
	$(1/\omega C') = 100$	
	$C' = 10 \mu F$	1
	$C' = C + C_1$	
	$10 = 2 + C_1$ so $C_1 = 8\mu F$	1/2
21.	Definition of threshold frequency and stopping potential	1/2 , 1/2

	Explanation why wave theory of light is not able to explain photoelectric effect	2
	OR	
	Derivation of $\lambda = (12.27 / \sqrt{V}) A^0$	
	Graph λ vs \sqrt{V}	2 1
22.	Derivation of Lens maker's formula:	
	Ray diagram	1
	Derivation OR	2
	Diffraction through single slit:	
	Ray diagram	1
	Condition and explanation of secondary minima	2
22		
23.	For L_1 $V_1 = 40 \text{ cm}$	1
	For L_2 Image formed by L_1 at the focus of L_2 so after refraction from L_2 light become parallel	
	Distance between L_1 and $L_2 = 60$ cm	1
	For L ₃ Image formed at focus so incident light on L ₃ should be parallel	
	Distance between L_2 and L_3 can have any value	1
2.4		1
24.	(i) High permeability, Low coercivity and Low retentivity (any two)	1
	(ii) $B_H = 2 B$ (with calculation)	2
25.	Definition of electric dipole moment S I unit- C-m	1/2 1/2
	Derivation: Force acting on it	1/2
	Expression of Torque acting on electric dipole	1½
	OR Derivation:	$\begin{vmatrix} 3 \\ 2 \end{vmatrix}$

	energy stored in parallel plate capacitor energ	y density	
26.	 (i) Derivation: Current lags behind applied voltage (ii) Definition of inductive reactance Graph between X_L and f 	OD	3 1 1
	i) Derivation: Current leads the applied voltage (ii) Definition of capacitive reactance Graph between X_C and f	OR	3 1 1
27.	(i) Optical fiber: working with diagram (ii) Derivation of refractive index formula:		1+1
	Ray diagram Derivation (i) Definition of coherent sources Two conditions of sustained interference	OR	1 2 1 1
	(ii) Young's double slit experiment; Diagram Derivation of fringe width		1 2