INDIAN SCHOOL MUSCAT

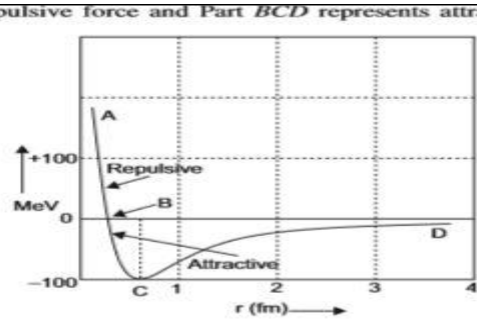
FINAL TERM EXAMINATION

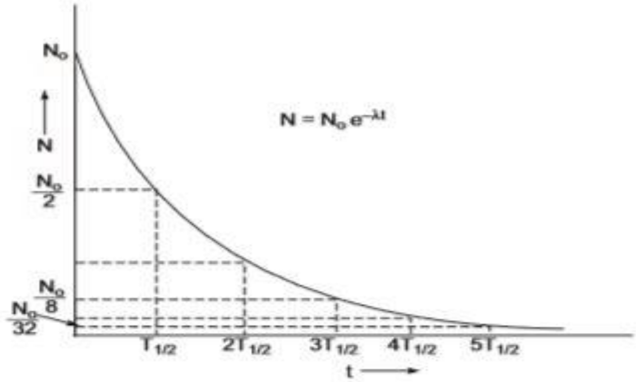
NOVEMBER 2018

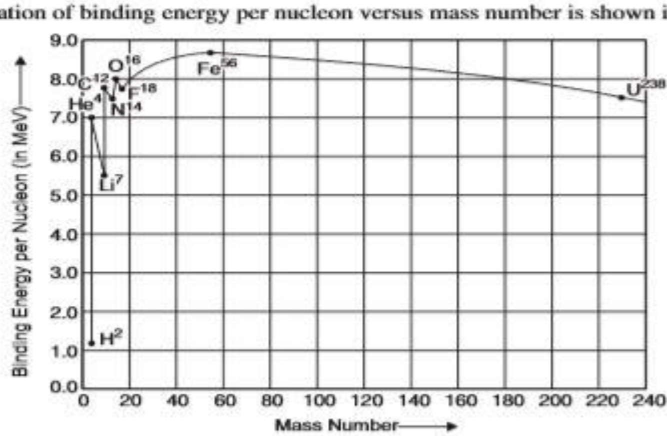
SET A

CLASS XII

Marking Scheme – PHYSICS [THEORY]

Q.NO.	Answers	Marks (with split up)
1.	Φ = π/3	1
2.	Less wavelength scattered least	1
3.	(i) Spherical (ii) plane OR Width of slit less than or equal to wavelength of light used	1
4.	Neutrinos are charge less and hardly interact with matter	1
5.	5V OR 1.5 eV	1
6.	Part *AB* represents repulsive force and Part *BCD* represents attractive force.  Any two charactertics of nuclear force OR Definition of Activity SI unit- Becquerel(= 1 disintegration/second)	1 ½, ½ ½ ½

		1
7.	Derivation of $v_d = -(e\tau/m)E$ OR Graph resistivity vs temperature semiconductor With the rise of temperature of semiconductor, number density of free electrons increase and hence resistivity decreases	2 1 1
8.	$K = (1/4\pi\varepsilon_0)(2e.Ze/d)$ $d = 2ze^2/4\pi\varepsilon_0 K$ $d = (2ze^2/4\pi\varepsilon_0 K)$	1 1
9.	(i) X-rays used as a diagnostic tool in medicine as a treatment for cancer (ii) Microwaves- used in radar systems for aircraft navigation	1 1
10.	$\lambda = q/l$ $q = \lambda l$ $\Phi = q/\varepsilon_0$ $\Phi = \lambda l/\varepsilon_0$	1 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 1
12.	Electric potential due to electric dipole at axial point:- Diagram Derivation: $V = k\,p/r^2$	½ 1½

13.	$U = W_1 + W_2 + W_3$ $U = -0.630$ J (with expression and calculation) Work done to dissociate the system of charges = + 0.630 J OR $U_1 = 12 \times 10^{-6}$ J Common potential = 100 V $U_2 = 6 \times 10^{-6}$ J Energy lost = 6×10^{-6} J	½ 2 ½ ½ 1 1 ½
14.	) Graphical variation of (BE/A) for nucleons with mass number A . The variation of binding energy per nucleon versus mass number is shown in figur  Three main inferences from graph	1½ 1½
15.	R/S = 40/60 R/S = 2/3 ……(i) Equivalent resistance of 12Ω and S Ω in parallel is (12S/12 +S) Ω R = 12S/12+S ………(ii) From two equations S = 6 Ω R = 4 Ω	 1 1 ½ , ½
16.	Verification of laws of refraction by Huygens' principle: Diagram showing incident and refracted wavefront verification	1 2
17.	Derivation of equivalent emf and equivalent internal resistance	

	$E = (E_1 r_2 + E_2 r_1)/ r_1 + r_2$ $R_{eq} = r_1 r_2 / r_1 + r_2$	2 1
18.	AC Generator: Working principle Diagram Derivation for alternating emf OR Transformer : Diagram Working Derivation of expression	 ½ 1 1½ ½ 1½ 1
19.	Distinguish between diamagnetic and ferromagnetic materials in respect of their (i) intensity of magnetization (ii) behavior in non-uniform magnetic field and (iii) susceptibility.	 1 1 1
20.	(i) $X_L = 100\ \Omega$ $X_C = 500\ \Omega$ $\tan\phi = -1$ $\Phi = -\pi/4$ Hence current leads voltage (ii) to make power factor unity $X_L = X_C$ $(1/\omega C') = 100$ $C' = 10\ \mu F$ $C' = C + C_1$ $10 = 2 + C_1$ so $C_1 = 8\mu F$	½ ½ ½ 1 ½
21.	Definition of threshold frequency and stopping potential	½ , ½

	Explanation why wave theory of light is not able to explain photoelectric effect OR Derivation of $\lambda = (12.27/\sqrt{V})\ A^0$ Graph λ vs $\sqrt{V}$	2 2 1
22.	Derivation of Lens maker's formula: Ray diagram Derivation OR Diffraction through single slit: Ray diagram Condition and explanation of secondary minima	 1 2 1 2
23.	For L_1 $V_1 = 40$ cm 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 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 1 1
24.	(i) High permeability , Low coercivity and Low retentivity (any two) (ii) $B_H = 2$ B (with calculation)	1 2
25.	Definition of electric dipole moment S I unit- C-m Derivation : Force acting on it Expression of Torque acting on electric dipole OR Derivation :	½ 1/2 ½ 1½ 3 2

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