CLASS XII : PHYSICS
MARKING SCHEME

SECTION A

1.	d	1
2.	b	1
3.	c	1
4.	b	1
5.	b	1
6.	c	1
7.	b	1
8.	b	1
9.	d	1
10.	b	1
11.	c	1
12.	b	1
13.	b	1
14.	c	1
15.	d	1
16.	c	1

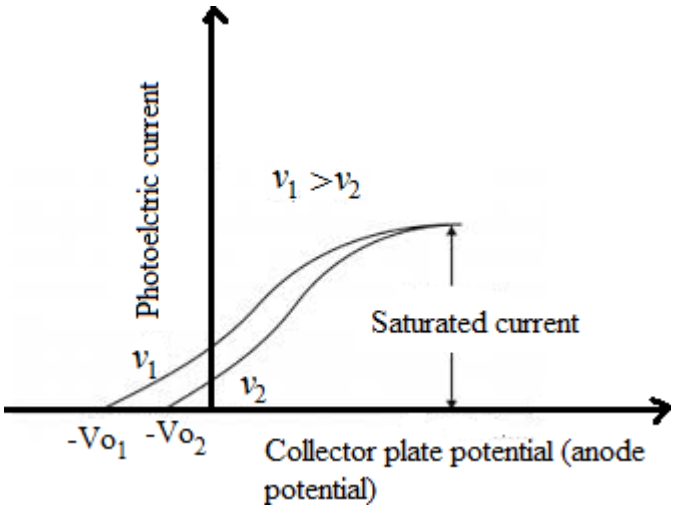
SECTION B

17.	Diagram paramagnetic Diamagnetic	1 1
18.	$E/(12+r) = 0.5$ $E/(25+r) = 0.25$ Solving $r = 1\Omega$ and $E = 6.5$ V	½ ½ 1

19.	(i) For points inside the balloon , E = 0 As the balloon is blown up, surface charge density decreases and so electric field on its surface decreases.	1 1
20.	Interference pattern Diffraction pattern Any two differences OR $y = y_1 + y_2$ $= a \cos \omega t + a \cos (\omega t + \Phi)$ $= 2a \cos \Phi/2 \cos (\omega t + \Phi/2)$ $I = 4a^2 \cos^2 \Phi/2$ $= 4I_0 \cos^2 \Phi/2$	½ ½ ½ ½ ½ ½ ½ ½
21.	Mass of $_{92}U^{238}$ = 238.05079 u Mass of $_{90}Th^{234}$ = 234.043630 u Mass of $_{2}He^{4}$ = 4.002600 u $M(_{92}U^{238}) - [M(_{90}Th^{234}) + M(_{2}He^{4})] = 0.00456$ u Energy released = 0.00456 x 931.5 = 4.24764 MeV	 1 ½ ½

SECTION C

22.	$q = CV$ $CV = 360 \times 10^{-6}$ C $120 \times 10^{-6} = C(V-120)$ $= CV - 120C$ $= 360 \times 10^{-6} - 120$ C $120C = 240 \times 10^{-6}$ $C = 2\mu$ F $V = q/C$ $= 360 \times 10^{-6}/2 \times 10^{-6}$ = 180 V	½ ½ ½ ½ ½ ½
23.	Locus of all points in the state of vibration. Plane Diagram Explanation	½ ½ ½ 1½
24.	a) Gamma ray. For radio therapy, gamma ray astronomy or any other use. b) To protect eyes from UV rays. c) Visible	½ ½ 1

25.	(a) New wave length $\lambda' = \lambda/\mu = 589/1.33 = 442.85$ nm New frequency is the same as the old frequency $\nu = V/\lambda = 3 \times 10^8/589 \times 10^{-9} = 5.09 \times 10^{14}$ Hz New speed $V' = V/\mu = 3 \times 10^8/1.33 = 2.25 \times 10^8$ m/s (b) $P = P_1 + P_2 = 11.5 - 1.5 = 10$ D $F = 1/P = 1/10 = 10$ cm $1/v - 1/u = 1/f$ $u = -15$ cm, $f = +10$ cm substituting and simplifying, $v = +10$ cm.	½ ½ ½ ½ ½ ½
26.	Drift velocity $v_d = eV\tau/ml$ Resistance $R = \rho l/A = \rho l/\pi r^2 = \rho l/\pi(D/2)^2 = 4\rho l/\pi D^2$ (i) v_d becomes double ; R remains same (ii) v_d becomes double ; R becomes half	½ ½ 1 1
27.	 The photoelectric equation in terms of stopping potential V0 is given by $eV_0 = h\nu - h\nu_o$ So, V_0 a ν Thus, Stopping potential will be higher for $\nu 1$.	1 1 ½ ½
28.	(a) Circuit diagram Explanation (b)Graph OR (a) Circuit diagram Graph	1 1 1 ½ ½ 1

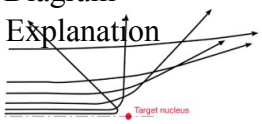
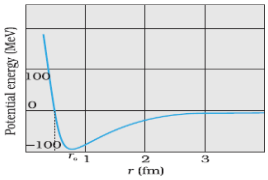
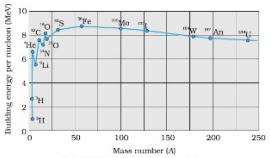
	(b) (i) During forward bias electrons from N side cross depletion layer and reach P side where they are minority carriers and holes from P side reach N side. (ii) The reverse current in a diode depends more on the concentration of minority carriers on either sides of the junction than the magnitude of the applied voltage. Current is independent of applied voltage up to a critical reverse bias voltage. This voltage is reverse break down voltage.	1

SECTION D

29.	(i) c (ii) c (iii) d OR c (iv) a	1 1 1 1
30.	(i) a (ii) c (iii) a OR c (iv) a	1 1 1 1

SECTION E

31	(a) Statement of law Diagram Derivation (b) Field at the centre (c) Diagram Right hand thumb rule OR (a) Diagram Principle Equation and explanation (b) Radial field for maximum and uniform torque (c) Ideal voltmeter has infinite resistance and ideal ammeter has zero resistance	1 ½ 1½ 1 ½ ½ ½ ½ 1+1 1 1
32	(a) Capacitor. $Xc = 1/C\omega$ (b) Graph for capacitor (c) Reactance decreases with frequency Graph (d) Phasor diagram OR (a) Proof (b) (i) $f = 100$, $L\omega = 20$	1 1 1 1 1 2

	L x $2\pi\nu = 100$ L = 0.032 H (ii) Max power dissipation occurs at resonance. $L\omega = 1/C\omega$ $C = 1/L\omega^2$ Substituting and simplifying C = 8.84μ F	½ ½ ½ ½ 1
33	(a) Diagram (b) Explanation  (c) (d) Impact parameter decides how close an alpha particle reaches the nucleus before scattering begins. Solution worked out example 12.2 NCERT. Formula Substitution and simplification OR (a)  Potential energy of a pair of nucleons as a function of their separation. (b)Graph  The binding energy per nucleon as a function of mass number. (c)Short range of nuclear force Explanation of fission Explanation of fusion	1 1 1 ½ ½ 1 1 1 1 1 1