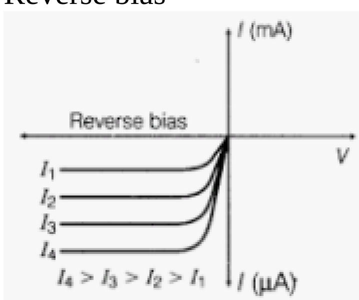
Roll Number		

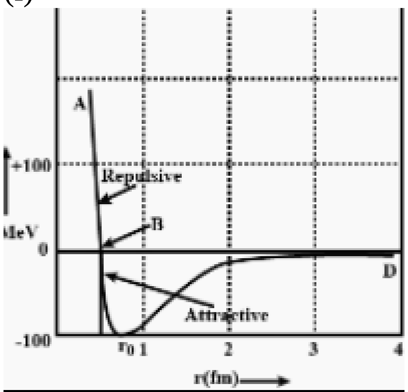
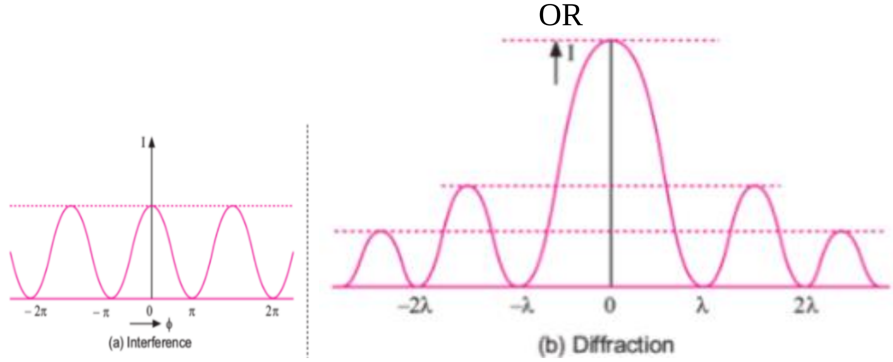
SET B

INDIAN SCHOOL MUSCAT
SECOND PRE - BOARD EXAMINATION
PHYSICS(042)

CLASS: XII TERM 2 Max.Marks: 35

MARKING SCHEME			
SET	QN.NO	VALUE POINTS	MARKS SPLIT UP
	1	Photodiode Reverse bias 	½ ½ 1
	2	(i) For a given metal and frequency of incident radiation, the number of photoelectrons ejected per second is directly proportional to the intensity of incident radiation. (ii) Maximum kinetic energy of the emitted photo electron is independent of the intensity of incident radiations. (i) Emission of photoelectrons is instantaneous. OR According to Bohr's second postulate $mvr_n = \frac{nh}{2\pi}$ $2\pi r_n = \frac{nh}{mv}$ ut $\frac{h}{mv} = \frac{h}{p} = \lambda$ $2\pi r_n = n\lambda$	Any two (1+1) 1+1
	3	(i) Diffusion, drift (ii) Definition-barrier potential	½+1/2 1
	4	(i) ray diagram of an astronomical telescope for the final image formed at least distance of distinct vision.	2

		(ii) because large **focal length enhances the magnifying power of the telescope** and large aperture help in collecting large amount of light coming from the object so that a bright image is obtained. OR (i) labelled ray diagram of a reflecting type telescope. (ii) two reasons to explain why a reflecting telescope is preferred over a refracting telescope.	½+1/2 2 ½+1/2
	5	(i) working principle of a solar cell (ii) three basic processes involved in the generation of emf- explanation (ii) The energy for the maximum intensity of the solar radiation is nearly equals to 1.5 eV. So, to obtain the photo excitation the energy radiation ($h\nu$) must be greater than the energy band gap (E_g). semiconductors with band gaps close to 1.5 eV are ideal materials for the fabrication of solar cells. Since Si and GaAs have band gaps of 1.1 eV and 1.53 eV, they are preferred for making solar cells.	½ 1 ½ 1
	6	(i) No, all the emitted photoelectrons do not have same K.E. The reason is that different electrons are bound with different forces in different layers of metals. More tightly bound electron will emerge with less K.E. (ii) No, kinetic energy of the emitted electrons does not depend on the intensity of incident radiation. (iii)number of emitted photoelectrons depends on intensity of incident radiation provided that energy $h\nu > W$	1 1 1
	7	a ray diagram for image formation of a point object by a thin double convex lens having radii of curvature R_1 and R_2 Len's maker's formula derivation	1 2
	8	(i) $r_n = \frac{\varepsilon_0 h^2 n^2}{\pi m e^2} \propto n^2$ For I excited state, n = 2 For ground state, n =1 $\therefore r_2/r_1 = 4/1$ **(ii)** (2) The atom radiates energy only when an electron jumps from one stationary orbit of higher energy to another of lower energy $E_2 - E_1 = h\nu$ or $\nu = (E_2 - E_1)/h$. (iii)	½ ½ 1

		$r = \frac{Ze(2e)}{4\pi\epsilon_0 (kE)}$ when KE is doubled $r' = \frac{Ze(2e)}{4\pi\epsilon_0 (2kE)} = \frac{1}{2} r$	1
	9	(i)  (iii) $R=R_0A^{1/3}$ (iv) Getting the answer 6Fermi	2 Any two (1/2+1/2)
	10	Wavefront definition figure showing the propagation of a plane wave refracting at a plane surface separating two media when light passes from a rarer to a denser medium. verify Snell's law of refraction.	½ 1 1 ½
	11	(i) (a)microwaves (b) X-rays (ii) $k=300\pi$ $2\pi/\lambda=300\pi$ $\lambda=1/150$m (iii) any 2 properties of em waves OR  	½ + ½ 1 ½+ ½ 1+1

<table>
<tr><td></td><td></td><td>Differences between interference and diffraction
<table><tr><th>Interference</th><th>Diffraction</th></tr><tr><td>(i) It is due to the superposition of two waves coming from two coherent sources.</td><td>(i) It is due to the superposition of secondary wavelets originating from different parts of the same wavefront.</td></tr><tr><td>(ii) The width of the interference bands is equal.</td><td>(ii) The width of the diffraction bands is not the same.</td></tr><tr><td>(iii) The intensity of all maxima (fringes) is same.</td><td>(iii) The intensity of central maximum is maximum and goes on decreasing rapidly with increase in order of maxima.</td></tr></table></td><td>½ + ½</td></tr>
<tr><td></td><td>12</td><td>(i) (b) 1.5×10^{8} m s^{-1}
(ii) (b) $n_1 > n_2$
(iii) (c) 90°
(iv) (d) is incident at an angle greater than the critical angle
(v) (d) All of these</td><td>1mark each
Total 5marks</td></tr>
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