SURE SHORT QUESTIONS FOR CLASSXII (PHYSICS) <u>2 MARKS QUESTIONS</u>

1	A point charge is placed at the centre of spherical Gaussian surface. How will electric flux ϕ_E change if
	(i) The sphere is replaced by a cube of same or different volume.
	(ii) A second charge is placed near, and outside, the original sphere,
	(iii) A second charge is placed inside the sphere, and
	(iv) The original charge is replaced by an electric dipole?
	Ans. (i) doesn't change . ϕ_E independent of shape / size
	(ii) doesn't change ,
	(iii) change ,
	(iv) zero
2	A parallel plate capacitor with plates of area A and separation d is charged to a potential difference V and the battery used to charge is disconnected. A dialectric slab of thickness d and
	difference v and the battery used to charge is disconnected. A dielectric slab of thickness a and dielectric constant K is now placed between the plates. Explain changes, if any in the charge
	notential difference canacitance electric field and energy stored in the canacitor
	Ans. (i) g remains unchanged
	(ii) V decreases
	(iii) C increases $C \propto \frac{1}{V}$
	(IV) $E =$
	(v) $U = -qV^2$, decreases
	-
3	An electric dipole is held in uniform electric field
	(i) Show that no translator force \swarrow
	acts on it. d/θ
	(ii) Derive an expression for he $\int_{\Theta} E$
	torque acting on it
	Ans. Force on +q charge=qE along direction of E $d \sin \theta$
	Force on $-q$ charge $=qE$ opposite to E
	$F_{net}=qE-qE=0$ The forces are equal in magnitude encoded in direction exting at different points
	therefore they form a couple which rotates the dipole
	Torque $\tau = F \times nern \ distance$
	$\tau = F \times dsin\theta = aE \times dsin\theta = (ad)Esin\theta$
	$[\tau = nF\sin\theta \ Or \ \vec{\tau} = \vec{n} \times \vec{F}]$
	$\begin{bmatrix} t - p \\ D \\ S \\ t \\ 0 \end{bmatrix}$
4	1. How does the resistivity of (i) a conductor and (ii) a semiconductor vary with
	temperature? Give reasons.
	Ans: $\mathbf{o} = \frac{m}{m} \rightarrow \mathbf{o} \mathbf{a} \frac{1}{m}$ and $\mathbf{o} \mathbf{a} \frac{1}{m}$
	$ne^2 \tau$ n τ





	Ans.						
	(a) Since $Z = \sqrt{R^2 + X_L^2}$						
	When number of turns of the inductor gets reduced $X_{L}\xspace$ and Z decreases and in turn						
	current increases Hence the bulb will grow more brightly						
	(b) When capacitor is included in the circuit $\frac{7}{\sqrt{p^2 + (x - x)^2}}$						
	$Z = \sqrt{R^2 + (X_L - X_C)^2}$						
	But $X_L = X_C$ (given) $\Rightarrow Z = R$ (minimum)						
	Hence brightness of the bulb will become maximum.						
11	What are optical fibres? Give their one use?						
	Ans. Optical fibres consist of thin and long strands of fine quality glass or quartz coated						
	with a thin layer of material of refractive index less than the refractive index of strands.						
	They work on the principle of total internal reflection so they do not suffer any loss.						
	Uses						
	The optical fibres are used in medical investigations i.e. one can examine the inside view						
	of						
	stomach and intestine by a method called endoscopy.						
12	In young's double slit experiment how is the fringe width change when						
	(a) Light of smaller frequency is used						
	(b) Distance between the slits is decreased?						
	Ans.						
	$\beta = \frac{D\lambda}{\Delta}$						
	d If light of smaller frequency is of higher wavelength is used the fringe width will						
	increase. (b) If distance between the slits is decreased						
	i.e. $\beta \alpha \frac{1}{\alpha}$ Fringe width will increase						
	$\frac{d}{d}$. This e which will increase.						
13	Suppose the electric field part of an electromagnetic wave is given by $F = (3 \not P N/C) \cos \left[(1.8 \text{ rad/m}) \text{ v} + (5.4 \text{ X}10^6 \text{ rad/s}) \text{ t} \right] \text{ i}$						
	(i) What is the direction of propagation?						
	(ii) what is the wavelength λ ?						
	(111) what is the frequency ν ? (iv) what is the amplitude of the magnetic field part of the wave?						
	Ans. (i) - j (ii) $\lambda = 3.5$ m						
	(iii) $\nu = 86 \text{ X } 10^6 \text{ H}_Z$						
	(iv) $B = 10^{-1} \cos \left[(1.8 \text{ rad/m}) \text{ y} + (5.4 \text{ X} 10^{\circ} \text{ rad/s}) \text{ t} \right]$						

14	Write two points of difference between interference and diffraction?					
	Ans.	Interference	Diffraction			
	1	Interference occurs due to superposition of light coming from two coherent sources.	It is due to the superposition of the waves coming from different parts of the same wavefront.			
	2	All bright fringes are of equal intensity	The intensity of bright fringes decreases with increasing distance from the central bright fringes.			
15	How the angular separation and visibility of fringes in Young will's double slit experiment change when (i) screen is moved away from the plane of the slits, and (ii) width of the source slit is increased? Ans . (i) Angular separation = $\beta/D = \lambda/d$ It is independent of <i>D</i> ; therefore, angular separation remains unchanged if screen is moved away from the slits. But the actual separation between fringes $\beta = D\lambda/d$ increases, so visibility of fringes increases. (ii) When width of source slit is increased, then the angular fringe width remains unchanged but fringes becomes less and less sharp: so visibility of fringes decreases.					
	the co	ndition s/S = λ /d is not satisfied, the interval of the set of t	erference pattern disappears.			
16	Draw a the re Ans: Ra Advan (<i>i</i>) It is (<i>ii</i>) Its	a labelled ray diagram of a reflecting te fracting telescope. ay diagram FIGURE 9.33 So teles tages: free from chromatic and spherical aber resolving power is greater than refracti	lescope. Mention its two advantages over			
	mirror	·.				
17	State the laws of photoelectric emission. Ans. Laws of photoelectric emission. On the basis of the experimental results on photoelectric effect, Lenard and Millikan gave the following laws of photoelectric emission:					

	 For a given photosensitive material and frequency of incident radiation, (above the threshold frequency), the photoelectric current is directly proportional to the intensity of light. The saturation current is directly proportional to the intensity of incident radiation. For a given photosensitive material, there exists a certain minimum cut off frequency below which no photoelectrons are emitted, howsoever high is the intensity of incident radiation. This frequency is called threshold frequency. Above the threshold frequency, the stopping potential or equivalently the maximum kinetic energy of the photoelectrons is directly proportional to the frequency of incident radiation, but is independent of its intensity. The photoelectric emission is an instantaneous process. The time lag between the incidence of light radiation and the emission of photoelectrons is very small, even less than 10⁻⁹ s.
18	Assume that the frequency of the radiation incident on a metal plate is greater than its threshold frequency. How will the following change, if the incident radiation is doubled? (1) Kinetic energy of electrons (2) Photoelectric current Ans. (1) If the frequency of the incident radiation is doubled $hv - hv_0$ is increased, hence kinetic energy is increased. (2) If the frequency of the incident radiation is doubled there will be no change in the number of photoectrons i.e. photo electronic current.
19	An electron and an alpha particle have the same De Broglie wavelength associated with them? How are their kinetic energies related to each other? Ans. $\lambda = \frac{h}{mv} \text{ or } mv = \frac{h}{\lambda}$ $K.E = \frac{P^2}{2m}$ $\Rightarrow K.E(E') = \frac{h^2}{2m\lambda^2}(2)$ $K.E = \frac{P^2}{2m}$ $\Rightarrow \frac{(K.E.) \text{ electron}}{(K.E.) \text{ alpha}} = \frac{m\alpha}{me} \left(\because \lambda = \frac{h}{P} \right)$ is same
20	State the limitations of Bohr's atomic model? Ans. (1) It does not give any indication regarding the arrangement and distribution of electrons in on atom. (2) It could not account for the wave nature of electrons.



	Ans. In figure (i) D1 and D2 are forward biased							
	$\Rightarrow I = V/_R = 2/_{20} = 0.1A$							
	In figure (ii) D1 is forward biased but D2 is reverse biased due to which D1 & D2 offers							
	infinite resistance							
	$\therefore I = 0$							
25	In the given block di	iagram of a receiver	identify the boxes labe	lled as X and Y also wri	te			
	their functions.							
	\vee							
	Receiving	Amplifier	X Detect	or V Outr	hit			
	Antenna I	Received	Dettet		/ut			
		Signal						
	Signal Ana: V is Intermediate frequency (IE) stage V is never emplifier							
	Ans: A is intermediate frequency (IF) stage, Y is power amplifier							
	amplifier onbances the strength for the signals							
26	amplifier enhances the strength for the signals.							
20.	Ans: (i) The transmi	sinying the need of I	cy signal needs antenny	a of height 4 - 5 km which	h			
	is impossible to	construct So there is	a need to modulate the x	vave in order to reduce t	the			
	height of antonn	e to a reasonable hai	whet	wave in order to reduce t	inc			
	(ii)Effective pou	a to a reasonable ner	giii. na far law wavalanath	or high fragueness wave	•			
	(11)Effective power radiated by antenna for low wavelength or high frequency wave as (10^{2})							
27	$pu(1/\lambda)$.	norked 'P' and 'O' in the	given circuit Write the tru	th table for the combination				
27.	Identify the logic gates i		given encunt. write the tru	the comomation.				
	A							
			$Q \longrightarrow X$					
	E	, L						
	Ans. P in NAND Gate as	nd Q is OR Gate						
	Truth table :				-			
	A	В	AB	B + AB				
	0	0	1	1]			
	0	1	1	1				
	1	0	1	1				
	1	1	0	1]			
28.	State Kirchhoff s rules	. Explain briefly how t	hese rules are justified.					
	Sol. Kirchoff's Current	t (Junction) rule: At ar	y junction, the sum of th	e currents entering the				
	junction is equal to the sum of current leaving the junction. When currents are steady, there is no accumulation of charge at any junction or at any point in a line. This is based on the conservation							
	of charge.							
	in any closed loop involving resistors and cells is zero. This law is based on the conservation of							
	energy.							