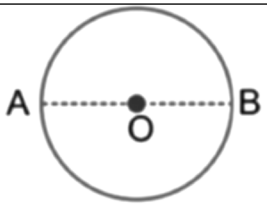
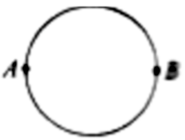
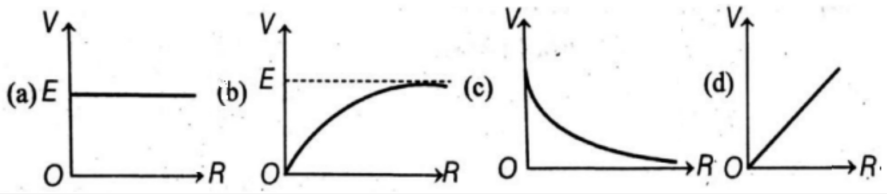
Pre-Board Examination : 2025-26

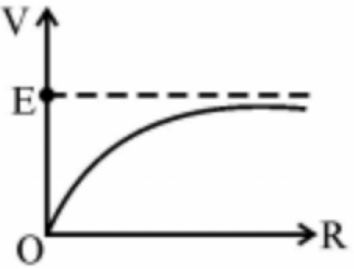
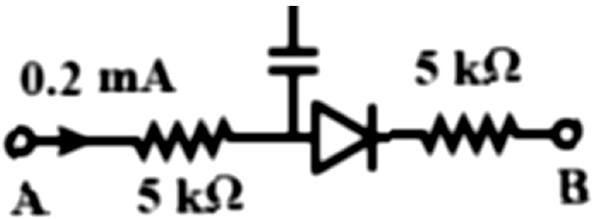
Sub : Physics

(The figures in the margin indicate full marks for the questions)

Time – 3 hours Full marks-70

Section A (Each question carries 1 mark)	
1	The threshold frequency for a photosensitive metal is 3.3×10^{14} Hz. If light of frequency 8.2×10^{14} Hz is incident on this metal, the cut-off voltage for the photoelectron emission is nearly (a) 1 V (b) 2 V (c) 3 V (d) 5 V
Ans	According to Einstein's photoelectric equation $eV_0 = h\upsilon - h\upsilon_0$ where, υ = Incident frequency υ_0 = Threshold frequency V_0 = Cut-off or stopping potential or $V_0 = \frac{h}{e}(\upsilon - \upsilon_0)$ Substituting the given values, we get $V_0 = \frac{6.63\times10^{-34}(8.2\times10^{14} - 3.3\times10^{14})}{1.6\times10^{-19}} \approx 2\text{ V}$

2	 A wire of resistance 12Ω/m is bent to form a complete circle of radius 10 cm. The resistance between its two diametrically opposite points A & B as shown in figure is (a) 3 Ω (b) 6 π Ω (c) 6 Ω (d) 0.6πΩ
Ans	Total length of wire = $2\pi r = 2\pi\times10\times10^{-2} = 2\pi\times10^{-1}$ m Total resistance = $2\pi\times10^{-1}\times12\ \Omega$ $\therefore$ Resistance of each part = $\frac{2\pi\times12\times10^{-1}}{2}$ $=1.2\,\pi\Omega$  As two are parts in parallel $\therefore R_e = \frac{R}{2} = 0.6\ \pi\Omega$
3	A cell of emf E and internal resistance r is connected across a variable external resistance R. The graph of terminal potential difference V as a function of R is 

Ans	$V = IR = \frac{E}{R+r}R = \frac{E}{1+\frac{r}{R}}$ $R = 0,\ V = 0$ $R = \infty\ V = E$ 
4	The impurity atoms to be doped in pure silicon to form p-type semiconductor are, of (a) phosphorus (b) germanium (c) antimony (d) aluminium
Ans	ATrivalent impurity - Aluminium
5	In the circuit shown in figure, if the diode forward voltage is 0.3 V, the voltage difference between A and B is  (a) 1.3 V (b) 2.3 V (c) 0 (d) 0.5 V

Ans	Let us the potential difference between A and B is V_{AB} . Then, $V_{AB} - 0.3 = [(r_1 + r_2)\,10^3] \times (0.2 \times 10^{-3})$ $= [(5+5)\,10^3] \times (0.2 \times 10^{-3})]$ $= 10 \times 10^3 \times 0.2 \times 10^{-3} = 2$ $\Rightarrow V_{AB} = 2 + 0.3 = 2.3$ V
6	The ratio of energies of the hydrogen atom in its first to second excited state is…….. (a) 1 : 4 (b) 4 : 1 (c) 4 : 9 (d) 9 : 4
Ans	The energy E_n of an electron in the n-th orbit is given by the formula: $$E_n = -\frac{13.6Z^2}{n^2} \text{ eV}$$ For a hydrogen atom ($Z = 1$), $E_n \propto \frac{1}{n^2}$ $$\frac{E_1}{E_2} = \frac{\frac{1}{n_1^2}}{\frac{1}{n_2^2}} = \frac{n_2^2}{n_1^2} = \frac{3^2}{2^2} = \frac{9}{4}$$
7	If the focal length of objective lens is increased, then magnifying power of (a) microscope will increase but that of telescope decrease (b) microscope and telescope both will increase

	(c) microscope and telescope both will decrease (d) microscope will decrease but that of telescope will increase
Ans	Magnifying power of microscope $= \frac{LD}{f_0 f_e} \propto \frac{1}{f_0}$ Hence with increase f_0 magnifyig power of microscope decreases. Magnifying power of telescope $= \frac{f_0}{f_e} \propto f_0$ Hence with increase f_0 magnifying power of telescope increases. Ans- (d)
8	The angle between electric field and equipotential surface is (a) 90^0 always (b) 0^0 always (c) 0^0 to 90^0 (d) 0^0 to 180^0
Ans	The electric field is always normal (perpendicular) to the equipotential surface at every point, making the angle between them 90^0.
9	The S I unit of inductance is (a) Farad (b) Henry (c) weber (d) Tesla

Ans	Ans-(b)
10	The permeability of a magnetic material is 0.9983. Name the type of magnetic materials it represents. (a)Paramagnetic (b)Ferromagnetic (c)Diamagnetic (d) all of above
Ans	Ans- (c) Magnetic materials are classified based on their relative permeability (μ_r), which describes how a material responds to an external magnetic field compared to a vacuum (μ_r=1) Diamagnetic Materials: These substances have a relative permeability slightly less than 1 ($\mu_r < 1$). Since 0.9983is less than 1, the material is diamagnetic. Physical Behavior: Diamagnetic materials are weakly repelled by magnetic fields and have a small negative magnetic susceptibility. A common example of a material with a permeability of 0.9983 is Bismuth.
11	Out of the following options which one can be used to produce a propagating electromagnetic wave? (a) A charge less particles (b) An accelerating charge

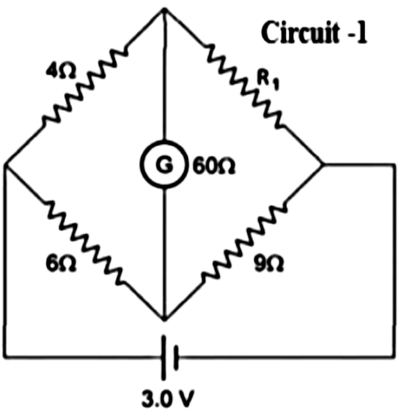
	(c) A charge moving at constant velocity (d) A stationary charge
Ans	Ans-(b) Electromagnetic (EM) waves are generated by accelerating electric charges. According to Maxwell's equations, an accelerating charge creates a time-varying electric field, which in turn induces a time-varying magnetic field. These oscillating, mutually perpendicular fields self-perpetuate and propagate through space as an electromagnetic wave.
12	A proton and a deuteron are accelerated through the same accelerating potential, value of de-Broglie wavelength of (a) proton greater than deuteron (b)deuteron greater than proton (c) deuteron and proton have same (d) none of the above

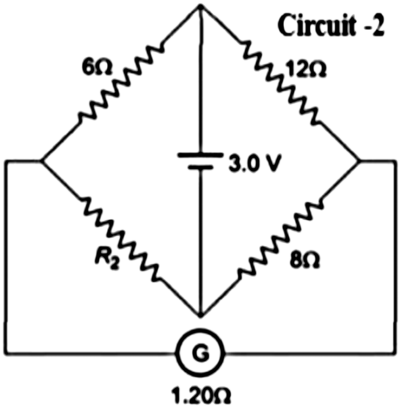
Ans	de Broglie wavelength is given by $\lambda = \frac{h}{\sqrt{2mqV}}$ As mass of proton < mass of deuteron and $q_p = q_d$ and V is same. $\Rightarrow \lambda p > \lambda_d$ for same accelerating potential
13	(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion. (b) If both Assertion and Reason are true but Reason is not the correct of Assertion. (c) If Assertion is true but Reason is false. (d) If both Assertion and Reason are false. **Assertion:** Thin films such as soap bubble or a thin layer of oil on water show beautiful colours when illuminated by white light. **Reason:** It is due to interference of sun's light reflected from upper and lower surfaces of the film.
Ans	The correct option is (c). **Explanation:** The beautiful colours are seen on account of interference of light reflected from the upper and the lower surfaces of the thin film. As conditions for constructive and destructive interference depend upon the wavelength of light,

	coloured interference fringes are observed.
14	**Assertion:** Two parallel conducting wires carrying currents in same direction, come close to each other. **Reason:** Parallel wires carrying currents in same direction repel and Parallel wires carrying currents in opposite direction attract.
Ans	**Correct Answer - A** The current carrying wires are electrically neutral. Hence the only interaction between wires is of attractive magnetic force. But in parallel beams of electrons both the beams have negative charge. Hence there is electrostatic repulsion and also magnetic attraction.Electrostatic repulsion has larger magnitude then magnetic attraction.Hence the beams repel.
15	**Assertion (A)**: On increasing the intensity of light the photocurrent increases. **Reason (R):** The photocurrent increases with increase of frequency of light.
Ans	Ans- (c) **Assertion (A) is true, but Reason (R) is false.**

	Explanation **Assertion (A) is true**: In the photoelectric effect, intensity of light represents the number of photons hitting the surface per unit area per unit time. Since one photon typically ejects one electron (provided frequency is above the threshold), increasing the intensity increases the number of emitted photoelectrons, thereby increasing the photocurrent. **Reason (R) is false**: The photocurrent is generally independent of the frequencyof incident light once it is above the threshold frequency. Increasing the frequency increases the kinetic energy (speed) of individual photoelectrons but does not increase the number of electrons emitted per second, which is what determines the current.
16	**Assertion (A)**: If a convex lens is kept in water, its convergence power decreases. **Reason (R):** The refractive index of convex lens relative to water is less than that relative to air.

Ans	(a) Both A and R are true and R is the correct explanation of A he focal length of a lens in a medium of refractive index μ_m is given by $$\frac{1}{f_m} = \left(\frac{\mu - \mu_m}{\mu_m}\right)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$$ where μ is the refractive index of glass. In air $\frac{1}{f_a} = (\mu - 1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$ From these two expressions it is clear that $f_m > f_a$, That is the focal length of the convex lens in water increases thereby reducing its convergent power.
Section B(Each question carries 3 marks)	
17	Figure shows two circuits each having a galvanometer and a battery of 3 V. When the galvanometers in each arrangement do not show any deflection, obtain the ratio R_1/R_2.





Ans

In the first balanced bridge circuit, the resistances are typically arranged such that: $\frac{4}{R_1} = \frac{6}{9}$

Solving for R_1: $R_1 = \frac{4 \times 9}{6} = 6\,\Omega$

In the second circuit, the galvanometer and battery interchanged

$\frac{12}{8} = \frac{6}{R_2}$

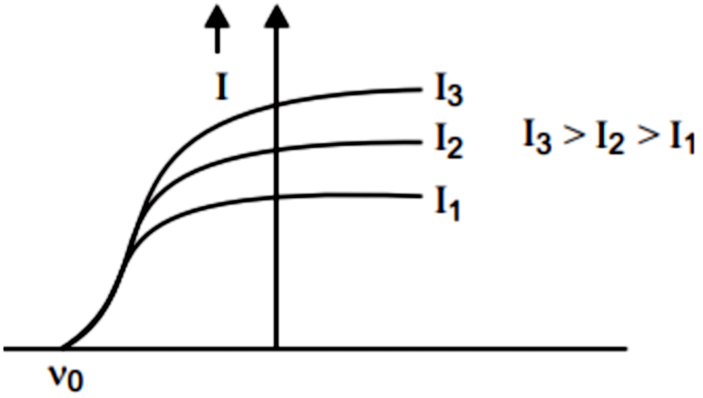
Solving for R_2: $R_2 = \frac{6 \times 8}{12} = 4\,\Omega$

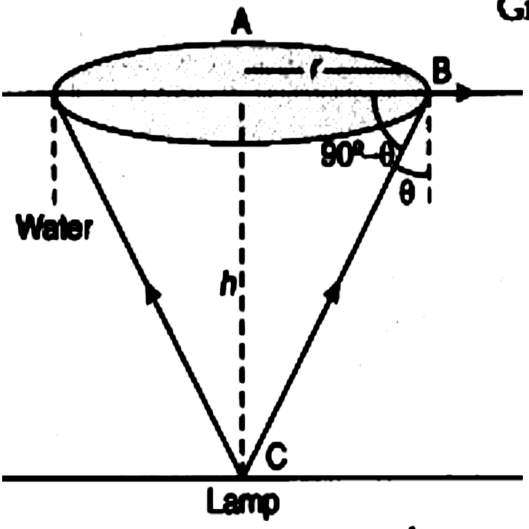
The ratio of R_1 to R_2 is found by

$$\frac{R_1}{R_2} = \frac{6\,\Omega}{4\,\Omega} = \frac{3}{2}$$

18 What role does infra-red radiation play in (i) maintaining the earth's warmth and (ii)

	physical therapy?
Ans	**Maintaining the Earth's Warmth** (The Greenhouse Effect) **Absorption and Re-emission:** The Earth's surface absorbs visible light from the sun and re-radiates this energy as long-wavelength infrared radiation (heat). **Atmospheric Trapping**: Greenhouse gases, such as water vapor and carbon dioxide, trap this IR radiation, preventing it from escaping directly into space. **Temperature Regulation**: This process keeps the Earth's average temperature stable and prevents it from dropping too low, especially at night. **ii) Role in Physical Therapy** **Deep Tissue Heating**: Infrared lamps and pads emit infrared radiation that penetrates skin tissues, generating warmth deep within the body. **Pain Relief:** The heat increases blood flow, relaxes muscles, reduces spasms, and alleviates pain associated with strains and injuries. **Improved Healing:** Enhanced circulation facilitates nutrient delivery and waste removal, accelerating tissue healing and reducing inflammation.
19	(i) Draw a graph showing variation of photo-electric current (I) with anode potential (V) for different intensities of incident radiation. Name the characteristic of the incident radiation that is kept constant in this experiment.

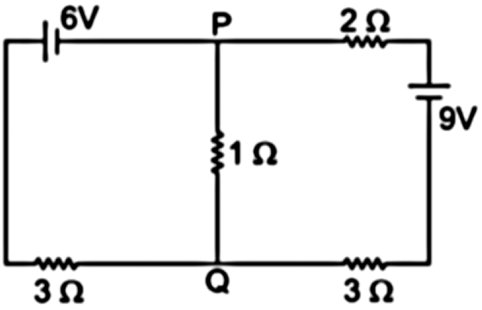
Ans	(a) The frequency of incident radiation was kept constant.  (b) de-Broglie wavelength, $\lambda = \frac{h}{\sqrt{2mqV}} \propto \frac{1}{\sqrt{V}}$ If potential difference V is doubled, the de-Broglie wavelength is decreased to $1/\sqrt{2}$ times.
20	(A) Distinguish between diamagnetic and ferromagnetic material. OR (B) Show diagrammatically the behaviour of magnetic field lines in the presence of (i) paramagnetic and (ii) diamagnetic substances. How does one explain this distinguishing feature?

21	(A) What is total internal reflection? Write the conditions for total internal reflection OR (B) A small bulb is placed at the bottom of a tank containing water to a depth of 80 cm. What is the area of the surface of water through which light from the bulb can emerge out? Refractive index of water is 4/3.
Ans	**In right angled triangle ABC,** $\therefore \tan(90^\circ - \theta) = \frac{h}{r} \Rightarrow \cot\theta = \frac{h}{r}$ ....(i) **where h is the depth of water and r is the radius of a water surface.**  Given : $\mu = \frac{4}{3}$, $h = 80\text{ cm} = 0.8\text{ m}$ $\mu = \frac{1}{\sin\theta}$ $\sin\theta = \frac{3}{4}$ ....(ii) $\cos\theta = \frac{\sqrt{7}}{4}$ $\tan\theta = \frac{3}{\sqrt{7}}$ From eqn. (i), $\cot\theta = \frac{h}{r} \Rightarrow \frac{\sqrt{7}}{3} = \frac{0.8}{r}$ **Surface area (A) $= \pi r^2 = 3.14 \times 0.9^2 = 2.5\text{ m}^2$**
Section C(Each question carries 3 marks)	

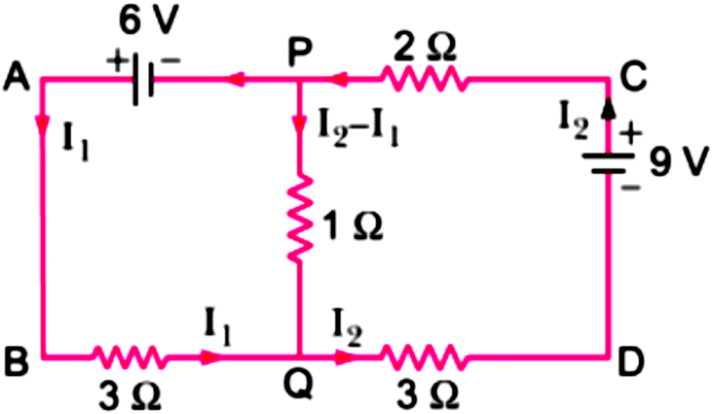
22	(A) Which two of the following lenses L_1, L_2 and L_3 will you select as objective and eyepiece for constructing best possible (i)telescope (ii) microscope? Give reason to support your answer. (B) In a Young's double-slit experiment the fringe width is found to be 0.4 mm. If the whole apparatus is dipped in water of refractive index 4/3, without disturbing the arrangement, Find the value of new fringe width.
Ans	(A) (i) Telescope L_2 : objective L_3 : eyepiece **Reason** : Light gathering Power and magnifying power will be larger. (ii) Microscope

Lens	Power (P)	Aperture (A)
L_1	6 D	1
L_2	3 D	8
L_3	10 D	1

	L_3 : objective L_1 : eyepiece **Reason** : Angular magnification is more for short focal length of objective and eyepiece. (B) The formula for the fringe width is: $\beta = \frac{\lambda D}{d}$ $\therefore \beta \propto \lambda$ We also know that the wavelength is inversely proportional to the refractive index of the medium. So, $\lambda' = \frac{\lambda}{\mu} = \frac{\lambda}{\frac{4}{3}} = \frac{3\lambda}{4} \Rightarrow \frac{\lambda'}{\lambda} = \frac{3}{4}$ So, the ratio can be obtained as: $\frac{\beta'}{\beta} = \frac{\lambda'}{\lambda}$ $\Rightarrow \frac{\beta'}{0.4} = \frac{3}{4} \Rightarrow \beta' = 0.3 \text{ mm} \left[\text{Given } \beta = 0.4 \text{ mm}\right]$
23	An ac source of voltage $V = V_0 \sin \omega t$ is connected to a series combination of L, C and R. Use the phasor diagram to obtain expressions for impedance of the circuit and phase angle between voltage and current.
24	Find the magnitude and direction of current in 1Ω resistor in the given circuit.



Ans



For the mesh APQBA

$$-6-1(I_2-I_1)+3I_1=0$$

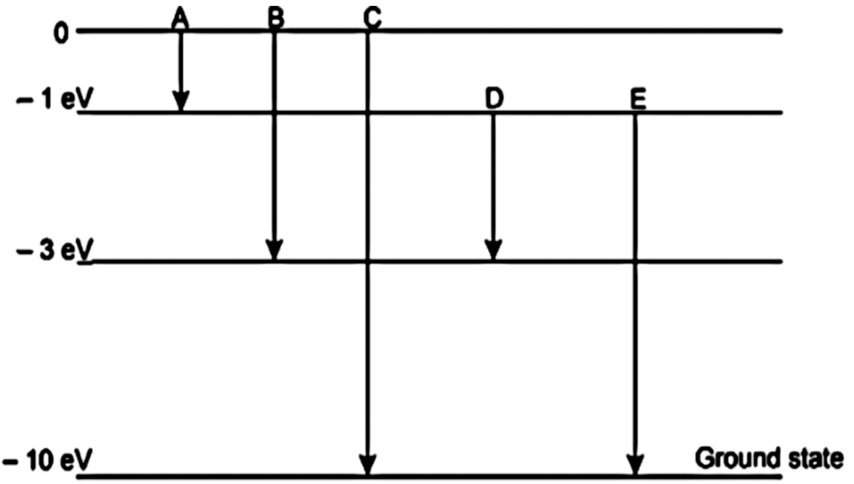
$$\Rightarrow -I_2+4I_1=6 \ldots \textbf{(1)}$$

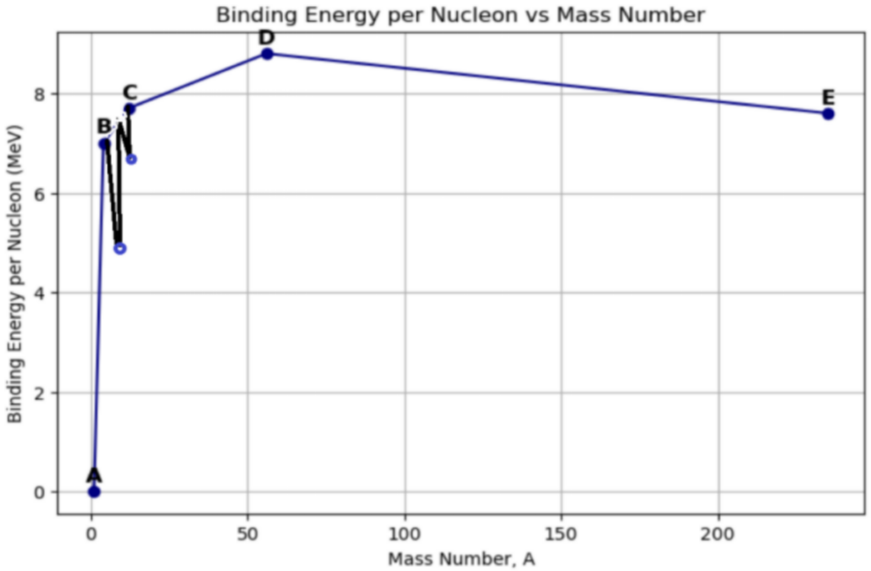
For the mesh PCDQP

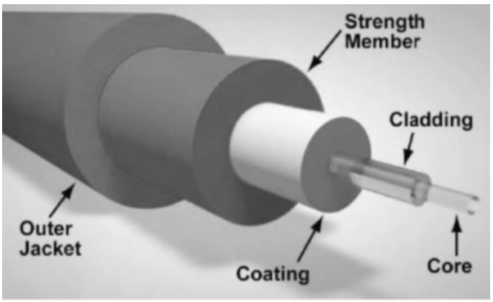
$$2I_2-9+3I_2+1(I_2-I_1)=0$$

$$\Rightarrow 6I_2-I_1=9 \ldots \textbf{(2)}$$

	Solving (1) and (2), we get $I_1 = \frac{45}{23}$ A and $I_2 = \frac{42}{23}$ A $\therefore$ Current through the 1 Ω resistor $= (I_2 - I_1) = \frac{-3}{23}$ A
25	(A) Define wave front. (B) What is the shape of the wavefront in each of following cases- (i) light diverging from a point source. (ii) light emerging out of a convex lens when a point source is placed at its focus.
26	State Gauss's law derive an expression for electric field due to an infinite charged plane sheet.
27	(A) Show that energy of electron in Bohr's orbit is inversely proportional to square of principle quantum number. OR (B) The energy levels of an atom of element X are shown in the diagram. Which one of the level transitions will result in the emission of photons of wavelength 620 nm ?

	Support your answer with mathematical calculations. 
Ans	The wavelength emitted $\lambda = 620$ nm $\therefore$ Corresponding energy $E = h\frac{c}{\lambda}$ $= \frac{6.6 \times 10^{-34} \times 3 \times 10^{8}}{620 \times 10^{-9} \times 1.6 \times 10^{-19}} eV = 2eV$ This corresponds to the transition D. In which energy emitted is $\Delta E = -1 - (-3) = 2eV$
28	Why do stable nuclei never have more protons than neutrons? The figure shows the plot of binding energy (BE) per nucleon as a function of mass number A. The letters A, B, C, D and E

	represent the positions of typical nuclei on the curve.Point out, giving reasons , the two processes (in terms of A, B, C, D and E), one of which can occur due to nuclear fission and the other due to nuclear fusion. 
Ans	Protons are positively charged and repel one another electrically. This repulsion becomes so great in nuclei with more than 10 protons or so, that an excess of neutrons which produce only attractive forces, is required for stability. Nuclei at A and B undergo nuclear fusion as their binding energy per nucleon is small and they are less stable so they fuse a other

	nuclei to become stable. The nuclei at E undergo nuclear fission as its binding energy per nucleon is less it splits into two or more lighter nuclei and becomes stable.
Section D (Each question carries 4 marks)	
29	**Read the following paragraph & answer the questions follow**  An optical fibre is a thin rod of high-quality glass. Light/infrared getting in at one end undergoes repeated total internal reflection and emerges at the other end. Optical Fibre is wave guided die – electric cable which non-conducting in nature used to data transmission using light pulses travelling in it. It transmits the light without any loss of energy. From one place to another for longer as well as for a shorter distance.

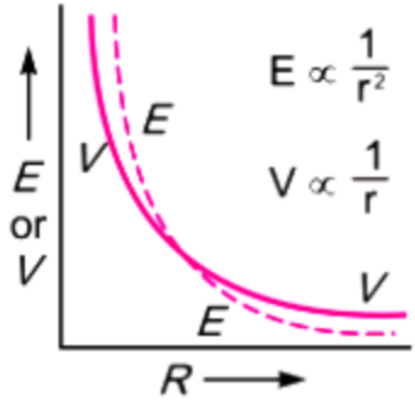
	In optical fibre cable light pulses bounce back and transmit from one place to another with any loss in the energy of light. Basically bounce back of light is the phenomena of Reflection of light in the same medium and happens without any loss. We can say Optical Fibre works on the principle of total internal reflections. It is a power full Phenomena which is used in optical fibre cable to transmit data from one place to another place. (i) **On which principle, optical fibre works?** (a) refraction of light (b) interference of light (c) diffraction of light (d) total internal reflection of light (ii) **The refractive indices of core is** (a) equal to cladding (c) less than cladding (b) more than cladding (d) none of the above (iii) Write two examples similar to optical

	fibre which are also working on the principle of total internal reflection. (a) Mirage, endoscopy (medical diagnostic tool) (b) Mirage, MRI (medical diagnostic tool) (c) Mirage and X-ray (medical diagnostic tool) (d) brilliance of diamond and ECG (medical diagnostic tool) (iv) An optical fiber system is designed for efficient data transmission. If a system uses a fiber with a core refractive index of n_1=1.53 and a cladding with an index of n_2. The possible value of n_2 is. (a) 1.63 (b) 1.58 (c) 1.48 (d) 1.65
Ans	(i) (d) total internal reflection of light (ii) (b) more than cladding (iii) **(a) Mirage, endoscopy (medical diagnostic tool).** (iv) We are given the core refractive index n_1=1.53. We must evaluate the options to find a value that satisfies the condition $n_2 < 1.53$

	(a) 1.63: Since 1.63 > 1.53, this value is invalid. (b) 1.58: Since 1.58 > 1.53, this value is invalid. **(c) 1.48**: Since 1.48 < 1.53, this value is valid. (d) 1.65: Since 1.65 > 1.53, this value is invalid. Ans -(c)
30	**Read the following paragraph & answer the questions follow.** Electromagnetic induction finds many applications such as in electrical components which includes transformers, inductors, and other devices such as electric motors and generators. An inductor is a passive component that is used in most power electronic circuits to store energy in the form of magnetic energy when electricity is applied to it. When a current begins to flow through a coil of wire, it undergoes an opposition to its flow in addition to the resistance of the metal wire. On the other hand, when an electric circuit carrying a steady current and containing a coil is suddenly opened, the collapsing, and hence

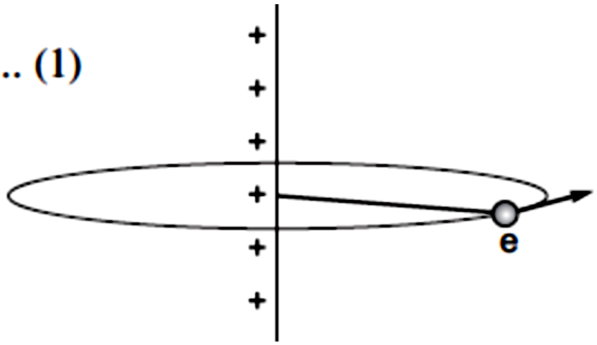
	diminishing, magnetic field causes an induced electromotive force that tends to maintain the current and the magnetic field and may cause a spark between the contacts of the switch. (i) Why does a spark appear when a current-carrying circuit with a coil is suddenly opened? (ii) What is the basic principle behind the working of electric generators and transformers? (iii) Two spherical bobs, one metallic and the other of glass, of the same size are allowed to fall freely from the same height above the ground. Which of the two would reach earlier and why?
Ans	(i) A spark appears because the rapid interruption of current causes the magnetic field in the coil to collapse instantly, inducing a very high voltage (back EMF) across the opening switch gap. (ii) Both electric generators and transformers operate based on Faraday's Law of

	electromagnetic Induction. Generators convert mechanical energy into electrical energy by rotating a conductor within a magnetic field, while transformers use a changing magnetic field (mutual induction) to change the voltage level between circuits. (iii) In glass, there is no effect of electromagnetic induction, due to the presence of the Earth's magnetic field, unlike in the case of metallic bob.
Section E (Each question carries 5 marks)	
31	(a) Show that the potential energy of a dipole making angle θ with the direction of the field is given by U = $-\vec{p}.\vec{E}$. Hence find out the amount of work done in rotating it from the position of unstable equilibrium to the stable equilibrium. (b) Plot a graph comparing the variation of potential V and electric field E due to a point charge Q as a function of distance R from the point charge.
Ans	(b) The graph of variation of potential and electric field due to a point charge Q with distance R from the point charge is shown in

	figure. 
	OR (a) An infinitely long positively charged straight wire has a linear charge density λ C/m. An electron is revolving around the wire as its centre with a constant velocity in a circular plane perpendicular to the wire. Deduce the expression for its kinetic energy. (b) Plot a graph of the kinetic energy as a function of charge density λ. (c) Five point charges, each of charge +q are placed on five vertices of a regular hexagon of side '*l*'. Find the magnitude of the resultant force on a charge – q placed at the centre of the hexagon.
Ans	(a) Infinitely long charged wire produces a

radical electric field.

$$E = \frac{\lambda}{2\pi\varepsilon_0 r} \quad \ldots (1)$$



The revolving electron experience an electrostatic force and provides necessarily centripetal force.

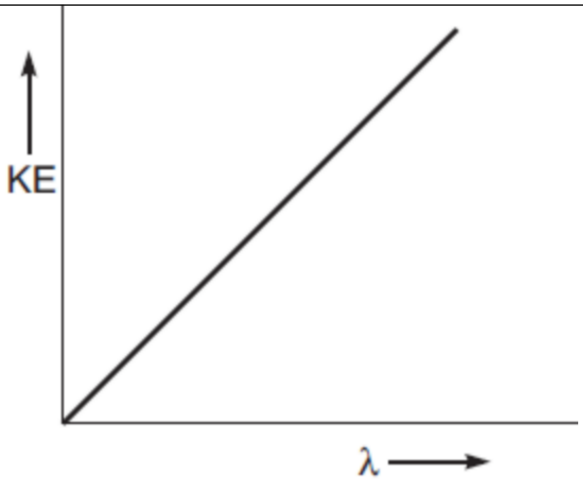
$$eE = \frac{mv^2}{r} \quad \ldots (2)$$

$$\Rightarrow \frac{e.\lambda}{2\pi\varepsilon_0 r} = \frac{mv^2}{r} \Rightarrow mv^2 = \frac{e\lambda}{2\pi\varepsilon_0}$$

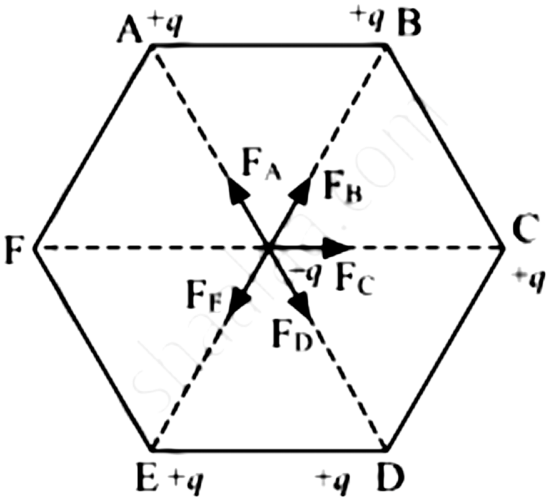
Kinetic energy of the electron

$$K = \frac{1}{2}mv^2 = \frac{e\lambda}{4\pi\varepsilon_0}$$

(b)



(c)

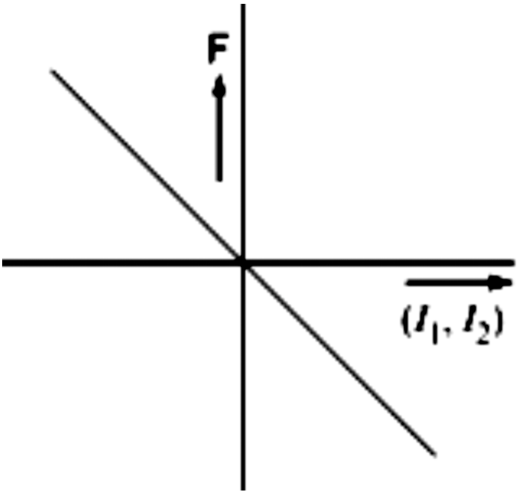


All the five charges, each of charge +q are placed on 5 vertices of a hexagon. Now if put a charge -q at the center of the hexagon. Force felt by -q charge will be F_A, F_B, F_C, F_D and F_E by charges present on vertices A, B, C, D, and E respectively.

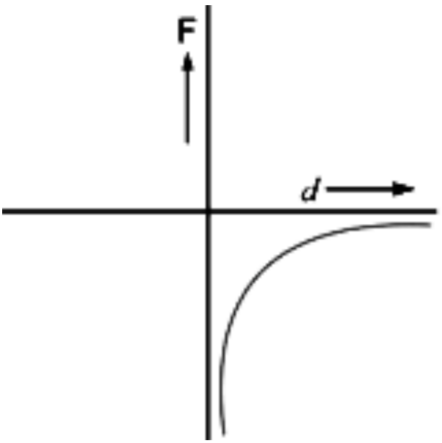
	As all the charges are the same and are separated by equal distances from -q charge, so magnitudes of all the forces felt by charge -q is the same. Hence force F_A will cancel the force F_D & force F_B will cancel the force F_E , as they are working in opposite directions. So the net force working on the charge -q will be only F_C . $F_{net} = F_C = \frac{1}{4\pi\varepsilon_\circ}\frac{q.q}{l^2}$ ... (Towards C) OR $\lvert F_{net}\rvert = \frac{1}{4\pi\varepsilon_\circ}\frac{q.q}{l^2}$
32	(a) Derive an expression for the force per unit length between two long straight parallel current carrying conductors. Hence define SI unit of current (ampere). (b) Draw graphs showing dependence of (i) F on I_1, I_2 when d is kept constant (ii) F on d when the product I_1 I_2 is maintained at a constant positive value.
Ans	(b) (i) We know that F is an attractive (–ve) force when the currents I_1 and I_2 are 'like'

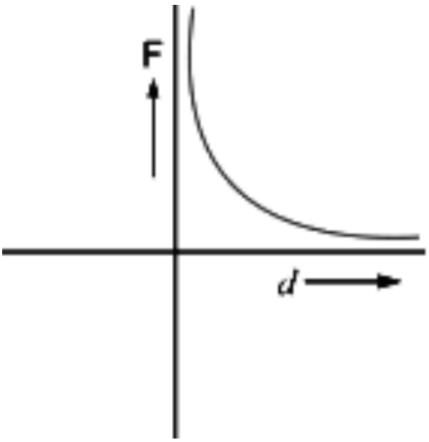
currents i.e. when the product I_1 I_2 is positive.

Similarly F is a repulsive (+ve) force when the currents I_1 and I_2 are 'unlike' currents, i.e. when the product I_1 I_2 is negative.

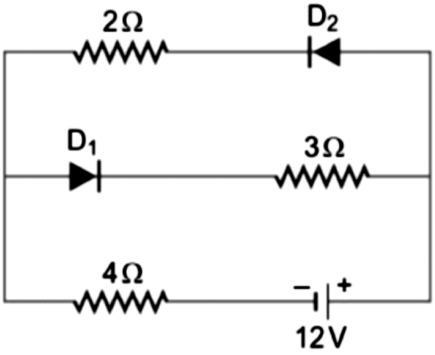


(ii) d when the product I_1 I_2 is maintained at a constant positive value.



	d when the product I_1 I_2 is maintained at a constant negative value. 
	OR (a) What is working principle moving coil galvanometer. Show that deflection in galvanometer is directly proportional to current flowing through coil. (b) A galvanometer coil has a resistance of 12 Ω and the meter shows full scale deflection for a current of 3 mA. How will you convert the meter into a voltmeter of range 0 to 18 V?
Ans	Let a resistor of resistance R be connected in series with the galvanometer to convert it into a voltmeter. This resistance is given as:

	$R = \frac{V}{I_g} - G = \frac{18}{3\times10^{-3}} - 12 = 6000 - 12 = 5988\ \Omega$ Hence, a resistor of resistance is to be connected in series with the galvanometer.
33	(a) Explain how the width of depletion layer in a p-n junction diode changes when the junction is (i) forward biased (ii) reverse biased. (b) Draw V – I characteristics of a p–n junction diode. Answer the following questions, giving reasons: (i) Why is the current under reverse bias almost independent of the applied potential upto a critical voltage? (ii) Why does the reverse current show a sudden increase at the critical voltage? OR (a) Explain the working of P-N junction diode as a full wave rectifier. (b) The circuit shown in the figure has two oppositely connected ideal diodes connected in parallel.



Find the current flowing through each diode in the circuit.

(c) A p-n junction diode is damaged by a strong current, why?

Ans

(b) Diode D_1 is reverse biased , so no current will flow through 3 Ω .

Diode D_2 is forward biased, and offers no resistance in the circuit. So current in the branch .

$$I = \frac{V}{R_{eq}} = \frac{12V}{2\Omega + 4\Omega} = 2\ A$$