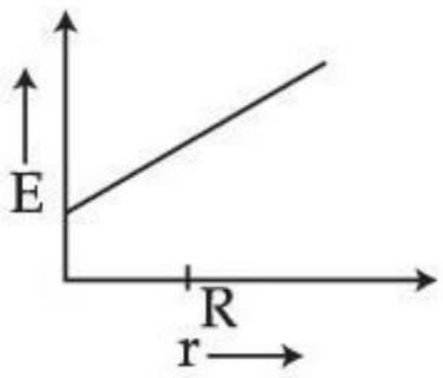
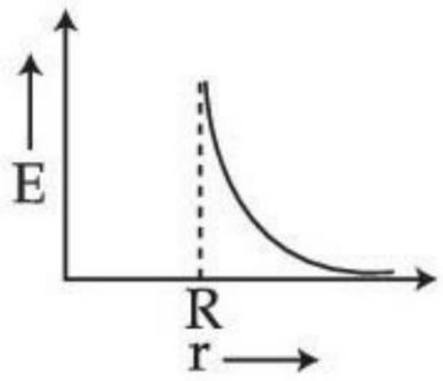
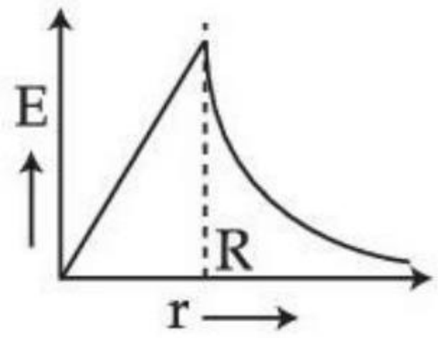
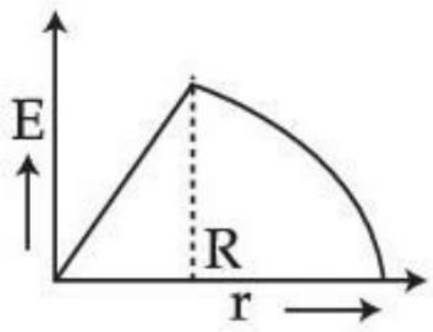
Paper:	PHYSICS
Set Name:	PHY17
Exam Date:	18 Aug 2022
Exam Shift:	2
Langauge:	English

Section:	PHYSICS
Item No:	1
Question ID:	**909401**
Question Type:	MCQ
Question:	An infinitly long wire is charged uniformly with charge density λ and placed in air, the electric field at distance r from wire will be : (1) $\frac{1}{4\pi\varepsilon_0}\frac{\lambda}{r}$ (2) $\frac{1}{4\pi\varepsilon_0}\frac{\lambda}{r^2}$ (3) $\frac{\lambda}{2\varepsilon_0}$ (4) $\frac{\lambda}{2\pi\varepsilon_0 r}$
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	2
Question ID:	**909402**
Question Type:	MCQ
Question:	Two point charges $(-q)$ and $(+4q)$ are placed at separation 'r'. Where should a third charge be placed so that entire system of charges becomes in equilibrium ? (1) at separation 'r' from $(-q)$ on the extreme side of $-q$. (2) at separation 'r' from (4q) on the extreme side of 4q. (3) at separation $\frac{r}{2}$ from $(-q)$ in between the two charges. (4) at separation $\frac{r}{4}$ from (4q) in between the two charges.
A:	1

B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	3
Question ID:	**909403**
Question Type:	MCQ
Question:	The variation of electric field with respect to distance from centre of a charged conducting spherical shell of radius R is given by : (1)  (2)  (3)  (4) 
A:	1
B:	2
C:	3
D:	4

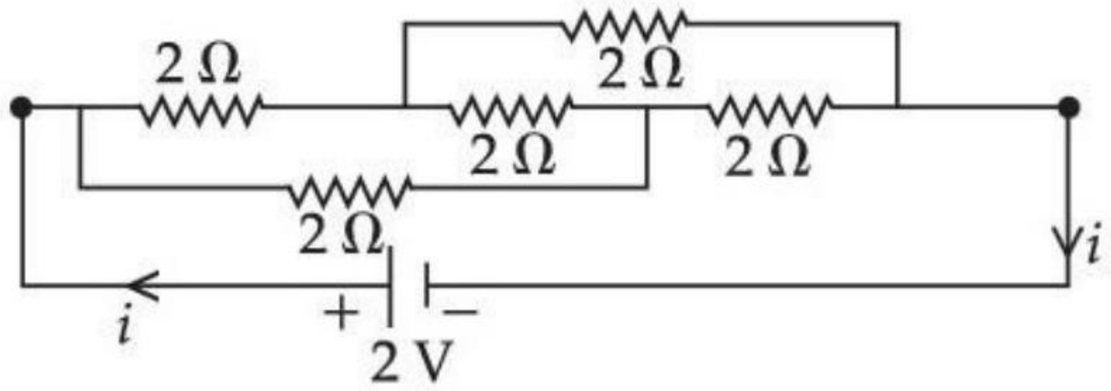
Section:	PHYSICS
Item No:	4
Question ID:	**909404**
Question Type:	MCQ
	A conducting sphere is charged. If the electric field at a distance 20 cm from the centre of

Question:	A conducting sphere is charged. If the electric field at a distance 20 cm from the centre of the sphere is $1.2\times10^{3}\ NC^{-1}$ and points radially inwards, the net charge on the sphere is : (1) $4.5\times10^{9}\ C$ (2) $-4.5\times10^{-9}\ C$ (3) $1.7\times10^{9}\ C$ (4) $-5.3\times10^{-9}\ C$
A:	1
B:	2
C:	3
D:	4

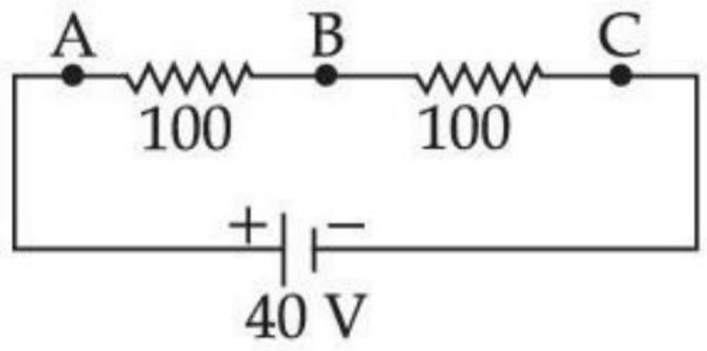
Section:	PHYSICS
Item No:	5
Question ID:	**909405**
Question Type:	MCQ
Question:	A parallel plate capacitor having cross - sectional area 'A' and separated by distance 'd' is filled by copper plate of thickness b. It's capacitance is : (1) $\frac{\varepsilon_0 A}{2d}$ (2) $\frac{\varepsilon_0 A}{d-b}$ (3) $\frac{2\varepsilon_0 A}{d+\frac{b}{2}}$ (4) $\frac{\varepsilon_0 A}{d+\frac{b}{2}}$
A:	1
B:	2
C:	3
D:	4

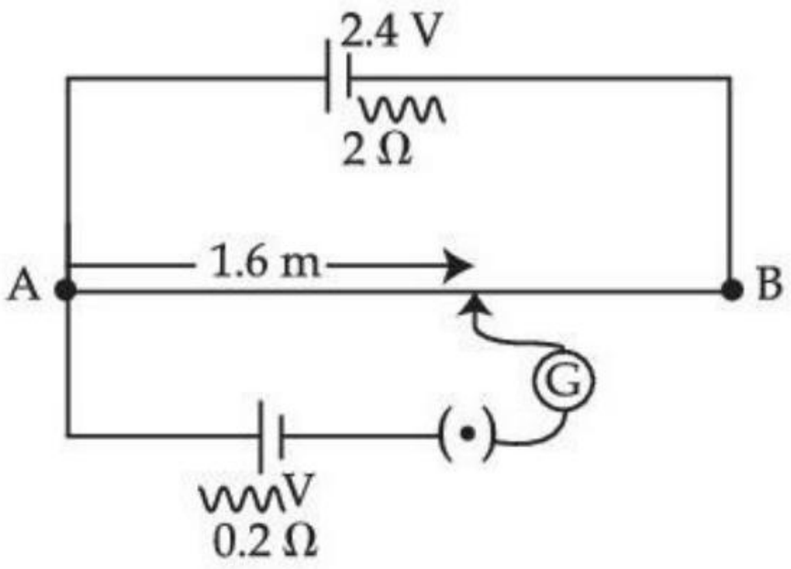
Section:	PHYSICS
Item No:	6
Question ID:	**909406**
Question Type:	MCQ
	The expression for torque '$\vec{\tau}$' experienced by an electric dipole of dipole moment '$\vec{P}$' in

Question:	an external uniform electric field 'E' is given by : (1) $\vec{\tau} = \vec{P} \cdot \vec{E}$ (2) $\vec{\tau} = \frac{\vec{P}}{\vec{E}}$ (3) $\vec{\tau} = \frac{\vec{E}}{\vec{P}}$ (4) $\vec{\tau} = \vec{P} \times \vec{E}$
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	7
Question ID:	**909407**
Question Type:	MCQ
Question:	Find the value of current in the circuit.  (1) 4 A (2) 3 A (3) 2 A (4) 1 A
A:	1
B:	2
C:	3
D:	4

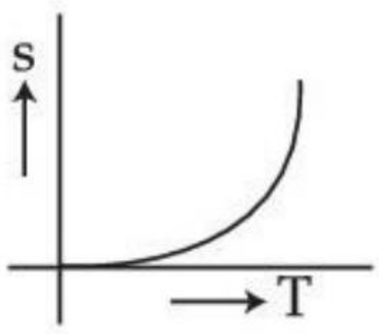
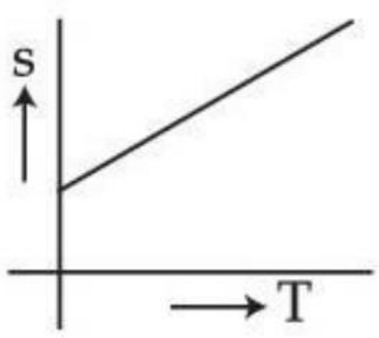
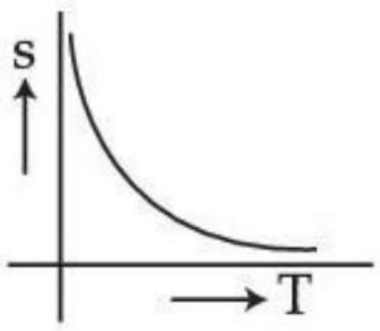
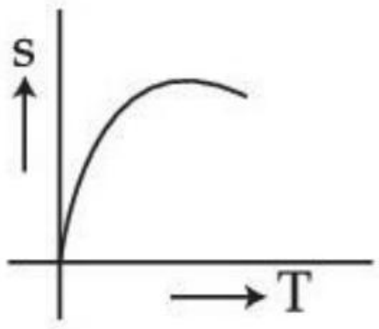
Section:	PHYSICS
Item No:	8
Question ID:	**909408**
Question Type:	MCQ
Question:	A voltmeter of resistance 150 Ω is connected across A and B in the given circuit. The

Question:	reading of voltmeter will be :  (1) 40 V (2) 20 V (3) 15 V (4) 25 V
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	9
Question ID:	**909409**
Question Type:	MCQ
Question:	A potentiometer with a cell of 2.4 volt and internal resistance of 2 Ω maintains a potential drop across the resistance wire AB of length 2 meters and resistance 10 Ω. A standard cell which maintains a constant emf of 'V' volt with internal resistance 0.2 Ω gives a balance point at 1.6 m length of the wire. The value of emf of second (standard) cell (V) is :  (1) 2.0 volt (2) 1.9 volt (3) 1.8 volt (4) 1.6 volt
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	10

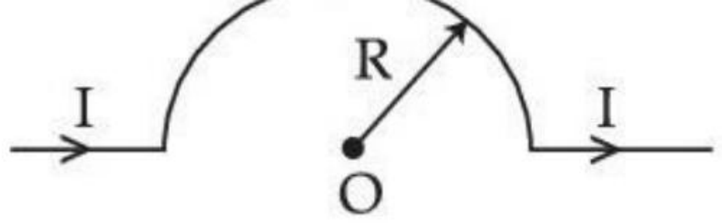
Question ID:	**909410**
Question Type:	MCQ
Question:	Drift velocity of electrons is directly proportional to the : (1) Temperature (2) Voltage applied (3) Length of the conductor (4) Area of cross section of conductor
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	11
Question ID:	**909411**
Question Type:	MCQ
Question:	Which of the following graph correctly represents the variation of resistivity 's' with temperature 'T' for a semiconductor material ? (1)  (2)  (3)  (4) 
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	12
Question ID:	**909412**
Question Type:	MCQ
Question:	A proton and an alpha particle moving with same kinetic energy enter in the region of uniform magnetic field perpendicular to it. The ratio of radii of their trajectories will be : (1) 1 : 1 (2) $\sqrt{2}$: 1 (3) 4 : 1 (4) 1 : $\sqrt{2}$
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	13
Question ID:	**909413**
Question Type:	MCQ
Question:	An electron is projected in a uniform magnetic field along the direction of field, the electron will experience : (1) a force opposite to the magnetic field (2) a force in the direction of magnetic field (3) no force in magnetic field (4) a force perpendicular to the magnetic field
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	14
Question ID:	**909414**
Question Type:	MCQ
	Magnetic field due to the current carrying wire as shown in the figure at point "O" will be : 

Question:	 (1) $\frac{\mu_0 I}{2R}$ (2) $\frac{\mu_0 I}{4R}$ (3) $\frac{\mu_0 I}{2\pi R}$ (4) $\frac{\mu_0 I}{4\pi R}$
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	15
Question ID:	**909415**
Question Type:	MCQ
Question:	An electron is shot into the uniform magnetic field, normal to the direction of field. Then the frequency of revolution of the electron in its circular orbit : (1) is independent of its speed (2) decreases with its speed (3) increases with its speed (4) increase with radius of revolution
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	16
Question ID:	**909416**
Question Type:	MCQ
Question:	To convert a galvanometer into an ammeter, one should connect : (1) high resistance in series with galvanometer (2) low resistance in series with galvanometer (3) low resistance in parallel with galvanometer

	(4) high resistance in parallel with galvanometer
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	17
Question ID:	**909417**
Question Type:	MCQ
Question:	Given below are two statements : **Statement I :** The electric field produced by a scalar source is known as electric charge. **Statement II :** The magnetic field produced by a vector source is known as current element (I dl). In the light of the above statements, choose the **correct** answer from the options given below : (1) Both **Statement I** and **Statement II** are true (2) Both **Statement I** and **Statement II** are false (3) **Statement I** is correct but **Statement II** is false (4) **Statement I** is incorrect but **Statement II** is true
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	18
Question ID:	**909418**
Question Type:	MCQ
Question:	Which of the following rays are used in doing LASIK (Laser - Assisted in Situ peratomileusis) eye surgery ? (1) Ultraviolet rays (2) Infrared rays (3) Gamma rays (4) Micro waves
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	19
Question ID:	**909419**
Question Type:	MCQ
Question:	The magnetic field of a plane electromagnetic wave is given by $B_x = 2\times10^{-7}\sin(0.6\times10^3 y + 2\times10^{11}\,t)$ T. An expression for its electric field is : (1) $E_x = 2\times10^{-7}\sin(0.6\times10^3 y + 2\times10^{11}\,t)$ V/M (2) $E_y = 60\sin(0.6\times10^3 y + 2\times10^{11}\,t)$ V/M (3) $E_z = 2\times10^{-7}\sin(0.6\times10^3 y + 2\times10^{11}\,t)$ V/M (4) $E_z = 60\sin(0.6\times10^3 y + 2\times10^{11}\,t)$ V/M
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	20
Question ID:	**909420**
Question Type:	MCQ
Question:	Number of photoelectrons emitted per second is proportional to : (1) Intensity of incident radiation (2) Frequency of incident radiation (3) Stopping potential (4) Wavelength of incident radiation
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	21
Question ID:	**909421**
Question Type:	MCQ
Question:	Emission of electron from the surface of metal when radiation of appropriate frequency is allowed to incident on it is called : (1) Nuclear fission (2) Compton effect (3) Photoelectric effect (4) Thermonic radiations

A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	22
Question ID:	**909422**
Question Type:	MCQ
Question:	An electron, an α particle, a proton and a deutron have the same kinetic energy. Which of these particles has the shortest De Broglie wavelength. (1) Electron (2) Proton (3) α Particle (4) Deutron
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	23
Question ID:	**909423**
Question Type:	MCQ
Question:	The ratio of radii of two nuclei having atomic mass numbers 27 and 8 respectively, will be : (1) $\frac{R_1}{R_2} = \frac{3}{2}$ (2) $\frac{R_1}{R_2} = \frac{4}{2}$ (3) $\frac{R_1}{R_2} = \frac{6}{4}$ (4) $\frac{R_1}{R_2} = \frac{\sqrt{3}}{2}$
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	24
Question ID:	**909424**
Question Type:	MCQ
Question:	If N_0 is the original mass of the substance of half life $t_{1/2} = 4$ years, then the amount of substance left after 12 years is : (1) $N_0/16$ (2) $N_0/4$ (3) $N_0/8$ (4) $N_0/2$
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	25
Question ID:	**909425**
Question Type:	MCQ
Question:	Match **List - I** with **List - II**. **List - I (Components of Reactor)** / **List - II (Function)** (A) Uranium — (I) Reaction rate can be controlled by it (B) Moderator — (II) Slows down the fast moving neutrons (C) Control rod — (III) Used for fission reaction (D) Coolent — (IV) Transfers heat from core to turbine Choose the **correct** answer from the options given below : (1) (A) - (III), (B) - (IV), (C) - (I), (D) - (II) (2) (A) - (III), (B) - (II), (C) - (IV), (D) - (I) (3) (A) - (III), (B) - (II), (C) - (I), (D) - (IV) (4) (A) - (II), (B) - (III), (C) - (IV), (D) - (I)
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	26
Question ID:	**909426**

Question Type:	MCQ
Question:	The difference in mass of a nucleus and its constituent nucleons is called the _____. (1) Packing fraction (2) Mass defect (3) Binding energy (4) Binding energy per nucleon
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	27
Question ID:	**909427**
Question Type:	MCQ
Question:	The shortest wavelength in the Lyman series of hydrogen spectrum is 912 Å. The shortest wavelength present in Paschen series of spectral lines will be : (1) 8208 Å (2) 6566 Å (3) 3648 Å (4) 14592 Å
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	28
Question ID:	**909428**
Question Type:	MCQ
Question:	The ratio maximum wavelength to minimum wavelength in Lyman series is : (1) $\frac{4}{3}$ (2) $\frac{3}{4}$ (3) $\frac{1}{3}$ (4) $\frac{1}{4}$

A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	29
Question ID:	**909429**
Question Type:	MCQ
Question:	If a light ray travels from denser to rarer medium. Which of the following statement/s are **correct** ? (A) Energy increases (B) Frequency remain same (C) Phase changes by 90° (D) Velocity increases (E) Wavelength decreases Choose the **correct** answer from the options given below : (1) (B) only (2) (B) and (D) only (3) (A) and (C) only (4) (E) only
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	30
Question ID:	**909430**
Question Type:	MCQ
Question:	When a forward bias is applied to a p-n junction diode, then : (1) The majority carrier current becomes zero (2) The potential barrier is raised (3) The junction resistance increases (4) The width of depletion layer reduces
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS

Item No:	31
Question ID:	**909431**
Question Type:	MCQ
Question:	Match **List - I** with **List - II**. **List - I (Electronic device)** / **List - II (Use/Application)** (A) Photo diode — (I) Remote controls (B) Zener diode — (II) Amplifier (C) Light emitting diode — (III) Voltage regulator (D) Transistor — (IV) Photo detector Choose the **correct** answer from the options given below : (1) (A) - (IV), (B) - (I), (C) - (II), (D) - (III) (2) (A) - (IV), (B) - (III), (C) - (I), (D) - (II) (3) (A) - (I), (B) - (III), (C) - (IV), (D) - (II) (4) (A) - (I), (B) - (II), (C) - (IV), (D) - (III)
A:	1
B:	2
C:	3
D:	4

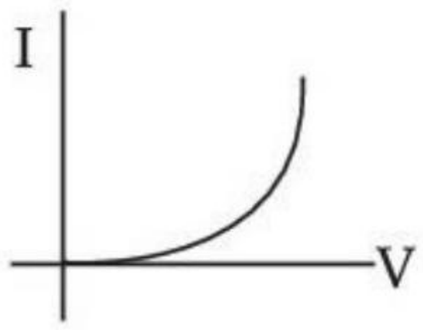
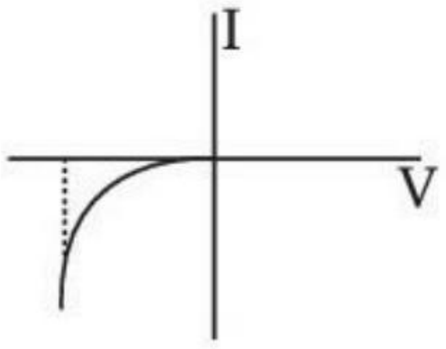
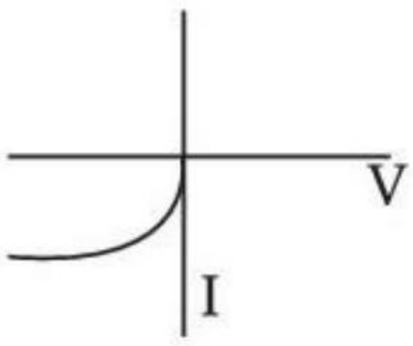
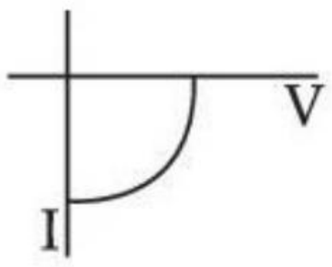
Section:	PHYSICS
Item No:	32
Question ID:	**909432**
Question Type:	MCQ
Question:	Read the following statements with reference to electronic devices. (A) A transistor is used as a rectifier (B) A zener diode is used as a voltage regulator (C) A NOT gate is a universal gate (D) A transistor is used as an amplifier (E) A photodiode is used as an oscillator Choose the **correct** answer from the options given below : (1) (A) and (B) (2) (B) and (D) (3) (A) and (D) (4) (B), (C) and (E)
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	33

Question ID:	**909433**
Question Type:	MCQ

Question:

Match **List - I** with **List - II**.

List - I **I-V Characteristics**	**List - II** **Diodes**
(A) 	(I) Solar cell
(B) 	(II) L.E.D.
(C) 	(III) Zener diode
(D) 	(IV) Photo diode

Choose the **correct** answer from the options given below :

(1) (A) - (II), (B) - (III), (C) - (IV), (D) - (I)

(2) (A) - (II), (B) - (III), (C) - (I), (D) - (IV)

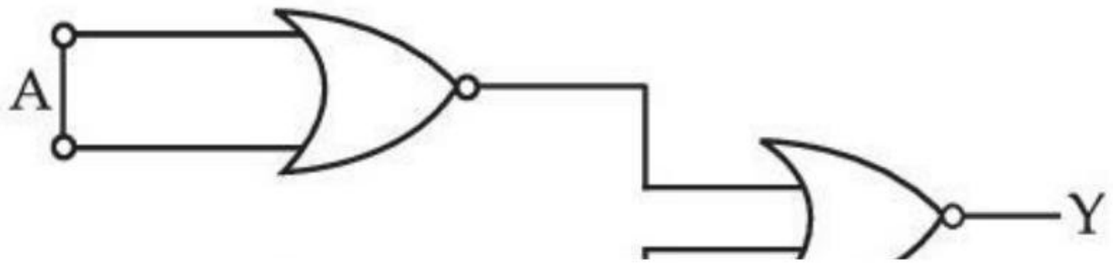
(3) (A) - (III), (B) - (II), (C) - (I), (D) - (IV)

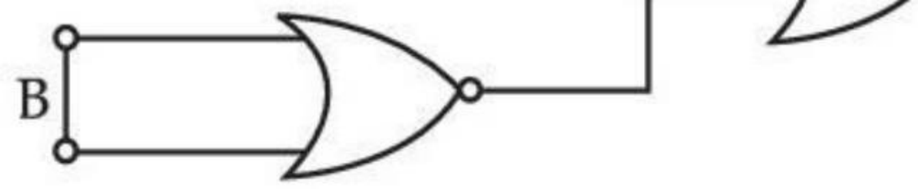
(4) (A) - (III), (B) - (II), (C) - (IV), (D) - (I)

A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	34
Question ID:	**909434**
Question Type:	MCQ

Choose the logic operation carried out by the following current :



Question:	 (1) OR Gate (2) AND Gate (3) NAND Gate (4) NOR Gate
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	35
Question ID:	**909435**
Question Type:	MCQ
Question:	The process of superimposing message signal with the carrier wave is known as : (1) demodulation (2) attenuation (3) modulation (4) detection
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	36
Question ID:	**909436**
Question Type:	MCQ
Question:	For a generalised communication system, arrange the following in the correct sequence : (A) Receiver (B) Information source (C) Channel (D) User of information (E) Transmitter Choose the **correct** answer from the options given below : (1) (D), (A), (C), (E), (B) (2) (B), (E), (C), (A), (D) (3) (C), (A), (E), (B), (D) (4) (D), (E), (C), (A), (B)

A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	37
Question ID:	**909437**
Question Type:	MCQ
Question:	A circuit element 'X' when connected to peak voltage of 200 V, a peak current of 5A flows which lags behind the voltage by $\frac{\pi}{2}$. A circuit element Y when connected to same peak voltage, same peak current flows which is in phase with the voltage. Now X and Y are connected in series with same peak voltage. The rms value of current through the circuit will be : (1) 5 A (2) $\frac{5}{\sqrt{2}}$ A (3) 2.5 A (4) $5\sqrt{2}$ A
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	38
Question ID:	**909438**
Question Type:	MCQ
Question:	To increase magnification power of refracting type Telescope, we should increase : (1) the focal length of the objective (2) the focal length of the eyepiece (3) aperture of the objective (4) aperture of the eyepiece
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	39

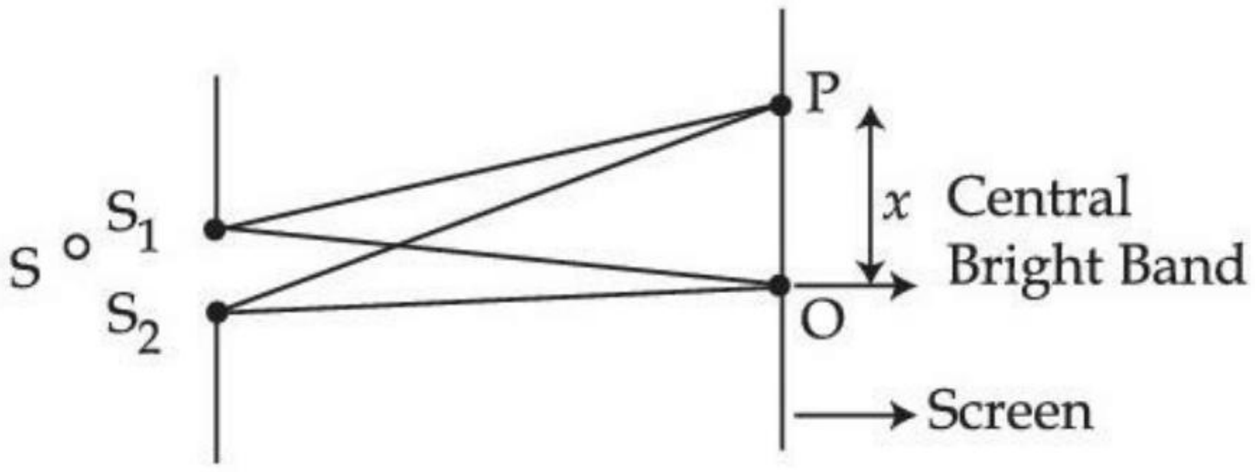
Question ID:	**909439**
Question Type:	MCQ
Question:	The radius of curvature of the curved surface of a plano-convex lens is 20 cm. If the refractive index of the material of the lens be 1.5, then focal length of lens will be : (1) 20 cm (2) −20 cm (3) −40 cm (4) 40 cm
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	40
Question ID:	**909440**
Question Type:	MCQ
Question:	A boy of height 1 m stands infront of a convex mirror. His distance from the mirror is equal to the focal length of the mirror, the height of the image is : (1) 0.33 m (2) 0.25 m (3) 0.67 m (4) 0.50 m
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	41
Question ID:	**909441**
Question Type:	MCQ
	Case based The British physicist Thomas used an ingenious technique to lock the phases of the waves emanating from two coherent sources S_1 and S_2. As these sources were derived from same source symmetrically placed wrt S_1 and S_2, the phases of waves were same. If any abrupt change happens in original sources, will manifest exactly similar phase changes in the light coming out of two sources S_1 to S_2. Due to constructive interference and destructive interference at different points in space and screen alternate dark and bright fringes of equal width were obtained. This pattern was called as interference pattern. The width of

Question:

each band was equal with central fringe as bright fringe.



The phase difference ($\Delta\phi$) between two super imposing waves to obtain constructive interference and hence bright band, is :

(1) $\Delta\phi = np$; $n = 1, 2, 3, 4, 5$

(2) $\Delta\phi = 2np$; $n = 0, 2, 3, 4, 5$

(3) $\Delta\phi = \frac{n\pi}{2}$ $n = 1, 2, 3, 4, 5$

(4) $\Delta\phi = \frac{3n\pi}{2}$ $n = 1, 2, 3, 4, 5$

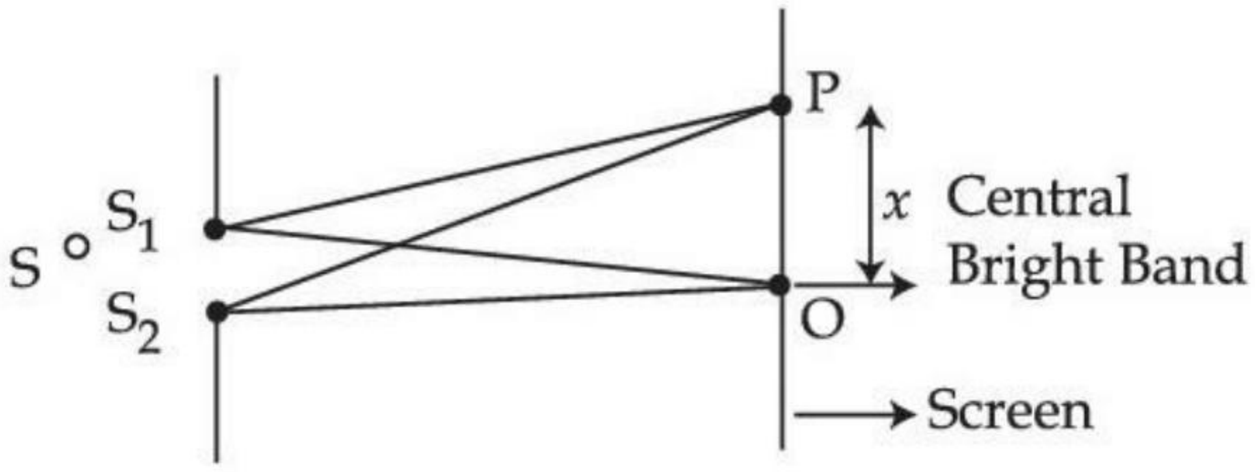
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	42
Question ID:	**909442**
Question Type:	MCQ

Question:

Case based

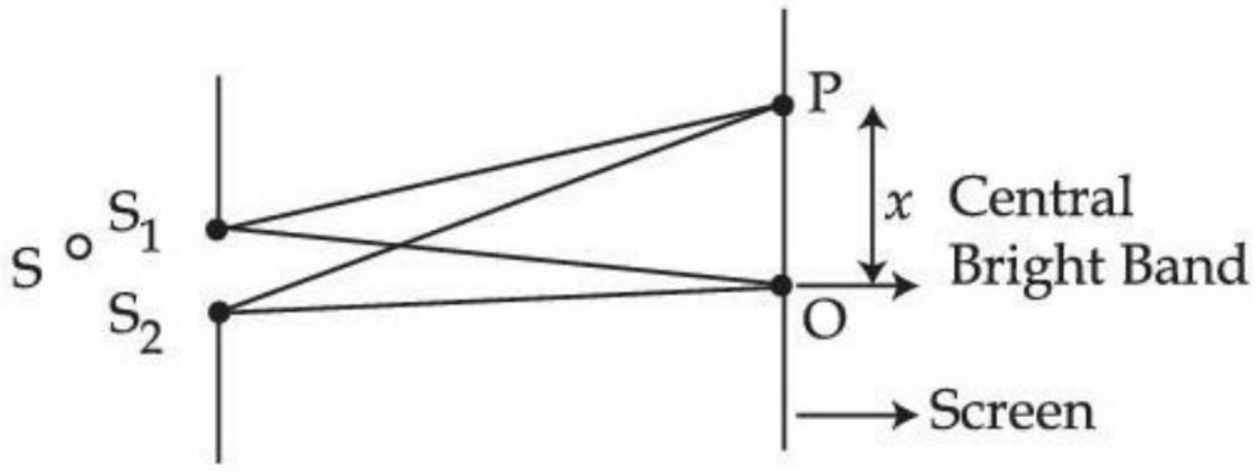
The British physicist Thomas used an ingenious technique to lock the phases of the waves emanating from two coherent sources S_1 and S_2. As these sources were derived from same source symmetrically placed wrt S_1 and S_2, the phases of waves were same. If any abrupt change happens in original sources, will manifest exactly similar phase changes in the light coming out of two sources S_1 to S_2. Due to constructive interference and destructive interference at different points in space and screen alternate dark and bright fringes of equal width were obtained. This pattern was called as interference pattern. The width of each band was equal with central fringe as bright fringe.



If two sources of intensifies I_0 each have a randomly varying phase difference ϕ, the resultant intensity at centre of screen will be :

(1) $\frac{I_0}{}$

	(1) $\frac{I_0}{2}$ (2) $\frac{2}{I_0}$ (3) $2\,I_0$ (4) $\frac{I_0}{\sqrt{2}}$
A:	1
B:	2
C:	3
D:	4

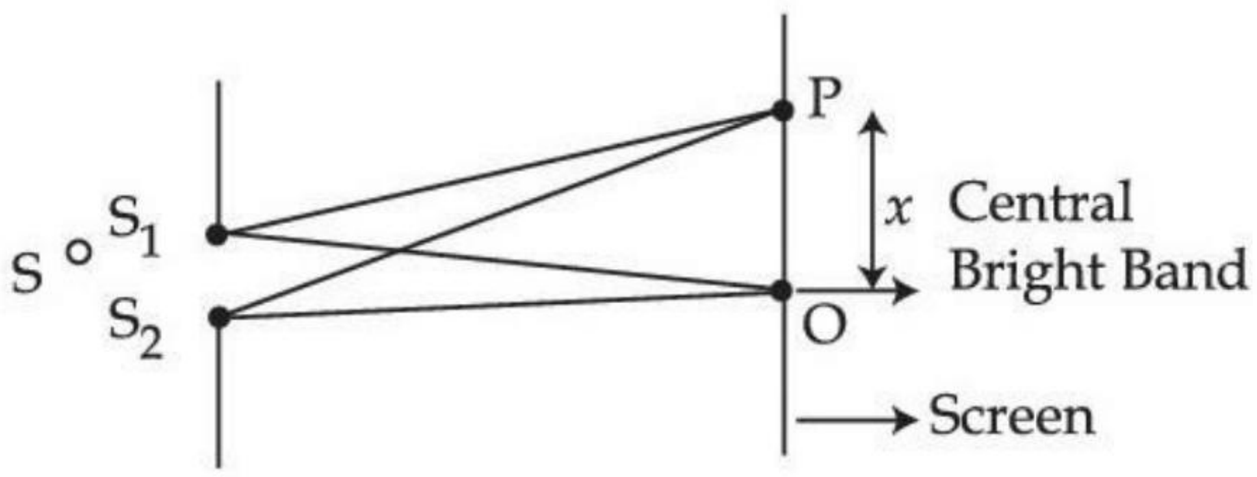
Section:	PHYSICS
Item No:	43
Question ID:	**909443**
Question Type:	MCQ
Question:	**Case based** The British physicist Thomas used an ingenious technique to lock the phases of the waves emanating from two coherent sources S_1 and S_2. As these sources were derived from same source symmetrically placed wrt S_1 and S_2, the phases of waves were same. If any abrupt change happens in original sources, will manifest exactly similar phase changes in the light coming out of two sources S_1 to S_2. Due to constructive interference and destructive interference at different points in space and screen alternate dark and bright fringes of equal width were obtained. This pattern was called as interference pattern. The width of each band was equal with central fringe as bright fringe.  In Young's double slit experiment, interference pattern is obtained on the screen. If one of the slits is closed, then : (1) Intensity and width of central maximum increase (2) Intensity and width of central maximum decrease (3) Intensity of central maximum decreases and while width of central maximum increases (4) Intensity of central maximum increases and width of central maximum decreases
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	44
Question ID:	**909444**
Question Type:	MCQ

Question:

Case based

The British physicist Thomas used an ingenious technique to lock the phases of the waves emanating from two coherent sources S_1 and S_2. As these sources were derived from same source symmetrically placed wrt S_1 and S_2, the phases of waves were same. If any abrupt change happens in original sources, will manifest exactly similar phase changes in the light coming out of two sources S_1 to S_2. Due to constructive interference and destructive interference at different points in space and screen alternate dark and bright fringes of equal width were obtained. This pattern was called as interference pattern. The width of each band was equal with central fringe as bright fringe.



In Young's double slit experiment, the separation between the slits is halved and distance between the slits and screen is doubled. The fringe width will be :

(1) unchanged

(2) halved

(3) doubled

(4) quadrupled

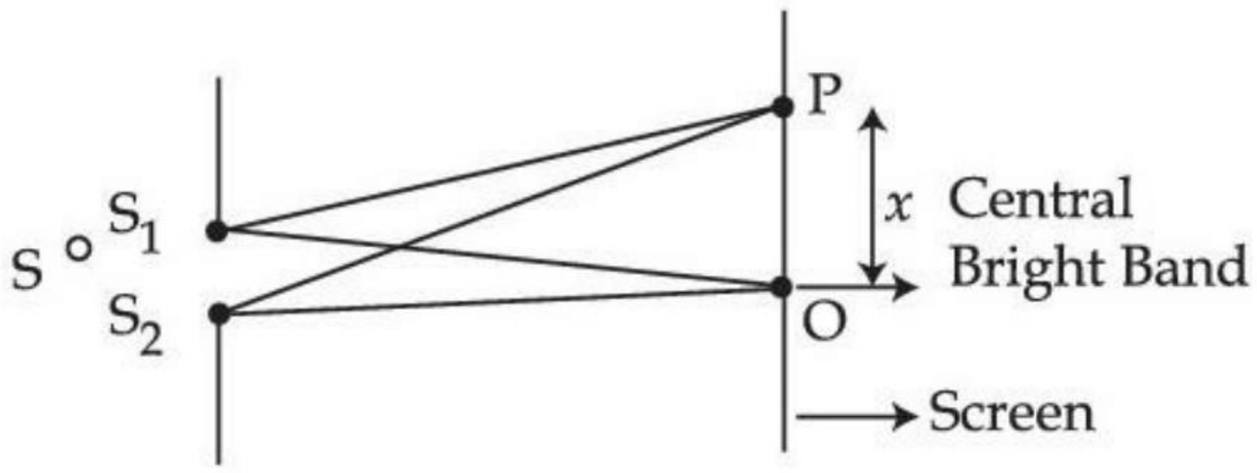
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	45
Question ID:	**909445**
Question Type:	MCQ

Case based

The British physicist Thomas used an ingenious technique to lock the phases of the waves emanating from two coherent sources S_1 and S_2. As these sources were derived from same source symmetrically placed wrt S_1 and S_2, the phases of waves were same. If any abrupt change happens in original sources, will manifest exactly similar phase changes in the light coming out of two sources S_1 to S_2. Due to constructive interference and destructive interference at different points in space and screen alternate dark and bright fringes of equal width were obtained. This pattern was called as interference pattern. The width of each band was equal with central fringe as bright fringe.

Question:



In Young's double slit experiment, the fringe width is 0.4 mm. If the whole apparatus is immersed in water of refractive index $\frac{4}{3}$, without changing its geometry, the new fringe width will be :

(1) 0.53 mm

(2) 0.4 mm

(3) 0.3 mm

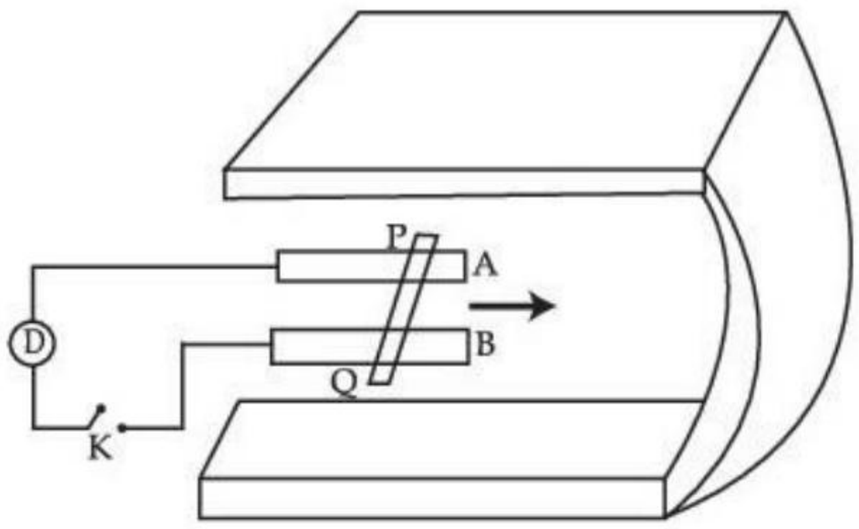
(4) 540 μm

A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	46
Question ID:	**909446**
Question Type:	MCQ

Question:

Figure shows a metal rod PQ resting on the rails AB and positioned between the poles of a permanent magnet. The rails, the rod and the magnetic field are in three mutual perpendicular directions. A galvanometer G connects the rails through a switch K. Length of the rod = 15 cm, B = 0.50 T, resistance of the closed loop containing the rod =180.0 mΩ . Assume the field to be uniform.



Suppose K is open and the rod is moved with a speed of 12 cms^{-1} in the direction. The magnitude of the induced emf will be :

(1) 4.5×10^{-3} V

(2) 9.0×10^{-3} V

(3) 18.0×10^{-3} V

(4) 27.0×10^{-3} V

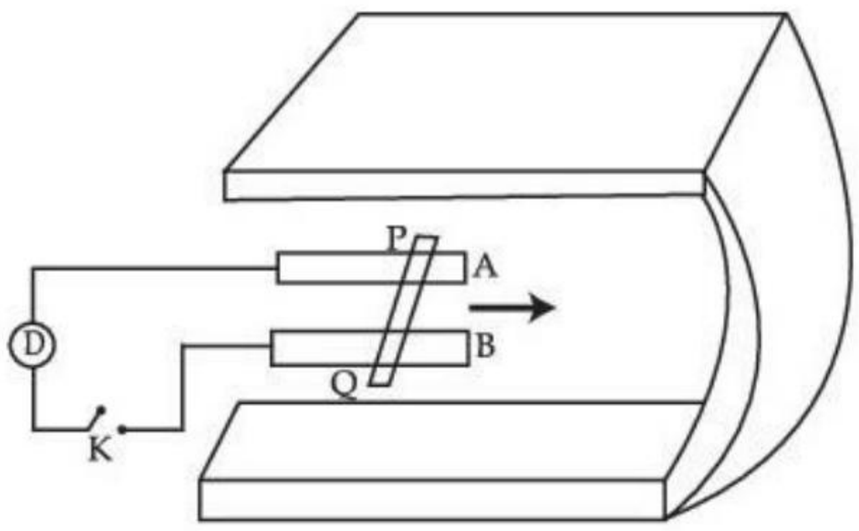
A:	1

B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	47
Question ID:	**909447**
Question Type:	MCQ

Question:

Figure shows a metal rod PQ resting on the rails AB and positioned between the poles of a permanent magnet. The rails, the rod and the magnetic field are in three mutual perpendicular directions. A galvanometer G connects the rails through a switch K. Length of the rod = 15 cm, B = 0.50 T, resistance of the closed loop containing the rod =180.0 mΩ . Assume the field to be uniform.



The magnetic force experienced by the rod when K is closed will be :

(1) 7.5×10^{-2} N

(2) 3.25×10^{-2} N

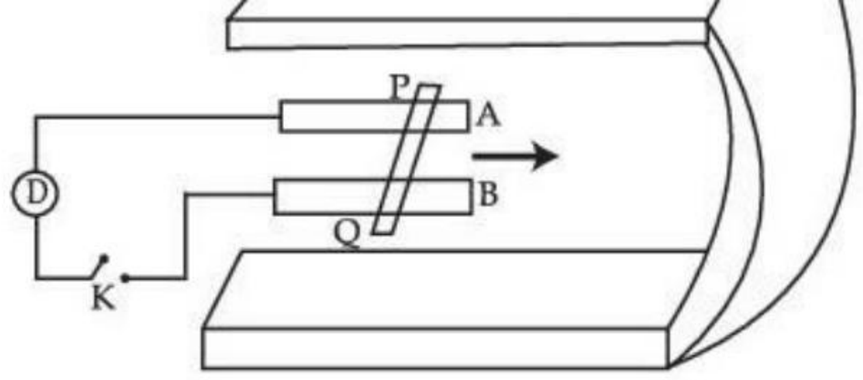
(3) 6.45×10^{-2} N

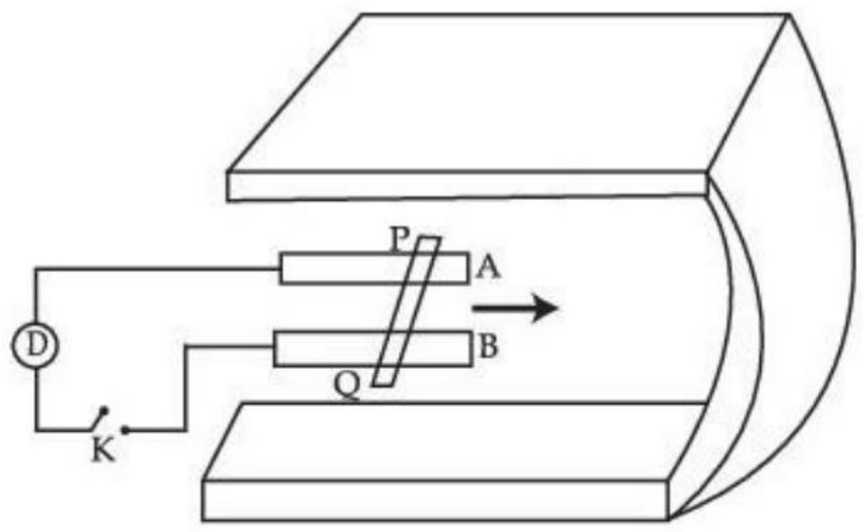
(4) 3.75×10^{-2} N

A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	48
Question ID:	**909448**
Question Type:	MCQ

Figure shows a metal rod PQ resting on the rails AB and positioned between the poles of a permanent magnet. The rails, the rod and the magnetic field are in three mutual perpendicular directions. A galvanometer G connects the rails through a switch K. Length of the rod = 15 cm, B = 0.50 T, resistance of the closed loop containing the rod =180.0 mΩ . Assume the field to be uniform.

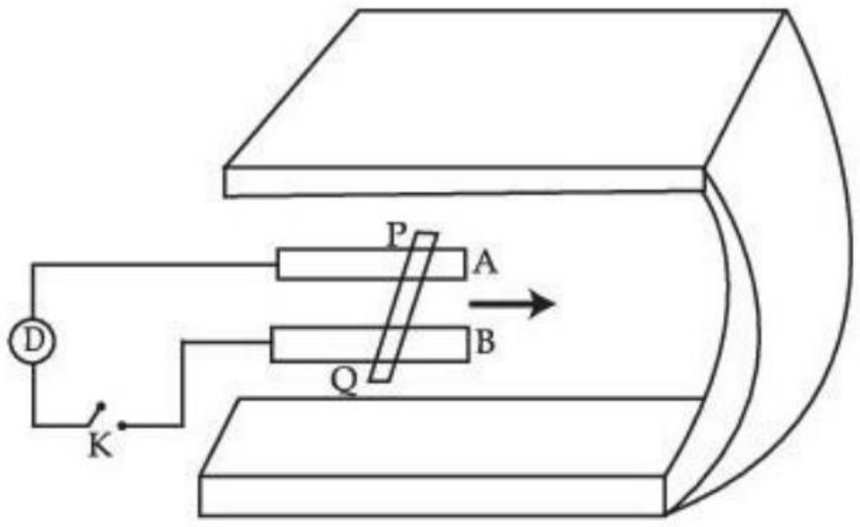
Question:	 The power required (by an external agent) to keep the rod moving at the same speed ($=12\ \text{cms}^{-1}$) when K is closed will : (1) Zero (2) 9×10^{-3} W (3) 4.5×10^{-3} W (4) 6.4×10^{-3} W
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	49
Question ID:	**909449**
Question Type:	MCQ
Question:	Figure shows a metal rod PQ resting on the rails AB and positioned between the poles of a permanent magnet. The rails, the rod and the magnetic field are in three mutual perpendicular directions. A galvanometer G connects the rails through a switch K. Length of the rod = 15 cm, B = 0.50 T, resistance of the closed loop containing the rod =180.0 mΩ . Assume the field to be uniform.  The power dissipated as heat in the closed circuit is : (1) 1.5×10^{-3} W (2) 3×10^{-3} W (3) 9.0×10^{-3} W (4) 4.5×10^{-3} W
A:	1
B:	2
C:	3
D:	4

Section:	PHYSICS
Item No:	50
Question ID:	**909450**
Question Type:	MCQ

Question:

Figure shows a metal rod PQ resting on the rails AB and positioned between the poles of a permanent magnet. The rails, the rod and the magnetic field are in three mutual perpendicular directions. A galvanometer G connects the rails through a switch K. Length of the rod = 15 cm, B = 0.50 T, resistance of the closed loop containing the rod =180.0 mΩ . Assume the field to be uniform.



The induced emf produced in the moving rod if the magnetic field becomes parallel to the rails instead of being perpendicular will be :

(1) 3×10^{-3} V

(2) 6×10^{-3} V

(3) 9×10^{-3} V

(4) Zero

A:	1
B:	2
C:	3
D:	4