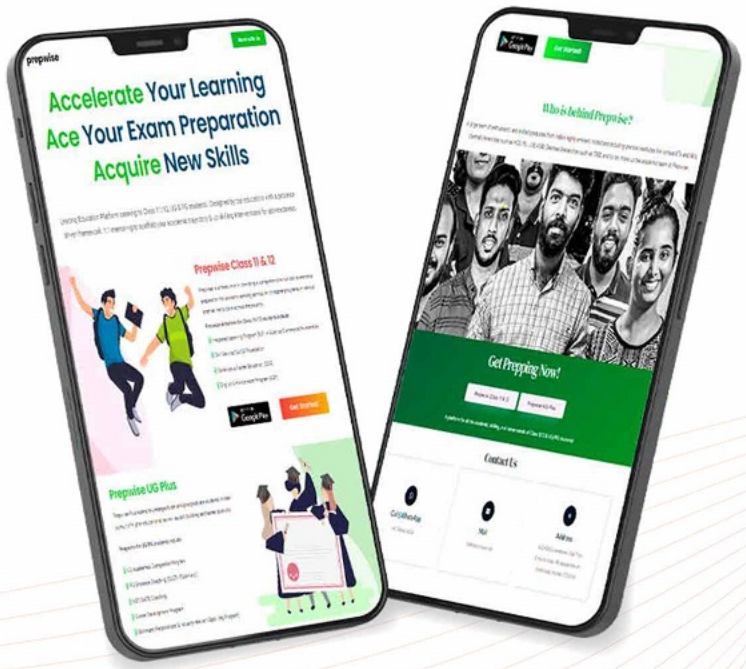
राष्ट्रीय परीक्षा एजेंसी
National Testing Agency
Excellence in Assessment

prepwise



CUET UG

Previous Year Question Paper

2022

Download the Prepwise App Now!

Call or WhatsApp
91+ 7994441041

Join Kerala's No.1
CUET UG Entrance Coaching

GET IT ON Google Play

Download on the App Store

राष्ट्रीय परीक्षा एजेंसी
National Testing Agency
Excellence in Assessment

prepwise

CUET UG

Previous Year Question Paper

2022

Section II
Physics

Section Name:PHYSICS
Question:

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

	List - I		**List - II**
(A)	Radio waves	(I)	To treat muscular strain
(B)	X-rays	(II)	For broadcasting
(C)	Infrared rays	(III)	Absorbed by the ozone layer of the atmosphere
(D)	Ultraviolet rays	(IV)	To detect fracture of bones

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

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

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

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

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

Section Name:PHYSICS
Question:

A dielectric slab of a material of dielectric constant k, with same area as that of plates and thickness $\frac{2}{5}d$ is inserted between the plates of a parallel plate capacitor. If the original distance between the plates is d and the initial capacitance is C, find the new capacitance C_{new} of the capacitor :

(1) $C_{new} = \frac{2}{5}C$

(2) $C_{new} = \left[\frac{3k+2}{5k}\right]C$

(3) $C_{new} = KC$

(4) $C_{new} = \left[\frac{5k}{3k+2}\right]C$

Section Name:PHYSICS
Question:

An electron beam of Energy E scatters from atoms on a surface with a spacing d=0.9 nm. The first maximum of intensity in the reflected beam occurs at $\theta = 60°$. What is the kinetic energy E of the beam in eV :

(1) 1.93×10^{-30}

(2) 1.575×10^{-38}

(3) 1.91×10^{-37}

(4) 2.751×10^{-32}

Section Name:PHYSICS
Question:

Given data; $m\ (_{92}U^{238}) = 238.05079$ amu

$m\ (_{91}Pa^{231}) = 237.05121$ amu

$m(_1H_1) = 1.00783$ amu

Can U^{238} decay a proton $(_1H_1)$?

(1) Yes, $_{92}U^{238}$ decay a proton as $Q = +ve$

(2) Yes, $_{92}U^{238}$ decay a proton as $Q = -ve$

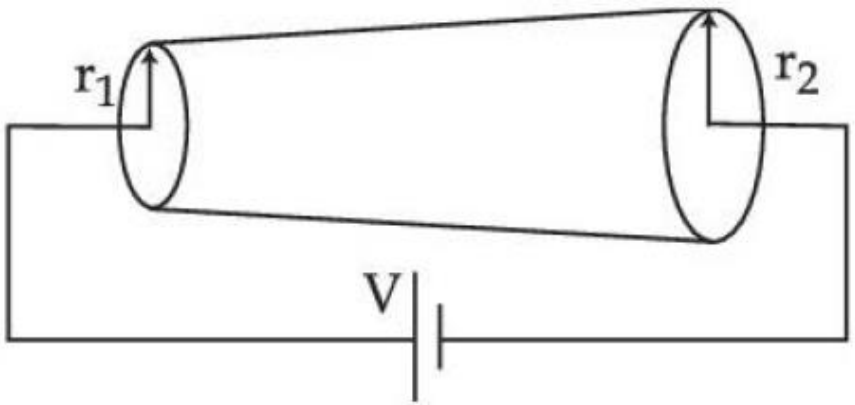
(3) No, $_{92}U^{238}$ cannot decay a proton as $Q = -ve$

(4) No, $_{92}U^{238}$ cannot decay a proton as $Q = +ve$

Question:

A conductor has non uniform area of cross section as shown. A potential difference V is applied to the conductor.

Choose the correct equation [J ⇒ current density]



(1) $J_1 r_1 = J_2 r_2$

(2) $J_1 r_1^2 = J_2 r_2^2$

(3) $J_1 r_2 = J_2 r_1$

(4) $J_1 r_2^2 = J_2 r_1^2$

Section Name:PHYSICS
Question:

Find the work done to separate two charges $Q_A = -6nC$ and $Q_B = +4nC$ placed 3 cm apart in vacuum. Assume there is no external field perscent. $\left(\frac{1}{4\pi\epsilon_0} = 9 \times 10^9 \text{ SI units}\right)$

(1) $W = +7.2 \times 10^{-6}$ J
(2) $W = -7.2 \times 10^{-6}$ J
(3) $W = -2.4 \times 10^{-6}$ J
(4) $W = +2.4 \times 10^{-6}$ J

Question:

Two concentric circular coils, one of small radius r_1 and other one of large radius r_2, are placed coaxially. Mutual inductance of the two coils is :

(1) $\frac{\mu_0 \pi r_1^2}{r_2}$

(2) $\frac{\mu_0 \pi r_2^2}{r_1}$

(3) $\frac{\mu_0 \pi r_1^2}{2r_2}$

(4) $\frac{\mu_0 \pi r_2^2}{2r_1}$

Section Name:PHYSICS
Question:

The ratio of contributions made by the electric field and magnetic field components to the intensity of an EM wave is :

Where c is speed of light in vacuum

(1) c : 1

(2) c^2 : 1

(3) 1 : c

(4) 1 : 1

Question:

In Faraday's second law of electromagnetic induction the formula of induced e.m.f. is given by $\epsilon = \frac{-N d\phi_B}{dt}$ what is the significance of negative sign $(-)$ given in above formula :

(1) direction of ϵ

(2) direction of induced current in open loop

(3) direction of ϵ and induced current in open loop

(4) direction of ϵ and induced current in closed loop

Section Name:PHYSICS
Question:

Superconductors completely expel the magnetic field lines. This phenomenon is called :

(1) Curic effect
(2) Cooper effect
(3) Meissner effect
(4) Diamagnetic effect

Section Name:PHYSICS
Question:

Two particles A_1 and A_2 of masses m_1 and m_2 ($m_1 > m_2$) have the same de Broglie's wavelength. Then their momenta and energies :

(1) both are same

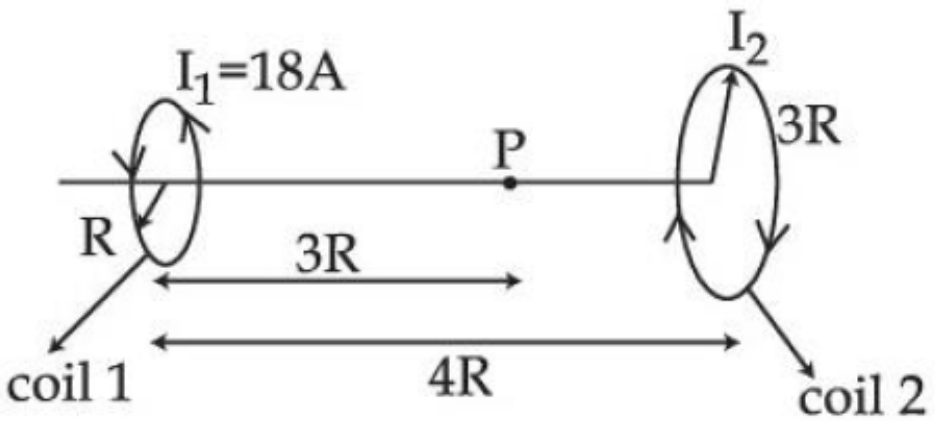
(2) same moments but energy of A_1 is less than the energy of A_2.

(3) same energy but different momenta

(4) same moments but energy of A_1 is more than the energy of A_2.

Question:

Two coils having radius R and 3R respectively are placed at a distance 4R apart, as shown in figure.



The value of current I_2 in coil 2 for which the net magnetic field at point P will be zero is given by :

(1) 9 A

(2) 1 A

(3) 2 A

(4) 3.5 A

Section Name:PHYSICS
Question:

Monochromatic light of frequency 6.0×10^{14} Hz is produced by a laser. The power emitted is 2.8×10^{-3} W. The average no. of photons emitted per second by the source is :

(1) 7×10^{15}

(2) 1×10^{14}

(3) 2×10^{15}

(4) 14×10^{15}

Section Name:PHYSICS
Question:

Two wires of equal thickness one of copper and the other of constantan, have the same resistance. What can be said about their lengths ?

(1) Length of the copper wire will be more than that of the constantan wire

(2) Length of the constantan wire will be more than that of the copper wire

(3) Both will have the same length

(4) Insufficient data to draw any conclusion

Section Name:PHYSICS
Question:

The phenomenon of resonance is common among systems that have a tendency to oscillate at a particular frequency. This frequency is called the system's natural frequency. In LCR series circuit :

(A) at resonance, rms current will be minimum

(B) at resonance, circuit is said to be pure resistive

(C) at resonance, power factor is unity

(D) at resonance, average power is zero

(E) at resonance, the voltage across resistor is equal to the voltage across inductor

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

(1) only (B) is correct

(2) (A), (B) and (C) are correct

(3) (B) and (C) are correct

(4) (B), (D) and (E) are correct

Section Name:PHYSICS
Question:

Time period of revolution of electron in the first allowed orbit of H-atom is To, the time period of revolution of electron in the 2^{nd} allowed orbit of H-atom will be :

(1) 2 To

(2) 4 To

(3) 8 To

(4) 16 To

Question:

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

	List - I		**List - II**
(A)	$Z = \sqrt{R^2 + (X_L - X_C)^2}$	(I)	At resonance
(B)	$Z = \sqrt{R^2 + X_L^2}$	(II)	Only CR circuit
(C)	$Z = \sqrt{R^2 + X_c^2}$	(III)	LCR series circuit
(D)	$Z = R$	(IV)	LR circuit

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

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

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

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

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

Section Name:PHYSICS
Question:

An electron is accelerated by a potential of 100 V. The de Broglie wavelength associated with electron then is : [given Planck's constant $h = 6.63 \times 10^{-34}$ Js, $m_e = 9.11 \times 10^{-31}$ kg]

(1) 1.27 nm

(2) 3.02 nm

(3) 0.127 nm

(4) 0.302 nm

Section Name:PHYSICS
Question:

What is the value of carbon resistor with colour bands of Red, Blue, Gold and silver respectively starting from left to right.

(1) $1.5 \pm 10\%$

(2) $2.6 \pm 5\%$

(3) $2.6 \pm 10\%$

(4) $1.5 \pm 5\%$

Section Name:PHYSICS
Question:

A galvanometer has a resistance of 100 Ω and it shows full scale deflection for a current of 10 mA. To convert the galvanometer into ammeter of range 0 to 100 mA, the required shunt is :

(1) 5.2 Ω

(2) 6.5 Ω

(3) 1.25 Ω

(4) 11.1 Ω

Section Name:PHYSICS
Question:

An emf is induced when a magnet is plunged into a coil. The strength of the induced emf is independent of :

(1) the strength of the magnet

(2) the number of turns in the coil

(3) the resistivity of the wire of the coil

(4) the speed with which the magnet is moved

Section Name:PHYSICS
Question:

An astronomical telescope has objective and eye piece of focal length 1 m and 6 cm respectively. To view an object 300 cm away from the objective, the maximum distance between the two lenses of the telescope should be :

(1) 106 cm

(2) 156 cm

(3) 170 cm

(4) 136 cm

Section Name: PHYSICS

Question:

The unit of surface integral of electric field is :

(1) NC^{-1}

(2) NmC^{-1}

(3) Vm^{-1}

(4) Vm

Section Name:PHYSICS
Question:

The phenomenon that supports the particle nature of radiation is :

(1) polarisation
(2) interference
(3) diffraction
(4) photoelectric effect

Section Name:PHYSICS
Question:

If three lenses each of focal length 2 cm are placed close to each other, then the power of the combination is :

(1) 0.025 D

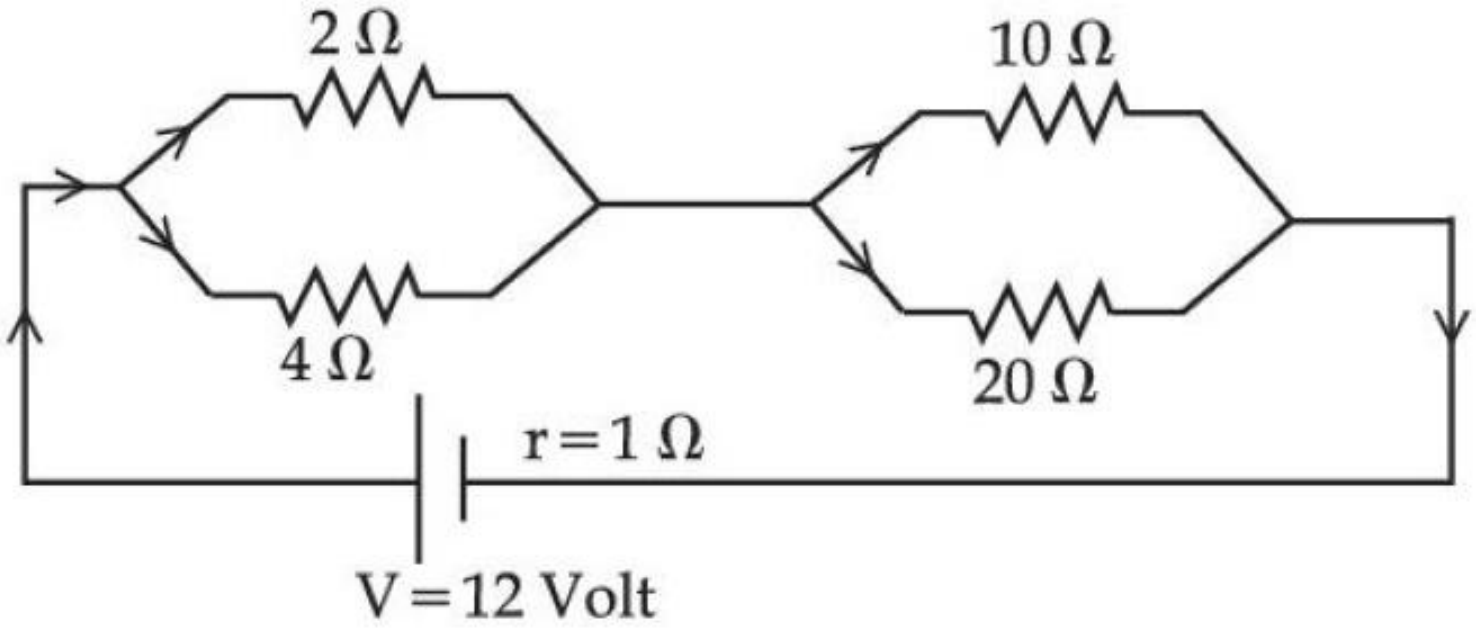
(2) −0.025 D

(3) 0.015 D

(4) +0.015 D

Question:

Current flowing through 2 Ω resistor in following circuit is :



(1) 1.5 A

(2) 0.88 A

(3) 2.6 A

(4) 0.7 A

Section Name:PHYSICS
Question:

Peak voltage of a carrier wave is 16 V. What should be the peak voltage of the modulating signal to have 100% modulation ?

(1) 0 volt
(2) 8 volt
(3) 16 volt
(4) −16 volt

Question:

An astronomical telescope has an objective of focal length 20 m and an eyepiece of focal length 2 cm :

(A) the length of telescope tube is 20.02 m

(B) the magnification is 1000

(C) the final image formed is inverted

(D) the magnification is 10

(E) the tube length is 22 m

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

(1) (A), (C), (D) only

(2) (A), (B), (C) only

(3) (A), (B), (C), (D) only

(4) (A), (D), (E) only

Section Name:PHYSICS
Question:

(A) Information source
(B) channel
(C) User of information
(D) Transmitter
(E) Receiver

Choose the correct sequence of communication system from the options given below :

(1) (A), (D), (E), (C), (B)
(2) (A), (D), (B), (E), (C)
(3) (A), (D), (C), (B), (E)
(4) (A), (C), (B), (D), (E)

Question:

A galvanometer of resistance 250 Ω has 30 divisions and figure of merit of 16 μA/division. It can be converted into a voltmeter to read 3 V by connecting a resistance of :

(1) 6 kΩ in series

(2) 6 kΩ in parallel

(3) 500 Ω in series

(4) 6.6 kΩ in series

Section Name:PHYSICS
Question:

(A) Radius of ${}_{z}X^{A}$ nuclei is given by $\gamma = \gamma_0 A^{1/3}$

(B) Nuclear density of ${}_{92}U^{235}$ is more than the nuclear density of ${}_{2}He^{4}$.

(C) Nuclear force is both attractive as well as repulsive

(D) Nuclear force is attractive only

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

(1) (A) and (D) only

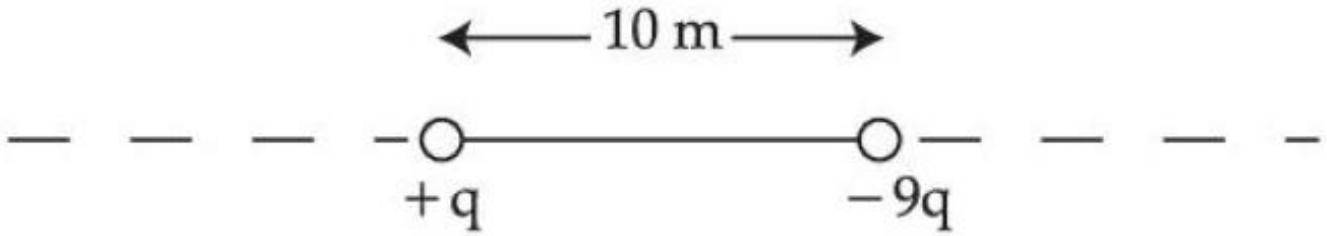
(2) (A) only

(3) (A) and (C)

(4) (D) only

Section Name:PHYSICS
Question:

Two charges $+q$ and $-9q$ are placed 10 m apart as shown.



Find the position of point P from $+q$ where net force on the test charge will be zero.

(1) $\frac{10}{3}$ m

(2) 5 m

(3) 2.5 m

(4) 4 m

Section Name:PHYSICS
Question:

In Geiger-Marsden experiment, when α-particles with kinetic energy 7.7 Mev are targeted, the least distance of closest approach is found to be $d_1 = 30$ fm. Now imagine, that the kinetic energy of incident α-particle is doubled, which changes the distance of closest approach to d_2. The sum $d = d_1 + d_2$ is

(1) 30 fm
(2) 60 fm
(3) 90 fm
(4) 45 fm

Section Name:PHYSICS
Question:

Susceptibility of a diamagnetic material lies in the range of :

(1) $-1 < \chi < 0$

(2) $0 < \chi < \epsilon_0$

(3) $\chi >> 1$

(4) $\chi << 0$

Question:

Current I flows through a conductor having area of cross-section A. If V_d is drift speed, and charge of each electron is 'e' then the number of electrons per unit volume of the conductor is :

(1) $\frac{I}{eAv_d}$

(2) $\frac{I}{eA^2v_d}$

(3) $\frac{Iv_d}{eA}$

(4) $\frac{I\,eA}{v_d}$

Section Name: PHYSICS
Question:

The wavelengths of the first two spectral lines in the Lyman series of the hydrogen spectrum (using Rydberg formula) are :

(1) 1218Å, 974.3Å

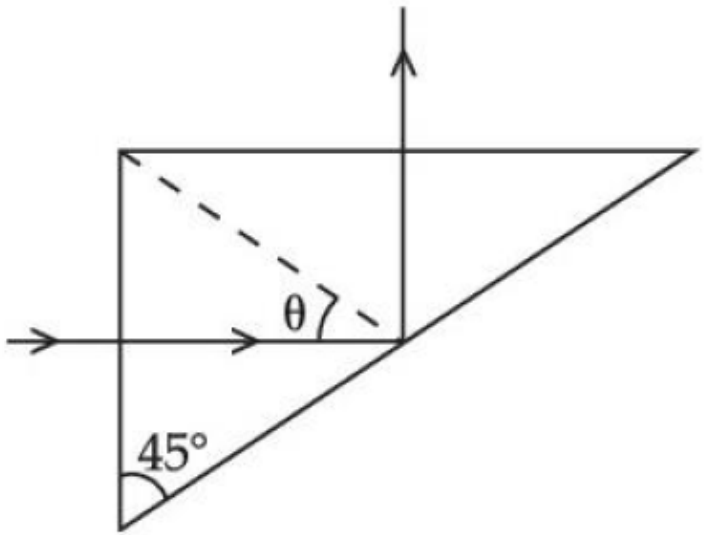
(2) 1218Å, 1028Å

(3) 1028Å, 974.3Å

(4) 951.4Å, 974.34Å

Question:

A ray of light incident normally on one face of a triangular glass prism is totally reflected if $\theta = 45°$, as shown.



The refractive index of glass is :

(1) less than 1.41

(2) equal to 1.41

(3) greater than 1.41

(4) equal to 1.0

Section Name:PHYSICS
Question:

An inductor of 4 mH is connected across a charged 16 nF capacitor. The angular frequency of free oscillations of the circuit is :

(1) $1.25 \times 10^{11}\ s^{-1}$

(2) $1.25 \times 10^{5}\ s^{-1}$

(3) $0.125\ s^{-1}$

(4) $1.99 \times 10^{4}\ s^{-1}$

Question:

The radius of curvature of a plano-convex lens is 20 cm. If the refractive index of the material of lens is 1.5, It will be :

(1) a convex lens for the obects that lie on its curved side

(2) a concave lens for the objects that lie on its curved side

(3) a convex lens irrespective of the side on which the object is lying

(4) a concave lens irrespective of the side on which the object is lying

Section Name:PHYSICS
Question:

To increase the magnification of a compound microscope :

(1) the focal length of objective should be increased and the focal length of eyepiece should be decreased

(2) the focal length of objective should be decreased and the focal length of eye piece should be increased

(3) the focal lengths of both the objective and the eyepiece should be decreased

(4) the focal length of both the objective and the eye piece should be increased

Section Name:PHYSICS
Question:

Read the text carefully and answer the questions.

In 1930, it was observed that solid state semiconductor material offer the possibility of controlled flow of electron through them. Just providing small voltage, heat or light, number of charge carries in a semiconductor can be altered. The devices made up of these materials do not require external heating or large space for operation unlike vacuum tube. The same conductor devices have long life and high reliability, therefore, these materials form the basis of new developement in technology. Now, more compact, efficient and reliable circuits can be developed using semiconductor materials adn devices.

Identify the semiconductor material from the following :

(1) Copper
(2) Silicon
(3) Calcium carbonate
(4) Iron sulphide

Section Name:PHYSICS
Question:

Read the text carefully and answer the questions.

In 1930, it was observed that solid state semiconductor material offer the possibility of controlled flow of electron through them. Just providing small voltage, heat or light, number of charge carries in a semiconductor can be altered. The devices made up of these materials do not require external heating or large space for operation unlike vacuum tube. The same conductor devices have long life and high reliability, therefore, these materials form the basis of new developement in technology. Now, more compact, efficient and reliable circuits can be developed using semiconductor materials adn devices.

Semiconductor material can be of two types, n-type and p-type. What will be minority carries in p-type semiconductor ?

(1) electrons
(2) holes
(3) protons
(4) positive ions

Section Name:PHYSICS
Question:

Read the text carefully and answer the questions.

In 1930, it was observed that solid state semiconductor material offer the possibility of controlled flow of electron through them. Just providing small voltage, heat or light, number of charge carries in a semiconductor can be altered. The devices made up of these materials do not require external heating or large space for operation unlike vacuum tube. The same conductor devices have long life and high reliability, therefore, these materials form the basis of new developement in technology. Now, more compact, efficient and reliable circuits can be developed using semiconductor materials adn devices.

According to the band theory, which of the following is considered as semiconductor material ?

(1) materials having very large gap between conduction band and valence band
(2) materials having large number of electrons in conduction band
(3) materials having small energy gap between valence band and conduction band
(4) material having zero energy gap between conduction band and valence band

Section Name:PHYSICS
Question:

Read the text carefully and answer the questions.

In 1930, it was observed that solid state semiconductor material offer the possibility of controlled flow of electron through them. Just providing small voltage, heat or light, number of charge carries in a semiconductor can be altered. The devices made up of these materials do not require external heating or large space for operation unlike vacuum tube. The same conductor devices have long life and high reliability, therefore, these materials form the basis of new developement in technology. Now, more compact, efficient and reliable circuits can be developed using semiconductor materials adn devices.

Which of the following is not correct for a solar cell ?

(1) It is basically a p-n junction diode.

(2) Its characteristics lie in fourth quadrant.

(3) It requires an external bias for its operation.

(4) It does not draw current but supplies the same to the load.

Section Name:PHYSICS
Question:

Read the text carefully and answer the questions.

In 1930, it was observed that solid state semiconductor material offer the possibility of controlled flow of electron through them. Just providing small voltage, heat or light, number of charge carries in a semiconductor can be altered. The devices made up of these materials do not require external heating or large space for operation unlike vacuum tube. The same conductor devices have long life and high reliability, therefore, these materials form the basis of new developement in technology. Now, more compact, efficient and reliable circuits can be developed using semiconductor materials adn devices.

Electron and hole concentration in a semiconductor at thermal equilibrium is given by the relation :

(1) $n_e n_u = n_i^2$

(2) $\frac{n_e}{nh} = n_i^2$

(3) $\frac{n_e}{nh} = (n_i + 1)^2$

(4) $n_e h_n = n_i$

Section Name:PHYSICS
Question:

Read the text carefully and answer the questions.

Young's double slit experiment (YDSE) is among the most famous experiments. It is used to verify the wave nature of light. In this experiment, alternate bright and dark regions are seen on the screen due to constructive and destructive superposition of light respectively. Huygen's theory and superposition principle completely describes, all the experimental findings in Young's double slit experiment.

When one slit is closed, then :

(1) interference pattern disappears and we see uniform illumination

(2) intensity of bright fringes decreases

(3) position of bright fringes and dark fringes inter changes. Intensity of bright fringes also decreases

(4) fringe width of both bright and dark fringes decreases

Section Name:PHYSICS
Question:

Read the text carefully and answer the questions.

Young's double slit experiment (YDSE) is among the most famous experiments. It is used to verify the wave nature of light. In this experiment, alternate bright and dark regions are seen on the screen due to constructive and destructive superposition of light respectively. Huygen's theory and superposition principle completely describes, all the experimental findings in Young's double slit experiment.

Monochromatic source of wavelength λ is placed symmetrically with respect to slits S_1 and S_2 (separation between them is d). screen is place at a distance D from the slits. What is the separation between the centres of 10^{th} bright fringe and that of 3rd dark fringe.

(1) $\left(\frac{17\lambda D}{2d}\right)$

(2) $\left(\frac{7\lambda D}{d}\right)$

(3) $\left(\frac{13\lambda D}{d}\right)$

(4) $\left(\frac{15\lambda D}{2d}\right)$

Section Name:PHYSICS
Question:

Read the text carefully and answer the questions.

Young's double slit experiment (YDSE) is among the most famous experiments. It is used to verify the wave nature of light. In this experiment, alternate bright and dark regions are seen on the screen due to constructive and destructive superposition of light respectively. Huygen's theory and superposition principle completely describes, all the experimental findings in Young's double slit experiment.

In the Young double slit experiment $I_1=I_2=I_0$ (with zero initial phase difference. Intensity at a point on the screen where path difference is $\frac{\lambda}{4}$.

[I_1 = Intensity of light energing from slits S_1,
and I_2 = Intensity of light energing from slits S_2]

(1) $2I_0$
(2) $4I_0$
(3) I_0
(4) $3I_0$

Question:

Read the text carefully and answer the questions.

Young's double slit experiment (YDSE) is among the most famous experiments. It is used to verify the wave nature of light. In this experiment, alternate bright and dark regions are seen on the screen due to constructive and destructive superposition of light respectively. Huygen's theory and superposition principle completely describes, all the experimental findings in Young's double slit experiment.

In a standard set up of Young's double slit experiment, fringe width is β. Now, the whole apparatus is immersed inside a medium of refractive index $\sqrt{\mu_r \epsilon_r}$. Fringe width inside the medium :

Here, μ_r and ϵ_r are relative permeabity of the medium & relative permittivity of the medium respectively.

(1) remains unchanged

(2) increase to $\sqrt{\mu_r \epsilon_r} - \beta$

(3) decreases to $\frac{\beta}{\sqrt{\mu_r \epsilon_r}}$

(4) increases to $\mu_r c_r \beta$.

Section Name:PHYSICS
Question:

Read the text carefully and answer the questions.

Young's double slit experiment (YDSE) is among the most famous experiments. It is used to verify the wave nature of light. In this experiment, alternate bright and dark regions are seen on the screen due to constructive and destructive superposition of light respectively. Huygen's theory and superposition principle completely describes, all the experimental findings in Young's double slit experiment.

Two sources S_1 and S_2 are coherent and sending light of intensities 4I & I to the screen. The ratio of maximum intensity to minimum intensity at the screen will be :

(1) 25 : 9

(2) 16 : 1

(3) 9 : 1

(4) 16 : 9