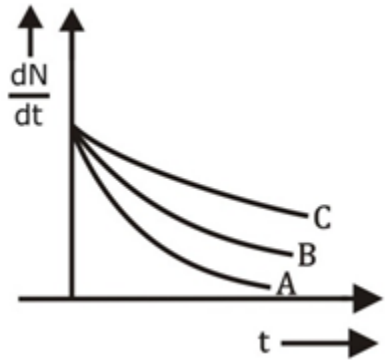
MOCK KCET Physics QP SET-2- Physics

Question 1: Which one of the following nuclei has a shorter mean life?



1. a. B
2. b. Same for all
3. c. A
4. d. C

Question 2: The conductivity of a semiconductor increases with an increase in temperature because

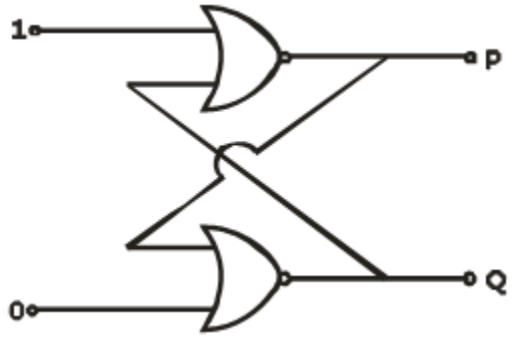
1. a. Relaxation time increases
2. b. Number density of current carriers increases, relaxation time decreases but the effect of decrease in relaxation time is much less than the increase in number density
3. c. Number density of charge carriers increases
4. d. Both number density of charge carriers and relaxation time increase

---

Question 3: For a transistor amplifier, the voltage gain

1. a. Is high at high and low frequencies and constant in the middle-frequency range
2. b. Constant at high frequencies and low at low frequencies
3. c. Remains constant for all frequencies
4. d. Is low at high and low frequencies and constant at mid frequencies

Question 4: In the following circuit, what are P and Q?



1. a. P = 1, Q = 0
2. b. P = 1, Q =1
3. c. P = 0, Q = 0
4. d. P = 0, Q =1

Question 5: An antenna uses electromagnetic waves of frequency 5 MHz. For proper working, the size of the antenna should be

1. a. 300 m
2. b. 3 km
3. c. 15 m
4. d. 15 km

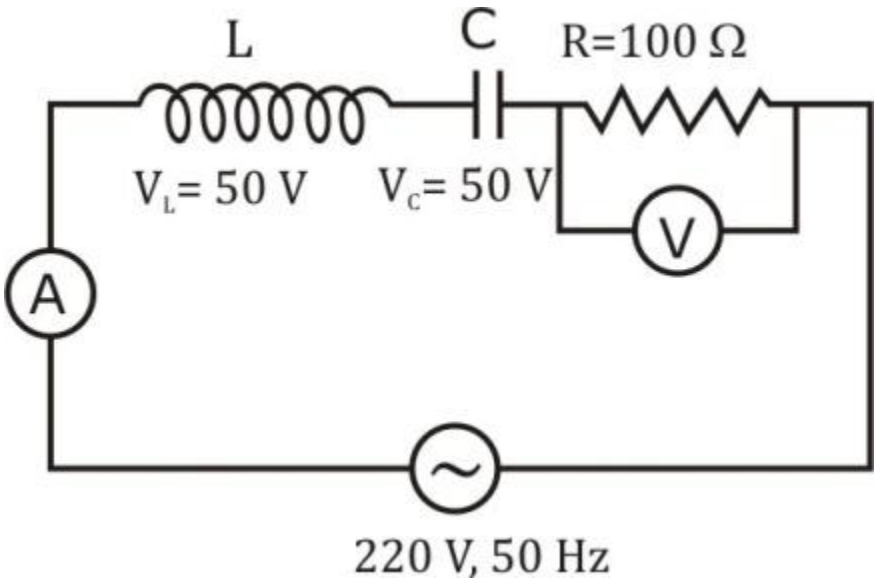
Question 6: A magnetic needle has a magnetic moment of 5×10^{-2} Am^2 and moment of inertia 8×10^{-6} kgm^2. It has a period of oscillation of 2s in a magnetic field $\vec{B}$. The magnitude of the magnetic field is approximately;

1. a. $0.4\times10^{-4}T$
2. b. $0.8\times10^{-4}T$
3. c. $1.6\times10^{-4}T$
4. d. $3.2\times10^{-4}T$

Question 7: A toroid has 500 turns per metre length. If it carries a current of 2A, the magnetic energy density inside the toroid is

1. a. 0.314 J/m^3
2. b. 3.14 J/m^3
3. c. 0.628 J/m^3
4. d. 6.28 J/m^3

Question 8: Consider the situation given in the figure. The wire AB is slid on the fixed rails with a constant velocity. If the wire AB is replaced by a semicircular wire, the magnitude of the induced current will

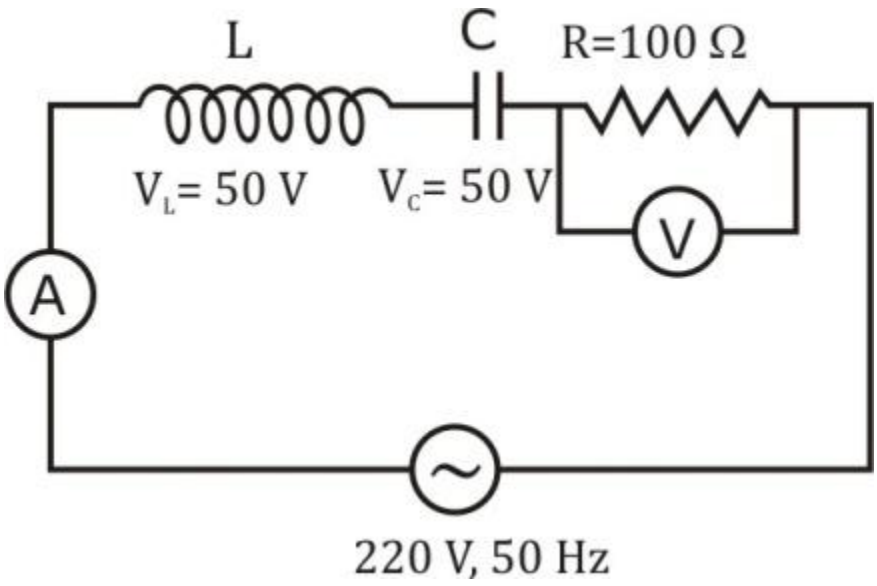


1. a. Remain same
2. b. Increase or decrease depending on whether the semicircle bulges towards the resistance or away from it
3. c. Increase
4. d. Decrease

Question 9: The frequency of an alternating current is 50 Hz. What is the minimum time taken by current to reach its peak value from rms value?

1. a. 2.5×10^{-3}s
2. b. 10×10^{-3}s
3. c. 5×10^{-3}s
4. d. 0.02 s

Question 10: The readings of ammeter and voltmeter in the following circuit are respectively

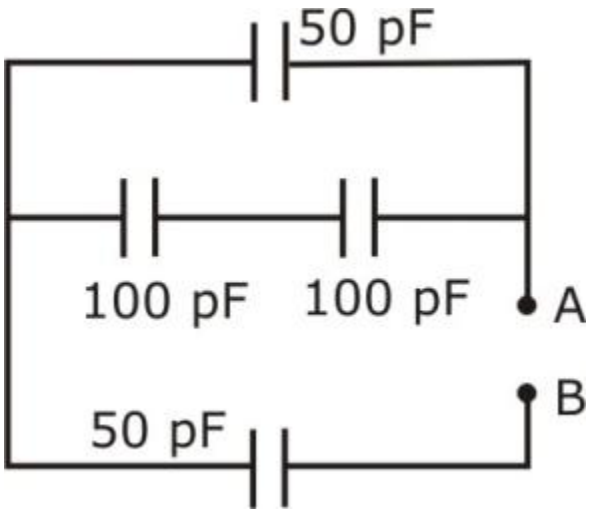


1. a. 1.5 A, 100 V
2. b. 2.2 A, 220 V
3. c. 1.2 A, 120 V
4. d. 2.7 A, 220 V

Question 11: Two metal plates are separated by 2 cm. The potentials of the plates are -10 V, and + 30 V. The electric field between the two plates is

1. a. 1000V/m
2. b. 3000V/m
3. c. 500V/m
4. d. 2000V/m

Question 12: The equivalent capacitance between A and B is,



1. a. 100/3 pF
2. b. 300 pF
3. c. 50 pF
4. d. 150 pF

Question 13: A capacitor of capacitance C charged by an amount Q is connected in parallel with an uncharged capacitor of capacitance 2C. The final charges on the capacitors are

1. a. Q/4, 3Q/4
2. b. Q/5, 4Q/5
3. c. Q/2, Q/2
4. d. Q/3, 2Q/3

Question 14: Though the electron drift velocity is small and the electron charge is very small, a conductor can carry an appreciably large current because

1. a. Drift velocity of the electron is very large
2. b. Relaxation time is small
3. c. Electron number density is very large
4. d. Electron number density depends on temperature

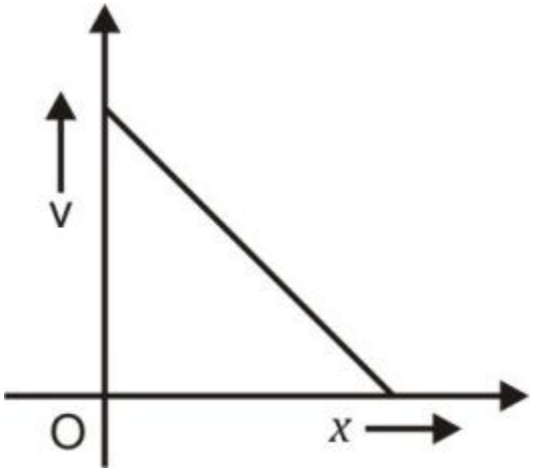
Question 15: Masses of three wires of copper are in the ratio 1:3:5 and their lengths are in the ratio 5:3:1. The ratio of their electrical resistance is

1. a. 5:3:1
2. b. 125:15:1
3. c. 1:3:5
4. d. 1:15:125

Question 16: If P, Q and R are physical quantities having different dimensions, which of the following combinations can never be a meaningful quantity?

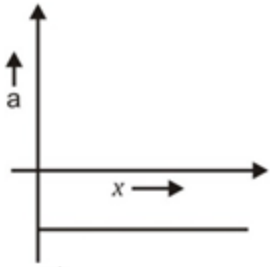
1. a. PQ-R
2. b. $(PR-Q^2)/R$
3. c. (P-Q)/R
4. d. PQ/R

Question 17: The given graph shows the variation of velocity (v) with position (x) for a particle moving along a straight line

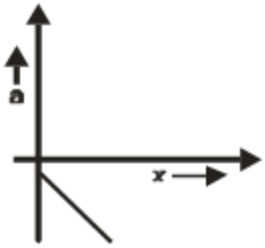


Which of the following graph shows the variation of acceleration (a) with position (x)?

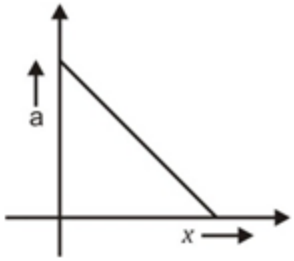
a.



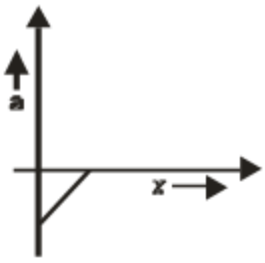
b.



c.



d.



Question 18: The trajectory of a projectile projected from the origin is given by the equation $y = x-2x^2/5$. The initial velocity of the projectile is?

1. a. 5 ms^{-1}
2. b. 5/2 ms^{-1}
3. c. 2/5 ms^{-1}
4. d. 25 ms^{-1}

Question 19: An object with mass 5 kg is acted upon by a force, $\vec{F} = -3\hat{i} + 4\hat{j}$ N. If it's initial velocity at t = 0 is $\vec{v} = 6\hat{i} - 2\hat{j}$ ms^{-1}, the time at which it will just have a velocity along y-axis is

1. a. 10 s
2. b. 15 s
3. c. 5 s
4. d. 2 s

Question 20: During inelastic collision between two objects, which of the following quantity always remains conserved?

1. a. Total mechanical energy
2. b. Speed of each body
3. c. Total kinetic energy
4. d. Total linear momentum

Question 21: In Rutherford experiment, for a head-on collision of α -particles with a gold nucleus, the impact parameter is

1. a. of the order of 10^{-14} m
2. b. of the order of 10^{-6} m
3. c. zero
4. d. of the order of 10^{-10} m

Question 21: In Rutherford experiment, for a head-on collision of α -particles with a gold nucleus, the impact parameter is

1. a. of the order of 10^{-14} m
2. b. of the order of 10^{-6} m
3. c. zero
4. d. of the order of 10^{-10} m

Question 22: Frequency of revolution of an electron revolving in n^{th} orbit of H-atom is proportional to

1. a. n
2. b. $1/n^3$
3. c. $1/n^2$
4. d. n independent of n

Question 23: A hydrogen atom in ground state absorbs 10.2 eV of energy. The orbital angular momentum of the electron is increased by

1. a. 2.11×10^{-34} Js
2. b. 4.22×10^{-34} Js
3. c. 1.05×10^{-34} Js
4. d. 3.16×10^{-34} Js

Question 24: The end product of decay of ${}_{90}Th^{232}$ is ${}_{82}Pb^{208}$. The number of α and β particles emitted are respectively.

1. a. 6, 4
2. b. 4, 6
3. c. 3, 3
4. d. 6, 0

Question 25: Two protons are kept at a separation of 10 nm. Let F_n and F_e be the nuclear force and the electromagnetic force between them

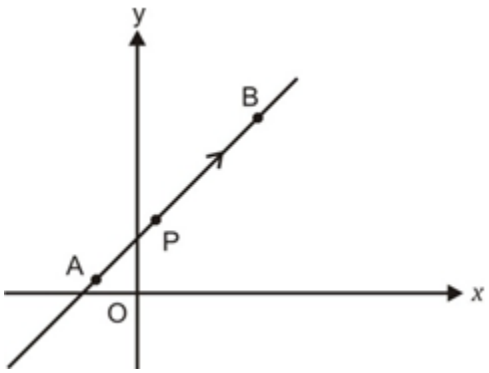
a. $F_e >> F_n$

1. a. $F_e >> F_n$
2. b. F_e and F_n differ only slightly
3. c. $F_e = F_n$
4. d. $F_e << F_n$

Question 26: Two particles which are initially at rest move towards each other under the action of their mutual attraction. If their speeds are v and 2v at any instant, then the speed of the centre of mass of the system is,

1. a. Zero
2. b. v
3. c. 2v
4. d. 1.5 v

Question 27:A particle is moving uniformly along a straight line as shown in the figure. During the motion of the particle from A to B, the angular momentum of the particle about 'O'



1. a. Decreases
2. b. First increases then decreases
3. c. Increases
4. d. Remains constant

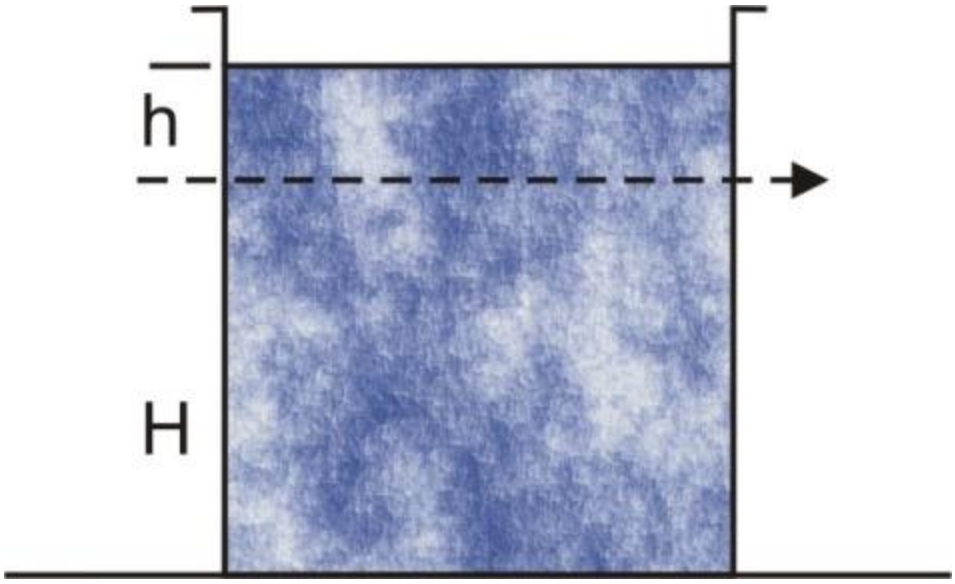
Question 28: A satellite is orbiting close to the earth and has a kinetic energy K. The minimum extra kinetic energy required by it to just overcome the gravitation pull of the earth is

1. a. 2K
2. b. $2\sqrt{2}$
3. c. K
4. d. $\sqrt{3}K$

Question 29: A wire is stretched such that its volume remains constant. The Poisson's ratio of the material of the wire is

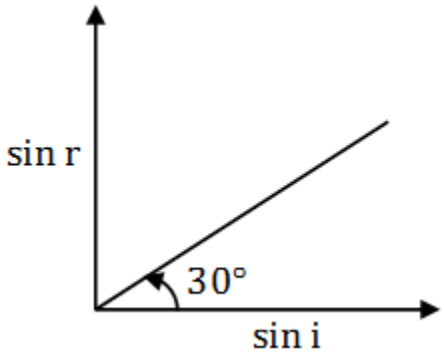
1. a. -0.50
2. b. -0.25
3. c. 0.50
4. d. 0.25

Question 30: A cylindrical container containing water has a small hole at height of H = 8 cm from the bottom and at a depth of 2 cm from the top surface of the liquid. The maximum horizontal distance travelled by the water before it hits the ground (x) is



1. a. $4\sqrt{2}$ cm
2. b. 6 cm
3. c. 8 cm
4. d. 4 cm

Question 31: A transparent medium shows relation between i and r as shown. If the speed of light in vaccum is c, the Brewster angle for the medium is



1. a. 45^0
2. b. 90^0
3. c. 30^0
4. d. 60^0

Question 32: In Young's double slit experiment, using monochromatic light of wavelength λ, the intensity of light at a point on the screen where path difference is λ is K units. The intensity of light at a point where path difference is λ/3 is

1. a. K/4
2. b. 2K
3. c. K
4. d. 4K

Question 33: Due to Doppler's effect, the shift in wavelength observed is 0.1 Å for a star producing wavelength 6000 Å. Velocity of recession of the star will be

1. a. 10 km/s
2. b. 20 km/s
3. c. 25 km/s
4. d. 5 km/s

Question 34: An electron is moving with an initial velocity $\vec{V} = V_0 \hat{i}$ and is in a uniform magnetic field $\vec{B} = B_0 \hat{j}$. Then, it's de Broglie wavelength

1. a. Increases with time
2. b. Increases and decreases periodically
3. c. Remains constant
4. d. Decreases with time

Question 35: Light of certain frequency and intensity incident on a photosensitive material causes the photoelectric effect. If both the frequency and intensity are doubled, the photoelectric saturation current becomes.

1. a. doubled
2. b. unchanged
3. c. quadrupled
4. d. halved

Question 36: A certain charge 2Q is divided at first into two parts q_1 and q_2. Later, the charges are placed at a certain distance. If the force of interaction between two charges is maximum then Q/Q_1 = __.

1. a. 2
2. b. 0.5
3. c. 4
4. d. 1

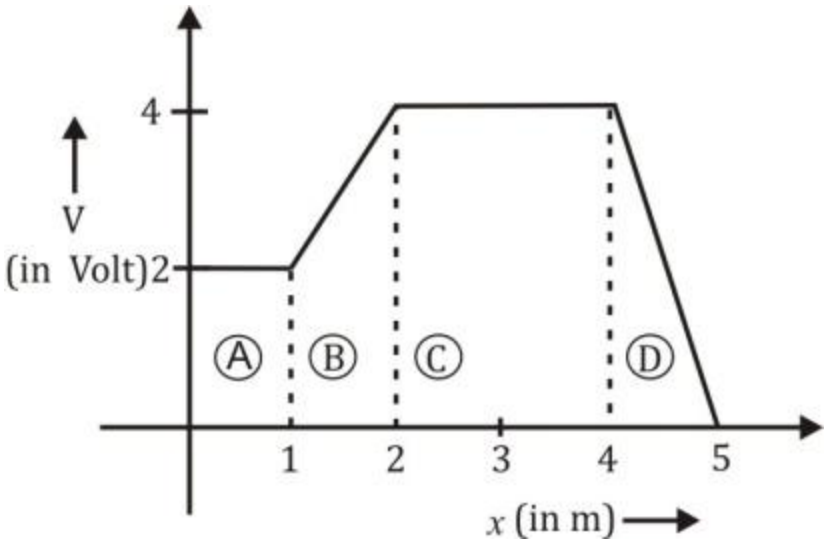
Question 37: A particle of mass m and charge q is placed at rest in uniform electric field E and then released. The kinetic energy attained by the particle after moving a distance y is

1. a. qE^2y
2. b. q^2Ey
3. c. qEy^2
4. d. qEy

Question 38: An electric dipole is kept in a non-uniform electric field. It generally experiences

1. a. A force but not a torque
2. b. Neither a force nor a torque
3. c. A force and torque
4. d. A torque but not a force

Question 39: The figure gives the electric potential V as a function of distance through four regions on x-axis. Which of the following is true for the magnitude of the electric field E in these regions?



1. a. $E_A = E_C$ and $E_B < E_D$
2. b. $E_A < E_B < E_C < E_D$
3. c. $E_A > E_B > E_C > E_D$
4. d. $E_B = E_D$ and $E_A < E_C$

Question 40: A system of two charges separated by a certain distance apart stores electrical potential energy. If the distance between them is increased, the potential energy of the system,

1. a. Decreases in any case
2. b. Remains the same
3. c. Increases in any case
4. d. May increase or decrease

Question 41: In a cyclotron, a charged particle

1. a. Speeds up between the dees because of the magnetic field
2. b. Slows down within a dee and speeds up between dees
3. c. Undergoes acceleration all the time
4. d. Speeds up in dee

Question 42: The number of turns in a coil of Galvanometer is tripled, then

1. a. Voltage sensitivity remains constant and current sensitivity increases 3 times
2. b. Both voltage and current sensitivity decreases by 33%
3. c. Voltage sensitivity increases 3 times and current sensitivity remains constant
4. d. Both voltage and current sensitivity remains constant

Question 43: A circular current loop of magnetic moment M is in an arbitrary orientation in an external uniform magnetic field $\vec{B}$. The work done to rotate the loop by 30^0 about an axis perpendicular to its plane is

1. a. $\sqrt{3}MB/2$
2. b. zero
3. c. MB
4. d. MB/2

Question 44: In a permanent magnet at room temperature

1. a. The individual molecules have a nonzero magnetic moment which are all perfectly aligned
2. b. Domains are all perfectly aligned
3. c. Magnetic moment of each molecule is zero
4. d. Domains are partially aligned

Question 45: Coersivity of a magnet where the ferromagnet gets completely demagnetized is 3×10^3 Am^{-1}. The minimum current required to be passed in a solenoid having 1000 turns per metre, so that the magnet gets completely demagnetized when placed inside the solenoid is

1. a. 60 mA
2. b. 6A
3. c. 30 mA
4. d. 3A

Question 46: An inductor of inductance L and resistor R are joined together in series and connected by a source of frequency ω. The power dissipated in the circuit is

a. $\frac{V^2R}{R^2+\omega^2L^2}$

b. $\frac{V^2R}{\sqrt{R^2+\omega^2L^2}}$

c. $\frac{R^2+\omega^2L^2}{V}$

d. $\frac{V}{R^2+\omega^2L^2}$

Question 47: An electromagnetic wave is travelling in x-direction with electric field vector given by $E_y\rightarrow=E_0\sin(kx-\omega t)\hat{j}$. The correct expression for magnetic field vector is

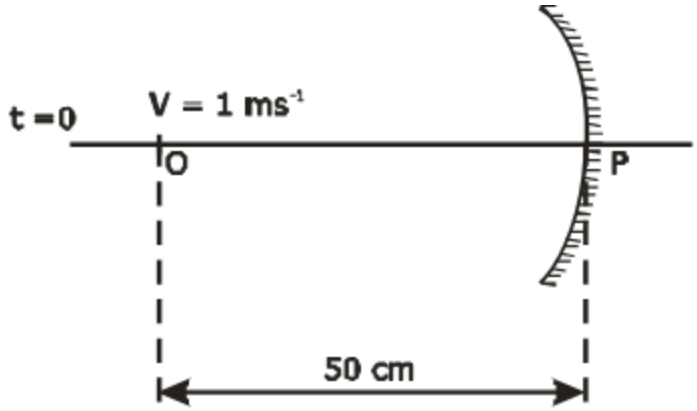
1. a. $B_z\rightarrow=E_0C\sin(kx-\omega t)\hat{k}$
2. b. $B_z\rightarrow=E_0C\sin(kx-\omega t)\hat{k}$
3. c. $B_y\rightarrow=E_0C\sin(kx-\omega t)\hat{j}$
4. d. $B_y\rightarrow=E_0C\sin(kx-\omega t)\hat{j}$

Question 48: The phenomenon involved in the reflection of radio-waves by ionosphere is similar to

1. a. Total internal reflection of light in the air during a mirage
2. b. Scattering of light by air particles
3. c. Reflection of light by plane mirror
4. d. Dispersion of light by water molecules during the formation of a rainbow

---

Question 49: A point object is moving uniformly towards the pole of a concave mirror of focal length 25 cm along its axis as shown below. The speed of the object is $1ms^{-1}$. At t = 0, the distance of the object from the mirror is 50 cm. The average velocity of the image formed by the mirror between time t = 0 and t = 0.25 s is:

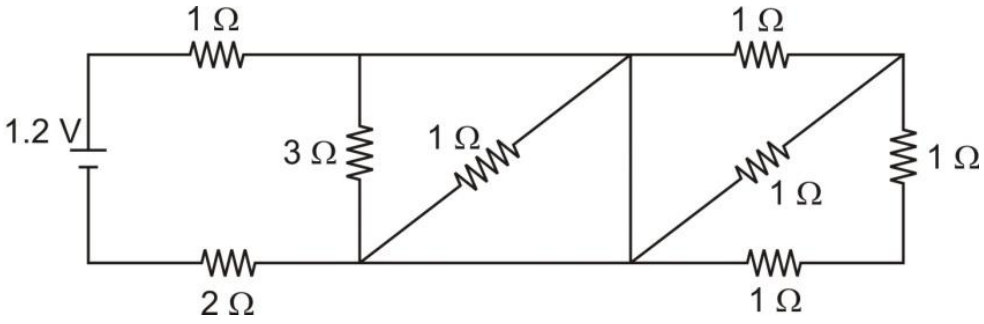


1. a. 20 cm s^{-1}
2. b. Infinity
3. c. 40 cm s^{-1}
4. d. Zero

Question 50: A certain prism is found to produce a minimum deviation of 38^0. It produces a deviation of 44^0 when the angle of incidence is either 42^0 or 62^0. What is the angle of incidence when it is undergoing minimum deviation?

1. a. 40^0
2. b. 60^0
3. c. 30^0
4. d. 49^0

Question 51: In the given circuit, the current through 2 ohm resistor is

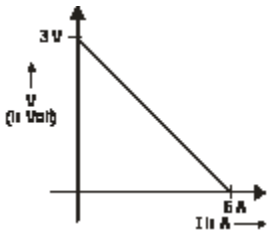


1. a. 0.3A
2. b. 0.1A
3. c. 0.2A
4. d. 0.4A

Question 52: Kirchhoff's junction rule is a reflection of

1. a. Conservation of energy
2. b. Conservation of charges
3. c. Conservation of current density vector
4. d. Conservation of momentum

Question 53: The variation of terminal potential difference (V) with current flowing through a cell is as shown



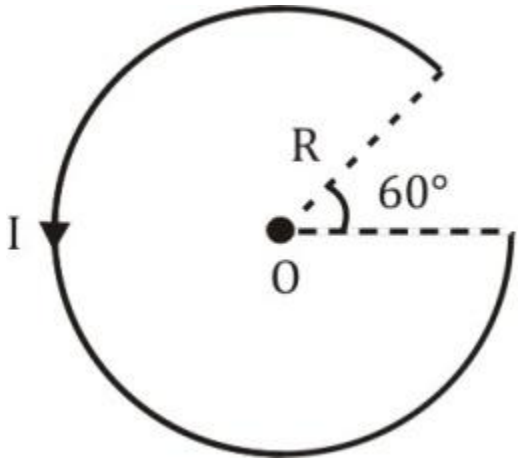
The emf and internal resistance of the cell are

1. a. 3V, 0.5 ohm
2. b. 6V, 0.5 ohm
3. c. 3V,2 ohm
4. d. 6V,2 ohm

Question 54: In a potentiometer experiment, the balancing point with a cell is at a length 240 cm. On shunting the cell with a resistance of 2 Ω, the balancing length becomes 120 cm. The internal resistance of the cell is

1. a. 2 Ω
2. b. 0.5 Ω
3. c. 4 Ω
4. d. 1 Ω

Question 55: The magnetic field at the centre 'O' in the given figure is

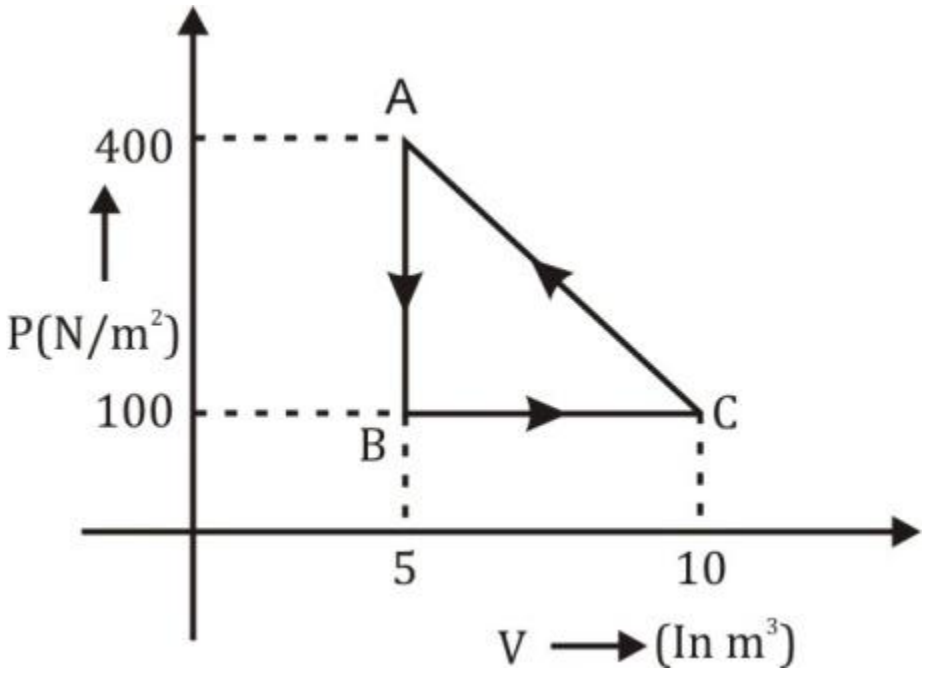


1. a. $5\mu_0 I/12\ R$
2. b. $\mu_0 I/12\ R$
3. c. $7\mu_0 I/14\ R$
4. d. $3\mu_0 I/10\ R$

Question 56: An aluminium sphere is dipped into the water. Which of the following is true?

1. a. Buoyancy will be more in water at 0^0C than that in water at 4^0C
2. b. Buoyancy may be more or less in water at 4^0C depending on the radius of the sphere
3. c. Buoyancy will be less in water at 0^0C than that in water at 4^0 C
4. d. Buoyancy in water at 0^0C will be same as that in water at 4^0C

Question 57: A thermodynamic system undergoes a cyclic process ABC as shown in the diagram. The work done by the system per cycle is



1. a. -1250 J
2. b. 1250 J
3. c. 750 J
4. d. -750 J

Question 58: One mole of O_2 gas is heated at constant pressure starting at 27 ^{0}C. How much energy must be added to the gas as heat to double it's volume?

1. a. 450 R
2. b. 1050 R
3. c. Zero
4. d. 750 R

Question 59: A piston is performing S.H.M. in the vertical direction with a frequency of 0.5 Hz. A block of 10 kg is placed on the piston. The maximum amplitude of the system such that the block remains in contact with the piston is

1. a. 0.5 m
2. b. 0.1 m
3. c. 1 m
4. d. 1.5 m

Question 60: The equation of a stationary wave is $y=2\sin(\pi x15)\cos(48\pi t)$. The distance between a node and it's next antinode is

1. a. 1.5 units
2. b. 30 units
3. c. 7.5 units
4. d. 22.5 units