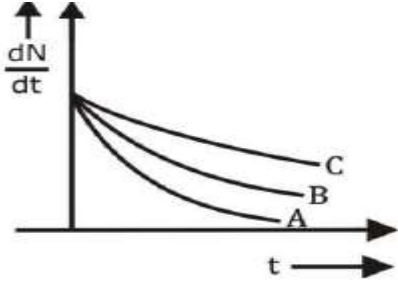




KCET 2019 PHYSICS QUESTION PAPER

1. Which one of the following nuclei has shorter mean life?



- a) B
- b) Same for all
- c) A
- d) C

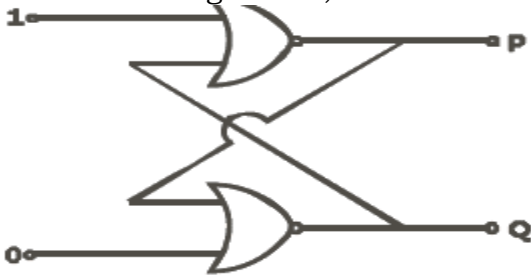
2. The conductivity of semiconductor increases with increase in temperature because

- a) Relaxation time increases
- b) Number density of current carriers increases, relaxation time decreases but effect of decreases in relaxation time is much less than increases in number density
- c) Number density of charges carriers increases
- d) Both number density of charge carriers and relaxation time increase

3. For a transistor amplifier, the voltage gain

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

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



- a) $P=1, Q=0$
- b) $P=1, Q=1$
- c) $P=0, Q=0$
- d) $P=0, Q=1$

5. An antenna uses electromagnetic waves of frequency 5 MHz. for proper working the wave of the antenna should be

- a) 300 m
- b) 3 km
- c) 15 m
- d) 15 km

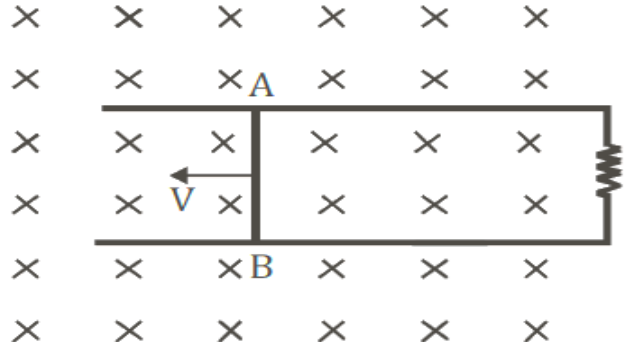
6. A magnetic needle has a magnetic moment of $5 \times 10^{-2} \text{ Am}^2$ and moment of inertia $8 \times 10^{-6} \text{ kgm}^2$. It has period of oscillation of 2s in a magnetic field B. The magnitude of magnetic field is approximately

- a) $0.4 \times 10^{-4} \text{ T}$
- b) $0.8 \times 10^{-4} \text{ T}$
- c) $1.6 \times 10^{-4} \text{ T}$
- d) $3.2 \times 10^{-4} \text{ T}$

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

- a) 0.314 J/m^3
- b) 3.14 J/m^3
- c) 0.628 J/m^3
- d) 6.28 J/m^3

8. Consider the situation given in figures. 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



- a) Remain same
- b) Increase or decrease depending on whether the semicircle bulges towards the resistance or away from it
- c) Increase
- d) Decrease

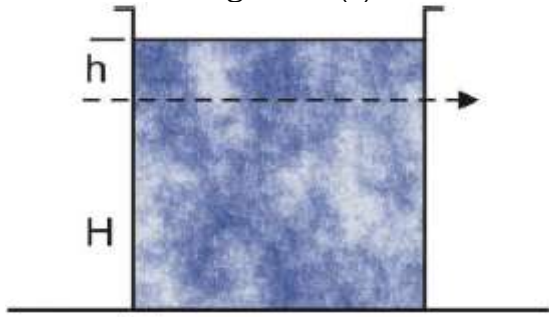
9. The frequency of an alternating current is 50 Hz. What is the minimum time taken by current to reach its peak value from rms value?

- a) $2.5 \times 10^{-3} \text{ s}$
- b) $10 \times 10^{-3} \text{ s}$
- c) $5 \times 10^{-3} \text{ s}$
- d) 0.22 s

30. 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 $\frac{\lambda}{3}$ is

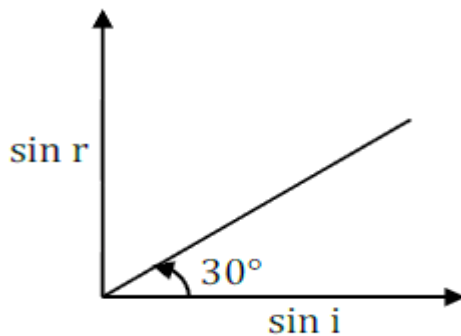
- a) $\frac{K}{4}$ b) $2K$
c) K d) $4K$

31. A cylindrical container containing water has a small hole of height of $H = 8\text{ cm}$ 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



- a) $4\sqrt{2}\text{ cm}$ b) 6 cm
c) 8 cm d) 4 cm

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



- a) 45° b) 90°
c) 30° d) 60°

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

- a) 10 km/s b) 20 km/s
c) 25 km/s d) 5 km/s

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 its de Broglie wavelength

- a) Increases with time
b) Increases and decreases periodically
c) Remains constant
d) Decreases with time

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

- a) Doubled b) Unchanged
c) Quadrupled d) Halved

36. A certain charge $2Q$ is divided at first 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 $\frac{Q}{q_1}$

- a) 2 b) 0.5
c) 4 d) 1

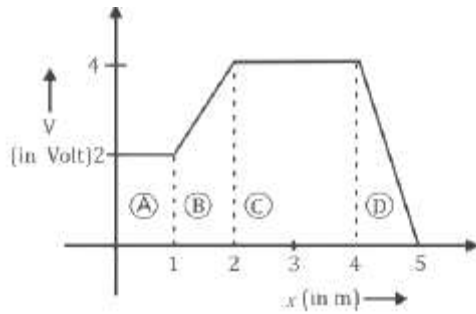
37. A particle of mass m and charge q is placed at rest in uniform electric field E and then released. The kinetic energy attained by the particle after moving a distance y is

- a) qE^2y b) q^2Ey
c) qEy^2 d) qEy

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

- a) A force but not a torque
b) Neither a force nor a torque
c) A force and torque
d) A torque but not a force

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?



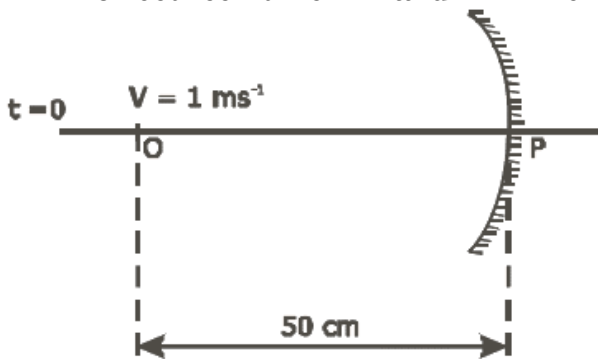
- a) $E_A = E_C$ and $E_B < E_D$
 b) $E_A < E_B < E_C < E_D$
 c) $E_A > E_B > E_C > E_D$
 d) $E_B = E_D$ and $E_A < E_C$
40. A system of two charges separated by a certain distance apart stores electrical potential energy. If the distance between them is increased, the potential energy of the system,
 a) Decrease in any case
 b) Remains the same
 c) Increase in any case
 d) May increase or decrease
41. In a cyclotron, a charged particle
 a) Speeds up between the dees because of the magnetic field
 b) Slows down with in a dee and speeds up between dees
 c) Undergoes acceleration all the time
 d) Speeds up in dee
42. The number of turns in a coil of Galvanometer is tripled, then
 a) Voltage sensitivity remains constant and current sensitivity increases 3 times
 b) Both voltage and current sensitivity decreases by 33%
 c) Voltage sensitivity increases 3 times and current sensitivity remains constant
 d) Both voltage and current sensitivity remains constant
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° about an axis perpendicular to its plane is
 a) $\sqrt{3} \frac{MB}{2}$
 b) Zero
 c) MB
 d) $\frac{MB}{2}$
44. In a permanent magnet at room temperature
 a) The individual molecules have nonzero magnetic moment which are all perfectly aligned.
 b) Domains are all perfectly aligned
 c) Magnetic moment of each molecule is zero
 d) Domains are partially aligned
45. Coersivity of a magnet where the ferromagnet gets completely demagnetized is $3 \times 10^3 \text{ Am}^{-1}$. 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
 a) 60 mA
 b) 6A
 c) 30 mA
 d) 3 A
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) $\frac{V^2 R}{R^2 + \omega^2 L^2}$
 b) $\frac{V^2 R}{\sqrt{R^2 + \omega^2 L^2}}$
 c) $\frac{R^2 + \omega^2 L^2}{V}$
 d) $\frac{V}{R^2 + \omega^2 L^2}$
47. An electromagnetic wave is travelling in x - direction with electric field vector given by $\vec{E}_v = E_0 \sin(kx - \omega t) \hat{j}$. The correct expression for magnetic field vector is
 a) $\vec{B}_z = E_0 C \sin(kx - \omega t) \hat{k}$
 b) $\vec{B}_z = \frac{E_0}{C} \sin(kx - \omega t) \hat{k}$
 c) $\vec{B}_y = E_0 C \sin(kx - \omega t) \hat{j}$
 d) $\vec{B}_y = \frac{E_0}{C} \sin(kx - \omega t) \hat{j}$
48. The phenomenon involved in the reflection of radio - waves by ionosphere is similar to
 a) Total internal reflection of light in air during a mirage
 b) Scattering of light by air particles

- c) Reflection of light by plane mirror
 d) Dispersion of light by water molecules during the formation of a rainbow

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

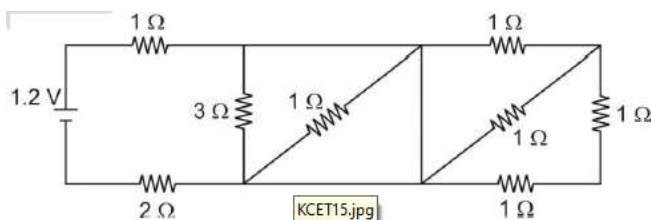
- a) 40° b) 60°
 c) 30° d) 49°

50. A point object is moving uniformly towards the pole of concave mirror of focal length 25 cm along its axis shown below. The speed of the object is 1 ms^{-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 $t = 0.25 \text{ s}$ is:



- a) 20 cm s^{-1} b) Infinity
 c) 40 cm s^{-1} d) Zero

51. In the given circuit, the current through 2Ω resistor is

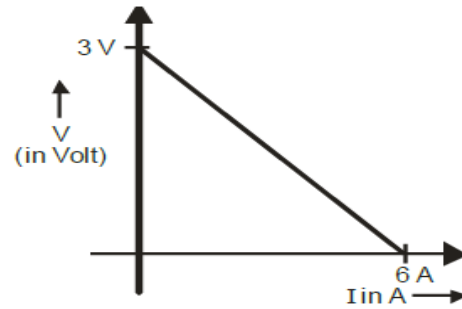


- a) 0.3 A b) 0.1 A
 c) 0.2 A d) 0.4 A

52. Kirchhoff's junction rule is a reflection of

- a) Conservation of energy
 b) Conservation of charges
 c) Conservation of current density vector
 d) Conservation of momentum

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



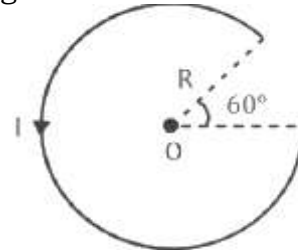
The emf and internal resistance of the cell are

- a) $3 \text{ V}, 0.5 \Omega$ b) $6 \text{ V}, 0.5 \Omega$
 c) $3 \text{ V}, 2 \Omega$ d) $6 \text{ V}, 2 \Omega$

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

- a) 2Ω b) 0.5Ω
 c) 4Ω d) 1Ω

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

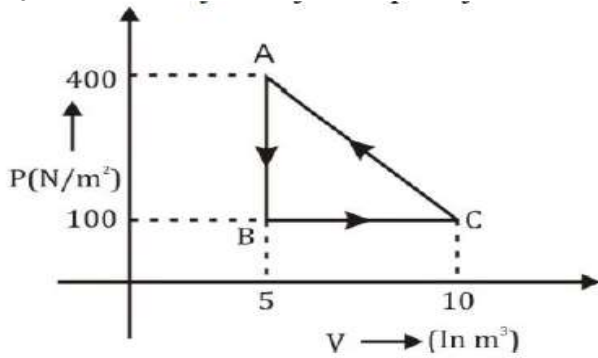


- a) $\frac{5}{12} \frac{\mu_0 I}{R}$ b) $\frac{\mu_0 I}{12 R}$
 c) $\frac{7}{14} \frac{\mu_0 I}{R}$ d) $\frac{3}{10} \frac{\mu_0 I}{R}$

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

- a) Buoyancy will be more in water at 0° than that in water at 4° C
 b) Buoyancy may be more or less in water at 4° C depending on the radius of the sphere
 c) Buoyancy will be less in water at 0° C than water at 4° C
 d) Buoyancy in water at 0° C will be same as that in water at 4° C

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



- a) -1250 J b) 1250 J
c) 750 J d) -750 J

58. One mole of O_2 gas is heated at constant pressure starting at $27^\circ C$. How much energy must be added to the gas as heat to double its volume?

- a) 450 R b) 1050 R
c) Zero d) 750 R

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

- a) 0.5 m b) 0.1 m
c) 1 m d) 1.5 m

60. The equation of a stationary wave is

$$y = 2 \sin\left(\frac{\pi x}{15}\right) \cos(48\pi t).$$

The distance between a node and its next antinode is

- a) 1.5 units b) 30 units
c) 7.5 units d) 22.5 units

ANSWER KEYS

1. (c)	2. (b)	3. (d)	4. (d)	5. (c)	6. (c)	7. (c)	8. (a)	9. (c)	10. (b)
11. (d)	12. (a)	13. (d)	14. (c)	15. (b)	16. (c)	17. (d)	18. (a)	19. (a)	20. (d)
21. (c)	22. (b)	23. (c)	24. (a)	25. (a)	26. (a)	27. (d)	28. (c)	29. (c)	30. (c)
31. (d)	32. (a)	33. (d)	34. (c)	35. (a)	36. (d)	37. (d)	38. (c)	39. (a)	40. (d)
41. (c)	42. (a)	43. (b)	44. (d)	45. (d)	46. (a)	47. (b)	48. (a)	49. (b)	50. (d)
51. (d)	52. (b)	53. (a)	54. (a)	55. (a)	56. (c)	57. (d)	58. (b)	59. (c)	60. (c)