MOCK KCET Physics QP SET-4

Question 1: A substance of mass 49.53 g occupies 1.5 cm^3 of volume. The density of the substance (in g cm^3) with the correct number of significant figures is

1. a. 3.302
2. b. 3.300
3. c. 3.3
4. d. 3.30

Question 2: A car moving with a velocity of 20 ms^{-1} is stopped in a distance of 40 m. If the same car is travelling at double the velocity, the distance travelled by it for the same retardation is

1. a. 640 m
2. b. 320 m
3. c. 1280 m
4. d. 160 m

Question 3: The angle between velocity and acceleration of a particle describing uniform circular motion is

1. a. 45º
2. b. 60º
3. c. 90º
4. d. 180º

Question 4: If $\vec{A} = 2\hat{i}+3\hat{j}+8\hat{k}$ is perpendicular to $\vec{B} = 4\hat{j}-4\hat{i}+\alpha\hat{k}$ then the value of ‘α’ is

1. a. 1 / 2
2. b. -1 / 2
3. c. 1
4. d. –1

Question 5: A body of mass 50 kg, is suspended using a spring balance inside a lift at rest. If the lift starts falling freely, the reading of the spring balance is

1. a. = 50 kg
2. b. > 50 kg
3. c. < 50 kg
4. d. = 0

Question 6: A motor pump lifts 6 tones of water from a well of depth 25m to the first floor of height 35 m from the ground floor in 20 minutes. The power of the pump (in kW) is [g = 10 ms^{-2}]

1. a. 3
2. b. 6
3. c. 1.5
4. d. 12

Question 7: Two balls are thrown simultaneously in the air. The acceleration of the centre of mass of the two balls when in air

1. a. depends on the masses of the two balls
2. b. depends on the speeds of the two balls
3. c. is equal to g (Acceleration due to gravity)
4. d. depends on the direction of motion of the two balls

Question 8: The value of acceleration due to gravity at a depth of 1600 km is equal to [Radius of earth = 6400 km]

1. a. 9.8 ms^{-2}
2. b. 19.6 ms^{-2}
3. c. 4.9 ms^{-2}
4. d. 7.35 ms^{-2}

Question 9: ‘Young’s modulus is defined as the ratio of

1. a. tensile stress and longitudinal strain
2. b. hydraulic stress and hydraulic strain
3. c. shearing stress and shearing strain
4. d. bulk stress and longitudinal strain

Question 10: ‘Hydraulic lift’ works on the basis of

1. a. Stoke’s law
2. b. Toricelli’s law
3. c. Pascal’s law
4. d. Bernoulli’s law

Question 11: The S.I. unit of specific heat capacity is

1. a. J mol^{-1} K^{-1}
2. b. J kg^{-1} K^{-1}
3. c. J K^{-1}
4. d. J kg

Question 12: For which combination of working temperatures, the efficiency of ‘Carnot’s engine’ is the least?

1. a. 60K, 40 K
2. b. 40K, 20K
3. c. 80K, 60K
4. d. 100K, 80K

Question 13: The mean energy of a molecule of an ideal gas is

1. a. 2 KT
2. b. [3 / 2] KT
3. c. KT
4. d. 1 / 2 KT

Question 14: Two simple pendulums A and B are made to oscillate simultaneously and it is found that A completes 10 oscillations in 20 sec and B completes 8 oscillations in 10 sec. The ratio of the lengths of A and B is

1. a. 8 / 5
2. b. 64 / 25
3. c. 5 / 4
4. d. 25 / 64

Question 15: The waves set up in a closed pipe are

1. a. Transverse and progressive
2. b. Longitudinal and stationary
3. c. Transverse and stationary
4. d. Longitudinal and progressive

Question 16: Two spheres of electric charges +2 nC and −8 nC are placed at a distance‘d’ apart. If they are allowed to touch each other, what is the new distance between them to get a repulsive force of the same magnitude as before?

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

Question 17: Three-point charges of +2q, + 2q and –4q are placed at the corner A, B and C of an equilateral triangle ABC of side ‘x’. The magnitude of the electric dipole moment of this system is

1. a. 2 qx
2. b. 2 √3 qx
3. c. 3 √2 qx
4. d. 3 qx

Question 18: 4×10^{10} electrons are removed from a neutral metal sphere of diameter 20 cm placed in air. The magnitude of the electric field (in NC^{-1}) at a distance of 20 cm from its centre is

1. a. 5760
2. b. 1440
3. c. 640
4. d. Zero

Question 19: Two-point charges A = +3 nC and B = 1nC are placed 5 cm apart in the air. The work done to move charge B towards A by 1 cm is

1. a. 1.35×10^{-7} J
2. b. 2.7×10^{-7} J
3. c. 2.0×10^{-7} J
4. d. 12.1×10^{-7} J

Question 20: A system of 2 capacitors of capacitance 2μF and 4μF is connected in series across a potential difference of 6V. The electric charge and energy stored in the system are

1. a. 10 μC and 30 μJ
2. b. 36 μC and 108 μJ
3. c. 8 μC and 24 μJ
4. d. 1 μC and 2 μJ

Question 21: The minimum value of effective capacitance that can be obtained by combining 3 capacitors of capacitances 1pF, 2pF and 4pF is

1. a. (4 / 7) pF
2. b. 1 pF
3. c. (7 / 4) pF
4. d. 2 pF

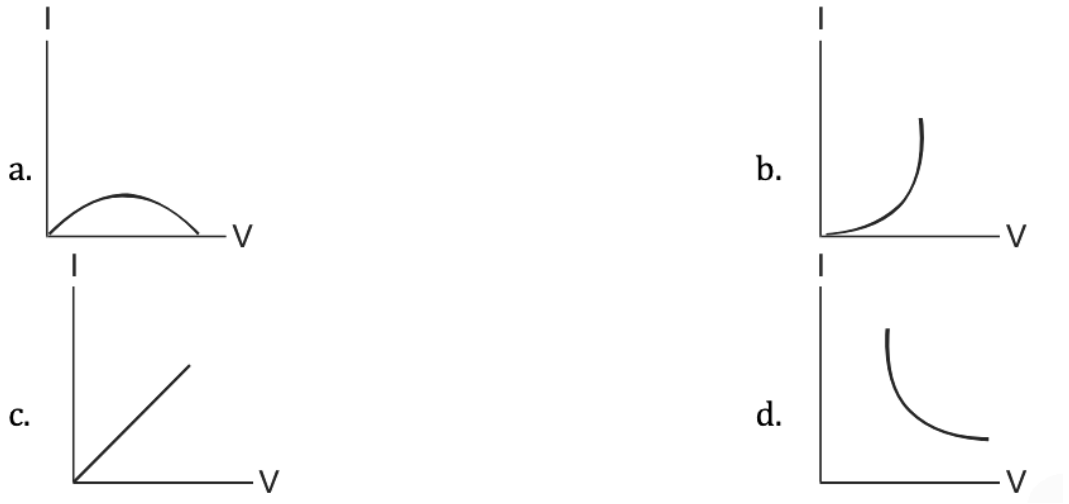
Question 22: A cylindrical conductor of diameter 0.1 mm carries a current of 90 mA. The current density (in Am^{-2}) is ($\pi \simeq 3$)

1. a. 1.2×10^{7}
2. b. 2.4×10^{7}
3. c. 3×10^{6}
4. d. 6×10^{6}

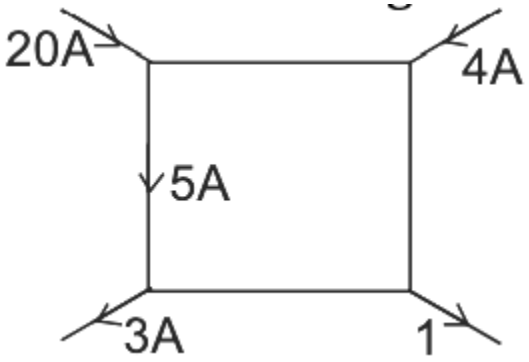
Question 23: A piece of copper is to be shaped into a conducting wire of maximum resistance. The suitable length and diameter are _____ and _____respectively.

1. a. L and d
2. b. 2 L and d
3. c. L / 2 and 2 d
4. d. L and d / 2

Question 24: Of the following graphs, the one that correctly represents the I –V characteristics of a 'Ohmic device' is

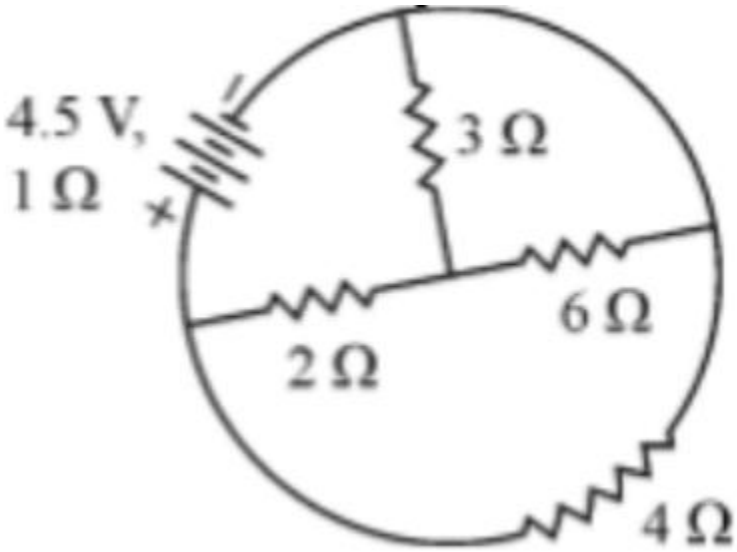


Question 25: The value of I in the figure shown below is



1. a. 8A
2. b. 21A
3. c. 19A
4. d. 4A

Question 26: The power dissipated in 3Ω resistance in the following circuit is



1. a. – 261 kJ
2. b. + 103 kJ
3. c. +261 kJ
4. d. –103 kJ

Question 27: In metre bridge experiment, with a standard resistance in the right gap and a resistance coil dipped in water (in a beaker) in the left gap, the balancing length obtained is ‘l’. If the temperature of the water is increased, the new balancing length is

1. a. > 1
2. b. < 1
3. c. = 1
4. d. = 0

Question 28: A proton, a deuteron and an α - particle is projected perpendicular to the direction of a uniform magnetic field with same kinetic energy. The ratio of the radii of the circular paths described by them is

1. a. 1 : √2 : 1
2. b. 1 : √2 : √2
3. c. √2 : 1 : 1
4. d. √2 : √2 : 1

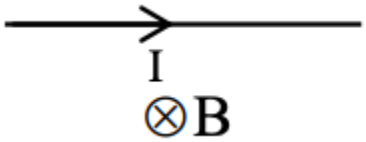
Question 29: A galvanometer of resistance 50 Ω is connected to a battery of 3V along with a resistance of 2950 Ω in series shows full-scale deflection of 30 divisions. The additional series resistance required to reduce the deflection to 20 divisions is

1. a. 1500 Ω
2. b. 4440 Ω
3. c. 7400 Ω
4. d. 2950 Ω

Question 30: The magnetic field at the centre of a current-carrying loop of radius 0.1 m is 5 √5 times that at a point along its axis. The distance of this point from the centre of the loop is

1. a. 0.2 m
2. b. 0.1m
3. c. 0.05m
4. d. 0.25m

Question 31: A straight wire of length 50 cm carrying a current of 2.5 A is suspended in mid-air by a uniform magnetic field of 0.5 T (as shown in the figure). The mass of the wire is ($g = 10\ ms^{-2}$)



1. a. 62.5 gm
2. b. 250 gm
3. c. 125 gm
4. d. $Cu_2O + FeS$

Question 32: Which of the following properties is ‘False’ for a bar magnet?

1. a. Its poles cannot be separated.
2. b. It points in North-South direction when suspended
3. c. It’s like poles repel and unlike poles attract.
4. d. It doesn’t produce a magnetic field

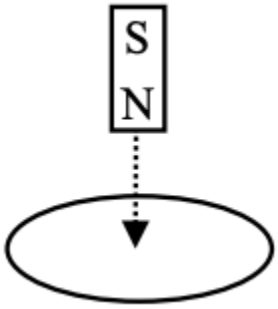
Question 33: A magnetic dipole of the magnetic moment 6×10^{-2} Am^2 and moment of inertia 12×10^{-6} kgm^2 performs oscillation in a magnetic field of 2×10^{-2} T. The time taken by the dipole to complete 20 oscillations is ($\pi \simeq 3$)

1. a. 36 s
2. b. 6s
3. c. 12 s
4. d. 18 s

Question 34: The susceptibility of a ferromagnetic substance

1. a. >>1
2. b. > 1
3. c. < 1
4. d. zero

Question 35: A bar magnet is allowed to fall vertically through a copper coil placed in a horizontal plane. The magnet falls with a net acceleration



1. a. = g
2. b. > g
3. c. < g
4. d. zero

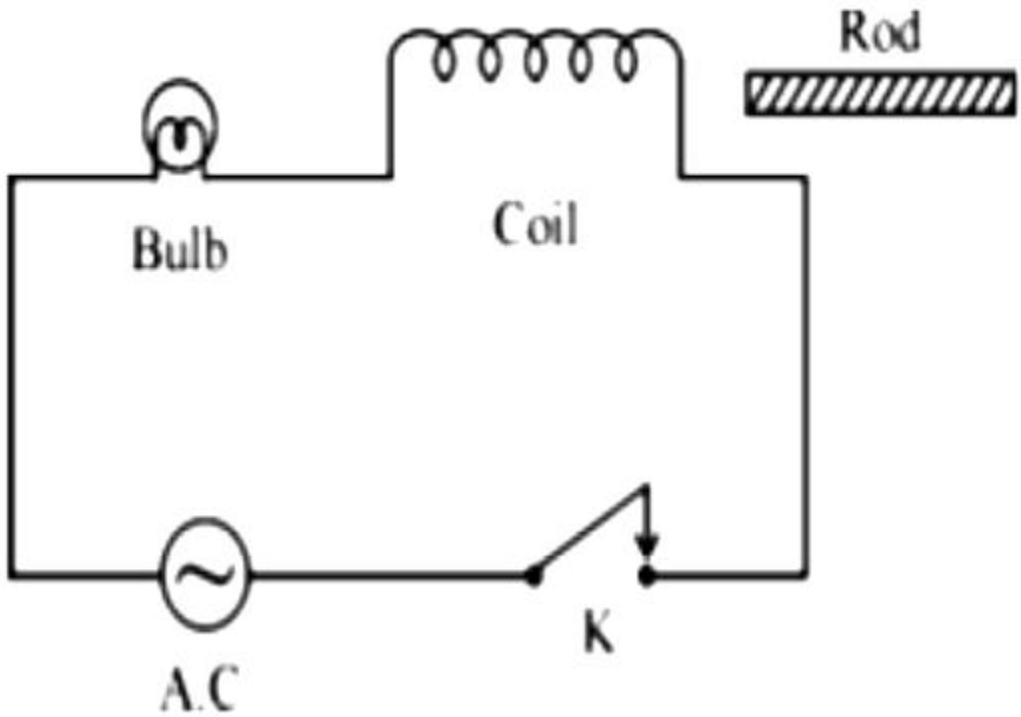
Question 36: The working of magnetic braking of trains is based on

1. a. Alternating current
2. b. Eddy current
3. c. Steady current
4. d. Pulsating current

Question 37: A jet plane of wingspan 20 m is travelling towards the west at a speed of 400 ms^{-1}. If the earth's total magnetic field is 4×10^{-4} T and the dip angle is 30º, at that place, the voltage difference developed across the ends of the wing is

1. a. 1.6 V
2. b. 3.2 V
3. c. 0.8 V
4. d. 6.4 V

Question 38: In the A.C. circuit shown, keeping 'K' pressed if an iron rod is inserted into the coil, the bulb in the circuit,



1. a. Glows more brightly
2. b. Glows less brightly
3. c. Glows with same brightness (as before the rod is inserted)
4. d. Gets damaged

Question 39: The output of a step-down transformer is measured to be 48 V when connected to a 12 w bulb. The value of peak current is

1. a. $(1 / \sqrt{2})$ A
2. b. $(\sqrt{2})$ A
3. c. $(1 / 2\sqrt{2})$ A
4. d. (1 / 4) A

Question 40: A coil of inductive reactance $(1 / \sqrt{3})\ \Omega$ and resistance 1Ω is connected to a 200 V, 50 Hz A.C. supply. The time lag between the maximum voltage and current is

1. a. (1 / 300) s
2. b. (1 / 600) s
3. c. (1 / 500) s
4. d. (1 / 200) s

Question 41: If E and B represent electric and magnetic field vectors of an electromagnetic wave, the direction of propagation of the wave is along

1. a. E
2. b. B
3. c. $E \times B$
4. d. $B \times E$

Question 42: According to Cartesian sign convention, in ray optics

1. a. all distances are taken positive
2. b. all distances are taken negative
3. c. all distances in the direction of the incident ray are taken positive
4. d. all distances in the direction of the incident ray are taken negative

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Question 43: A linear object of height 10 cm is kept in front of a concave mirror of radius of curvature 15 cm, at a distance of 10 cm. The image formed is

1. a. magnified
2. b. magnified and inverted
3. c. diminished and erect
4. d. diminished and inverted

Question 44: During scattering of light, the amount of scattering is inversely proportional to _____ of the wavelength of light,

1. a. cube
2. b. square
3. c. fourth power
4. d. Half

Question 45: In Young's double-slit experiment if yellow light is replaced by blue light, the interference fringes become

1. a. wider
2. b. narrower
3. c. brighter
4. d. darker

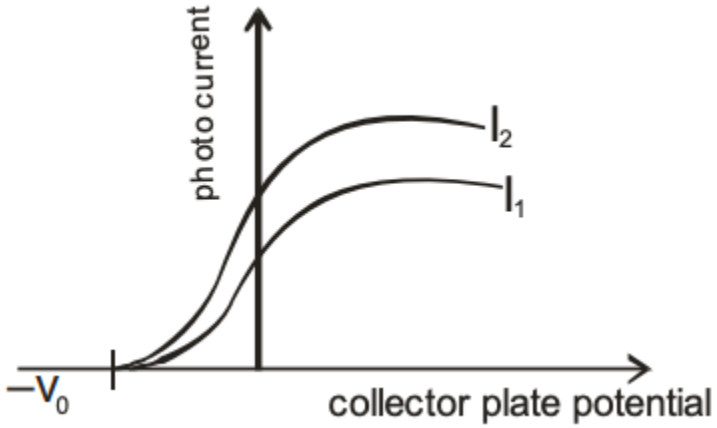
Question 46: According to Huygens' principle, during refraction of light from air to a denser medium

1. a. Wavelength and speed decrease
2. b. Wavelength and speed increase
3. c. Wavelength increases but speed decreases
4. d. Wavelength decreases but speed increases

Question 47: In a system of two crossed polarizers, it is found that the intensity of light from the second polarizer is half from that of the first polariser. The angle between their pass axes is

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

Question 48: From the following graph of photocurrent against collector plate potential, for two different intensities of light I_1 and I_2, one can conclude



1. a. $I_1 = I_2$
2. b. $I_1 > I_2$
3. c. $I_1 < I_2$
4. d. Comparison is not possible

Question 49: A particle is dropped from a height ‘H’. The de’Broglie wavelength of the particle depends on height as

1. a. H
2. b. H^0
3. c. $H^{1/2}$
4. d. $H^{-1/2}$

Question 50: The scientist who is credited with the discovery of ‘nucleus’ in an atom is

1. a. J.J. Thomson
2. b. Rutherford
3. c. Niels Bohr
4. d. Balmer

Question 51: The energy (in eV) required to excite an electron from n = 2 to n = 4 state in the hydrogen atom is

1. a. + 2.55
2. b. – 3.4
3. c. – 0.85
4. d. + 4.25

Question 52: In a nuclear reactor the function of the Moderator is to decrease

1. a. Number of neutrons
2. b. Speed neutrons
3. c. Escape of neutrons
4. d. Temperature of the reactor

Question 53: The particles emitted in the decay of $^{238}_{92}U$ to $^{234}_{92}U$

1. a. 1 α and 2 β
2. b. 1 α only
3. c. 1 α and 1 β
4. d. 2 α and 2 β

Question 54: The mass defect of $^{4}_{2}He$ is 0.03μ. The binding energy per nucleon of helium (in MeV) is

1. a. 27.93
2. b. 6.9825
3. c. 2.793
4. d. 69.825

Question 55: The energy gap in case of which of the following is less than 3 eV?

1. a. copper
2. b. Iron
3. c. Zener diode
4. d. Germanium

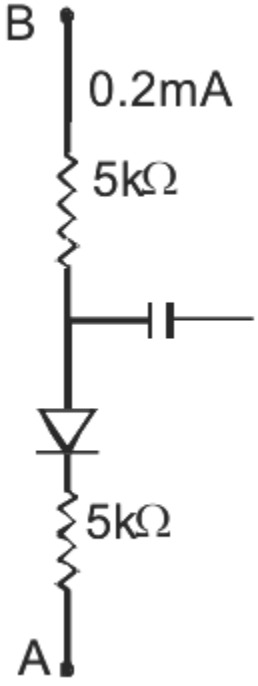
Question 56: Which of the following semiconducting devices is used as a voltage regulator?

1. a. Photo diode
2. b. LASER diode
3. c. Zener diode
4. d. Solar cell

Question 57: In the three parts of a transistor, ‘Emitter is of

1. a. Moderate size and heavily doped
2. b. Large size and lightly doped
3. c. Thin size and heavily doped
4. d. Large size and moderately doped

Question 58: In the figure shown, if the diode forward voltage drop is 0.2 V, the voltage difference between A and B is



1. a. 1.3 V
2. b. 2.2 V
3. c. 0
4. d. 0.5 V

Question 59: Which of the following logic gates is considered as ‘universal’?

a. 

b. 

c. 

d. 

Question 60: A basic communication system consists of

(a) Transmitter

(b) Information source

(c) User of information

(d) Channel

(e) Receive

1. a. a, b, c, d and e
2. b. b, a, d, e and c
3. c. b, d, a, c and e
4. d. b, e, a, d and c