NEET 2020 Paper

Date : 13th September 2020

Time : 02 : 00 pm - 5 : 00 pm

Subject : Physics

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1. For transistor action, which of the following statements is correct ?
(1) Both emitter junction as well as the collector junction are forward biased.
(2) The base region must be very thin and lightly doped.
(3) Base, emitter and collector regions should have same doping concentrations.
(4) Base, emitter and collector regions should have same size.

Sol. **(2)**
For a transistor action, the base junction must be lightly doped so that the base region is very thin.

2. A spherical conductor of radius 10 cm has a charge of 3.2×10^{-7} C distributed uniformly. what is the magnitude of electric field at a point 15 cm from the centre of the sphere ?

$$\left(\frac{1}{4\pi\varepsilon_0} = 9 \times 10^9 \text{Nm}^2 / \text{C}^2\right)$$

Sol. **(4)**

$$E = \frac{kQ}{r^2} = \frac{9 \times 10^9 \times 3.2 \times 10^{-7}}{15 \times 15 \times 10^{-4}}$$

$$E = \frac{3.2}{25} \times 10^6 = 0.128 \times 10^6$$

$E = 1.28 \times 10^5$ N/C

3. Assume that light of wavelength 600 nm is coming from a star. The limit of resolution of telescope whose objective has a diameter of 2m is:
(1) 7.32×10^{-7} rad (2) 6.00×10^{-7} rad (3) 3.66×10^{-7} rad (4) 1.83×10^{-7} rad

Sol. **(3)**

$$\Delta\theta_{min} = \frac{1.22\lambda}{d} = \frac{1.22 \times 600 \times 10^{-9}}{2}$$

$\Delta\theta_{min} = 3.66 \times 10^{-7}$ rad

4. Dimensions of stress are :
(1) $[ML^0T^{-2}]$ (2) $[ML^{-1}T^{-2}]$ (3) $[MLT^{-2}]$ (4) $[ML^2T^{-2}]$

Sol. **(2)**

$$\text{Stress} = \frac{F}{A} = \frac{M^1L^1T^{-2}}{L^2} = ML^{-1}T^{-2}$$

5. A screw gauge has least count of 0.01 mm and there are 50 divisions in its circular scale. The pitch of the screw gauge is :

(1) 0.5 mm (2) 1.0 mm (3) 0.01 mm (4) 0.25 mm

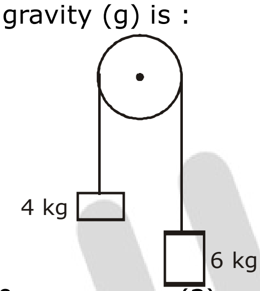
Sol. **(1)**

$$\text{Least Count} = \frac{\text{Pitch}}{\text{no. of division on circular scale}}$$

$$= 0.01 = \frac{\text{pitch}}{50}$$

Pitch = 0.01 × 50 = 0.5 mm

6. Two bodies of mass 4 kg and 6 kg are tied to the ends of a massless string. The string passes over a pulley which is frictionless (see figure). The acceleration of the system in terms of acceleration due to gravity (g) is :



(1) g/5 (2) g/10 (3) g (4) g/2

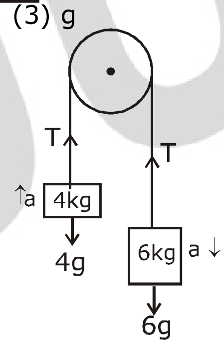
Sol. **(1)**

$6g - T = 6a$

$T - 4g = 4a$

$2g = 10a$

$a = \frac{g}{5} m/s^2$



7. An electron is accelerated from rest through a potential difference of V volt. If the de Broglie wavelength of the electron is 1.227×10^{-2} nm, the potential difference is :

(1) 10^3 V (2) 10^4 V (3) 10 V (4) 10^2V

Sol. **2**

For e^-, according to de-broglie's wavelength

$$\lambda = \frac{12.27}{\sqrt{v}} \text{Å} \Rightarrow \lambda = \frac{12.27}{\sqrt{v}} \times 10^{-10} = 1.227 \times 10^{-2} \times 10^{-9}$$

$$\frac{1}{\sqrt{v}} = \frac{1}{100} \Rightarrow v = 10^4 \text{ volt}$$

8. In a certain region of space with volume 0.2 m^3, the electric potential is found to be 5 V throughout. The magnitude of electric field in this region is :

(1) 1 N/C (2) 5 N/C (3) Zero (4) 0.5 N/C

Sol. 3

given v = const. (5 volt)

$\therefore E = -\frac{dv}{dr}$

E = 0

9. A cylinder contains hydrogen gas at pressure of 249 kPa and temperature 27°C. Its density is : (R = 8.3 J mol^{-1} K^{-1})

(1) 0.1 kg/m^3 (2) 0.02 kg/m^3 (3) 0.5 kg/m^3 (4) 0.2 kg/m^3

Sol. (4)

From ideal gas equation

$\therefore PV = nRT$

$\Rightarrow PV = \frac{m}{M}RT \qquad \therefore m = \rho V$

$PV = \frac{(\rho V)RT}{M}$

$\rho = \frac{PM}{RT} \Rightarrow \frac{249 \times 10^3 \times 2 \times 10^{-3}}{8.3 \times 300} \Rightarrow 0.2\ kg/m^3$

10. The mean free path for a gas, with molecular diameter d and number density n can be expressed as :

(1) $\frac{1}{\sqrt{2}n^2\pi d^2}$ (2) $\frac{1}{\sqrt{2}n^2\pi^2 d^2}$ (3) $\frac{1}{\sqrt{2}n\pi d}$ (4) $\frac{1}{\sqrt{2}\,n\pi d^2}$

Sol. 4

The mean free path for gas is given by

$\lambda = \frac{1}{\sqrt{2}\pi n d^2}$

11. A ball is thrown vertically downward with a velocity of 20m/s from the top of a tower. It hits the ground after some time with a velocity of 80m/s. The height of the tower is : (g= 10m/s^2)

(1) 320 m (2) 300 m (3) 360 m (4) 340 m

Sol. (2)

$v^2 - u^2 = 2as$

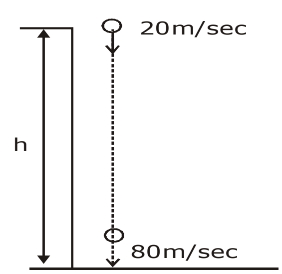
$(80)^2 - (-20)^2 = 2(-10) \times s$

$6400 - 400 = 2 \times (-10) \times s$

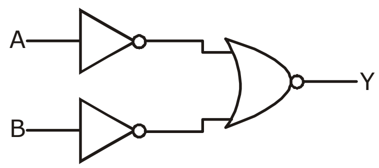
$\frac{-6000}{20} = s$

s = – 300 m

Height of tower h = 300 m



12. For the logic circuit shown, the truth table is :



(1)

A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

(2)

A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0

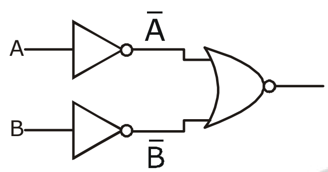
(3)

A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

(4)

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

Sol. **(3)**



$\overline{\overline{A}+\overline{B}} = \overline{\overline{A}}\cdot\overline{\overline{B}}$ = A.B (using de-Morgan's rule)

$\therefore$

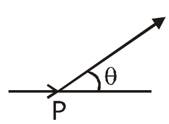
A	B	y = A.B
0	0	0
0	1	0
1	0	0
1	1	1

13. A short electric dipole has a dipole moment of 16×10^{-9} C m. The electric potential due to the dipole at a point at a distance of 0.6 m from the centre of the dipole, situated on a line making an angle of 60° with the dipole axis is :

$\left(\frac{1}{4\pi\varepsilon_0} = 9\times10^9 Nm^2 / C^2\right)$

(1) 400 V (2) Zero (3) 50 V (4) 200 V

Sol. **(4)**



$$V = \frac{kP\cos\theta}{r^2} = \frac{9\times10^9\times16\times10^{-9}\times1}{(0.6)^2\times2} = \frac{400}{2} = 200$$

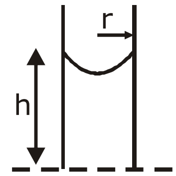
14. A capillary tube of radius r is immersed in water and water rises in it to a height h. The mass of the water in the capillary is 5g. Another capillary tube of radius 2r is immersed in water. The mass of water that will rise in this tube is :

(1) 10.0 g (2) 20.0 g (3) 2.5 g (4) 5.0 g

Sol. **(1)**

$h = \dfrac{2T\cos\theta}{rg}$ = m = ρ × volume = ρ × h × πr^2 = = 5 gm

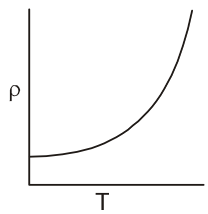
r′ = 2r

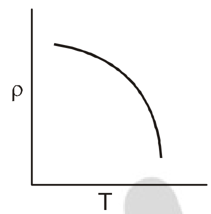


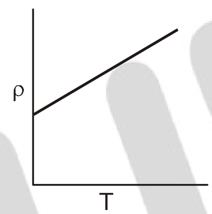
∴ h′ = h/2; m = $\rho \times \dfrac{h}{2} \times \pi(2r)^2$

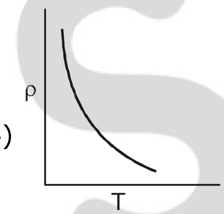
= ρ × $h\pi r^2$ × 2 = 10 gm

15. which of the following graph represents the variation of resistivity (ρ) with temperature (T) For copper ?

(1) 

(2) 

(3) 

(4) 

Sol. **(1)**
Relation between resistivity and temperature is given by
$\rho = \rho_0 e^{-\alpha T}$

16. The ratio of contributions made by the electric field and magnetic field components to the intensity of an electromagnetic wave is : (c = speed of electromagnetic waves)
(1) 1 : c (2) 1 : c^2 (3) c : 1 (4) 1 : 1

Sol. **(4)**
Energy distribution is same so ration of electric field and magnetic field will be 1 : 1

17. A long solenoid of 50 cm length having 100 turns carries a current of 2.5 A. The magnetic field at the centre of the solenoid is : ($\mu_0 = 4\pi\times10^{-7}$ Tm A^{-1})
(1) 6.28×10^{-5} T (2) 3.14×10^{-5} T (3) 6.28×10^{-4} T (4) 3.14×10^{-4} T

Sol. **(3)**
Magnetic field for solenoid is given by

$B = \mu_0 nI$ $n = \dfrac{N}{\ell}$

$= 4\pi \times 10^{-7} \times 200 \times 2.5$ $n = \dfrac{100}{50\times10^{-2}}$ **=** 200 turn/m

$= 4 \times 3.14 \times 10^{-7} \times 500$
$= 2000 \times 3.14 \times 10^{-7}$
$= 6.14 \times 10^{-4}$ T

18. For which one of the following, Bhor model is not valid?

(1) Deuteron atom
(2) Singly ionised neon atom (Ne^+)
(3) Hydrogen atom
(4) Singly ionised helium atom (He^+)

Sol. **(2)**

Bohr Model is valid only for those atoms which have one electron in orbit.

19. The energy equivalent of 0.5 g of a substance is :

(1) 1.5×10^{13} J (2) 0.5×10^{13}J (3) 4.5×10^{16}J (4) 4.5×10^{13}J

Sol. **(4)**

$E = \Delta mc^2 = 0.5 \times 10^{-3} \times (3\times10^8)^2$

$= 0.5 \times10^{-3} \times 9 \times10^{16}$

$E = 4.5 \times10^{13}$ J

20. Taking into account of the significant figures, what is the value of 9.99 m–0.0099 m?

(1) 9.980 m (2) 9.9 m (3) 9.9801 m (4) 9.98 m

Sol. **(4)**

$$\begin{array}{r} 9.99 \\ \underline{.0099} \\ \underline{9.9801} \end{array}$$

As per rule

least no. of place in decimal portion of any number

Ans. 9.98

21. In a guitar, two strings A and B made of same material are slightly out of tune and produce beats of frequency 6 Hz. When tension in B is slightly decreased, the beat frequency increases to 7 Hz. If the frequency of A is 530 Hz, the original frequency of B will be :

(1) 536 Hz (2) 537 Hz (3) 523 Hz (4) 524 Hz

Sol. **(4)**

Frequency of A = f_A = 530 Hz, f_B = ?

$|f_A - f_B| = 6$, given $\Rightarrow f_B \left\langle \begin{matrix} 536 \\ 524 \end{matrix} \right.$

when Tension B $\downarrow$ then $f_B \downarrow$, Beat Freq. $\uparrow$ to 7

$f_B \left\langle \begin{matrix} 536 \\ 524 \end{matrix} \right.$ But Beat Freq. $\uparrow$ 7

so if f_B = 524 then Beat $\uparrow$ when $f_B \downarrow$

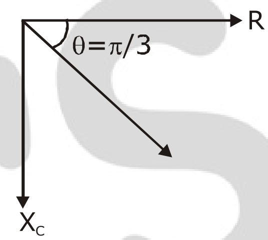
So f_B = 524 Hz

22. A series LCR circuit is connected to an AC voltage source. When L is removed from the circuit, the phase difference between current and voltage is $\frac{\pi}{3}$. If instead C is removed from the circuit, the phase difference is again $\frac{\pi}{3}$ between current and voltage. The power factor of the circuit is :

(1) 1.0 (2) –1.0 (3) zero (4) 0.5

Sol. **(1)**

When inductor alone is removed,



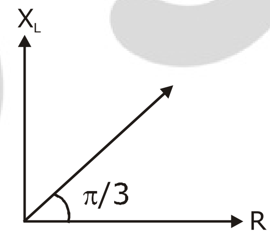
$$\Delta\phi = \frac{\pi}{3}$$

$$\tan\Delta\phi = \frac{X_C}{R}$$

$$\tan\frac{\pi}{3} = \frac{X_C}{R} = \sqrt{3}$$

$$X_C = R\sqrt{3}$$

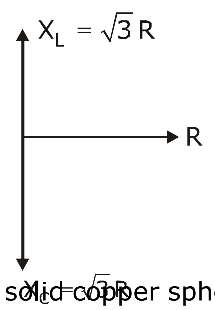
When capacitor alone is removed,



$$\tan\Delta\phi = \frac{X_L}{R}$$

$$\tan\frac{\pi}{3} = \frac{X_L}{R}$$

Thus, for the original circuit,



$$\sqrt{3} = \frac{X_L}{R}$$

$$X_L = R\sqrt{3} = X_C$$

$$= X_L = X_C \Rightarrow (Z = R)$$

$$\text{power factor} = \cos\Delta\phi = \frac{R}{Z} = \frac{R}{R} = 1$$

23. The quantities of heat required to raise the temperature of two solid copper spheres of radii r_1 and r_2 ($r_1 = 1.5\,r_2$) through 1 K are in the ratio :

(1) $\frac{3}{2}$ (2) $\frac{5}{3}$ (3) $\frac{27}{8}$ (4) $\frac{9}{4}$

Sol. **(3)**

$Q = ms\Delta T$ s is same as material is same

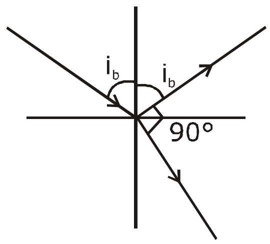
$$\frac{Q_1}{Q_2} = \frac{m_1}{m_2} = \frac{\rho\frac{4}{3}\pi r_1^3}{\rho\frac{4}{3}\pi r_2^3} = \left(\frac{r_1}{r_2}\right)^3 = \left(\frac{1.5r_2}{r_2}\right)^3$$

$$\frac{Q_1}{Q_2} = \left(\frac{15}{10}\right)^3 = \frac{27}{8}$$

24. The Brewster's angle i_b for an interface should be :

(1) $45° < i_b < 90°$ (2) $i_b = 90°$ (3) $0° < i_b < 30°$ (4) $30° < i_b < 45°$

Sol. **1**



$\mu = \tan(i_b)$

$i_b = \tan^{-1}(\mu)$

$(\mu > 1)$

$i_b > 45$

$45 < i_b < 90°$

25. Two cylinders A and B of equal capacity are connected to each other via a stop cock. A contains an ideal gas at standard temperature and pressure. B is completely evacuated. The entire system is thermally insulated. The stop cock is suddenly opened. The process is :

(1) isochoric (2) isobaric (3) isothermal (4) adiabatic

Sol. **4**

For the thermally insulated system,

dQ = 0

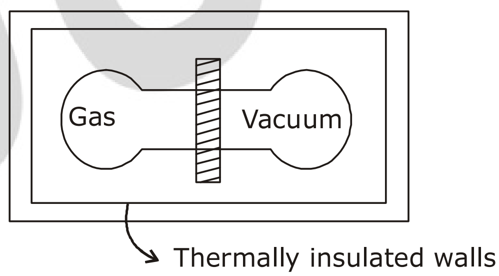
and when cock remove

dw = 0

(because in vacuum dw = 0)

dQ = du + dw

So du also zero.



Following are the essential conditions for the adiabatic process to take place. The system must be perfectly insulated from the surrounding. the process must be carried out quickly so that there is a sufficient amount of time for heat transfer to take place. According to question both conditions satisfied so process will be adiabatic.

26. An iron rod of susceptibility 599 is subjected to a magnetising field of 1200 A m^{-1} . The permeability of the material of the rod is : ($\mu_0 = 4\pi\times10^{-7}$ T mA^{-1})

(1) $2.4\pi\times10^{-5}$ T m A^{-1} (2) $2.4\pi\times10^{-7}$ T m A^{-1}

(3) $2.4\pi\times10^{-4}$ T m A^{-1} (4) 8.0×10^{-5} T m A^{-1}

Sol. **3**

$x_m = 599$, $\mu_0 = 4\pi \times 10^{-7}$

H = 1200 A/m, μ = ?

$\mu = \mu_0 (1 + x_m)$

$= 4\pi \times 10^{-7} (1 + 599)$

$= 4\pi \times 10^{-7} \times 600$

$= 24\pi \times 10^{-5}$

$\mu = 2.4\pi \times 10^{-4}$ TmA^{-1}

27. The capacitance of a parallel plate capacitor with air as medium is 6 μF. With the introduction of a dielectric medium, the capacitance becomes 30 μF. The permittivity of the medium is :
($\varepsilon_0 = 8.85 \times 10^{-12}$ C^2 N^{-1} m^{-2})

(1) 0.44×10^{-10} C^2 N^{-1} m^{-2} (2) 5.00 C^2 N^{-1} m^{-2}
(3) 0.44×10^{-13} C^2 N^{-1} m^{-2} (4) 1.77×10^{-12} C^2 N^{-1} m^{-2}

Sol. **1**

$C_{air} = 6\mu F$, $C_{medium} = 30\mu F$

$C_{air} = \frac{\varepsilon_0 A}{d}$, $C_{medium} = \frac{\varepsilon_0 Ak}{d}$

$C_{med} = KC_{air}$
$30\mu F = K6\mu F$
$K = 5$
$\therefore\ \varepsilon = \varepsilon_0 k = 8.85 \times 10^{-12} \times 5$
$\varepsilon = 44.25 \times 10^{-12}$
$\varepsilon = 0.4425 \times 10^{-10}$
$\varepsilon = 0.44 \times 10^{-10}\ C^2N^{-1}m^{-2}$

28. A charged particle having drift velocity of 7.5×10^{-4} m s^{-1} in an electric field of 3×10^{-10} Vm^{-1} has a mobility in m^2 V^{-1} s^{-1} of :

(1) 2.5×10^{-6} (2) 2.25×10^{-15} (3) 2.25×10^{15} (4) 2.5×10^{6}

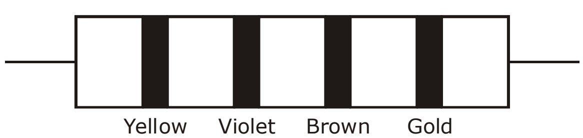
Sol. **4**

$v_d = \mu E \Rightarrow \mu = \frac{v_d}{E}$

$= \frac{7.5 \times 10^{-4}}{3 \times 10^{-10}}$

$\mu = 2.5 \times 10^6$
(μ = mobility)

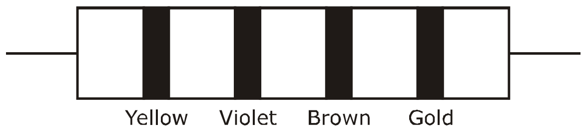
29. The color code of a resistance is given below:



The values of resistance and tolerance, respectively, are :

(1) 4.7 kΩ, 5% (2) 470Ω, 5% (3) 470 kΩ, 5% (4) 47 kΩ, 10%

Sol. **2**



B	B	R	O	Y	G	B	V	G	W
0	1	2	3	4	5	6	7	8	9
	↓			↓			↓		
	B			Y			V		

$R = 47 \times 10^{1}\Omega \pm 5\%$

$= 470\ \Omega \pm 5\%$

So, 470, 5%

30. The solids which have the negative temperature coefficient of resistance are :

(1) semiconductors only
(2) insulators and semiconductors
(3) metals
(4) insulators only

Sol. **2**

Insulators have a negative temperature coefficient because as temperature increases, the resistance of insulators decreases. The resistivity of the semiconductor material to decrease with the rise in temperature, resulting in a negative temperature coefficient of resistance.

31. A body weighs 72 N on the surface of the earth. What is the gravitational force on it, at a height equal to half the radius of the earth ?

(1) 30 N
(2) 24 N
(3) 48 N
(4) 32 N

Sol. **(4)**

$$\frac{g}{\left(1+\frac{h}{R_e}\right)^2} = g_{eff} \quad ; \; g_{ef} = \frac{g}{\left(1+\frac{\frac{R_e}{2}}{R_e}\right)^2} = \frac{g}{\left(1+\frac{1}{2}\right)^2} = \frac{4g}{9}$$

$$F = \frac{4 \times 72}{9} = 32\text{ N}$$

32. A 40 μF capacitor is connected to a 200 V, 50 Hz ac supply. The rms value of the current in the circuit is, nearly:

(1) 2.5 A
(2) 25.1 A
(3) 1.7 A
(4) 2.05 A

Sol. **(1)**

$$I_{rms} = \frac{V_{rms}}{z} = \frac{200}{X_C} = 200.\ 2\pi f.C$$

$= 200 \times 2 \times 3.14 \times 50 \times 40 \times 10^{-6}$

$I_{rms} = 251.2 \times 10^{-2} \approx 2.5\text{ A}$

33. The phase difference between the displacement and acceleration of a particle in a simple harmonic motion is:

(1) $\frac{\pi}{2}$ rad (2) zero (3) π rad (4) $\frac{3\pi}{2}$ rad

Sol. **(3)**

for SHM acceleration and displacement both must have opposite direction

$a = -\omega^2 x \quad \therefore$ phase diff. is π

$\therefore x = A \sin(\omega t),\ a = -A\omega^2 \sin\omega t$

34. The average thermal energy for a mono-atomic gas is : (k_B is Boltzmann constant and T, absolute temperature)

(1) $\frac{5}{2} k_B T$ (2) $\frac{7}{2} k_B T$ (3) $\frac{1}{2} k_B T$ (4) $\frac{3}{2} k_B T$

Sol. **4**

by theory

for monoatomic gas average thermal energy = $\frac{3}{2} k_B T$

35. Light of frequency 1.5 times the threshold frequency is incident on a photosensitive material. What will be the photoelectric current if the frequency is halved and intensity is doubled ?

(1) one-fourth (2) zero (3) doubled (4) four times

Sol. **2**

$f_0 < f_1 = 1.5\ f_0$

$\therefore f_2 = 0.75\ f_0$

for given condition

$f_{incident} < f_{threshold}$

so no photo electron emission

$i = 0$

36. A wire of length L, area of cross section A is hanging from a fixed support. The length of the wire changes to L_1 when mass M is suspended from its free end. The expression for Young's modulus is :

(1) $\frac{MgL}{AL_1}$ (2) $\frac{MgL}{A(L_1 - L)}$ (3) $\frac{MgL_1}{AL}$ (4) $\frac{Mg(L_1 - L)}{AL}$

Sol. **2**

from young’s modulus formula

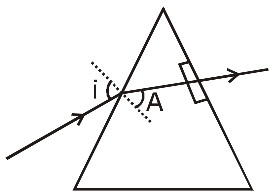
$$Y = \frac{\frac{F}{A}}{\frac{\Delta l}{l}}$$

$$y = \frac{Mg}{A\frac{(L_1 - L)}{L}}$$

37. A ray is incident at an angle of incidence i on one surface of a small angle prism (with angle of prism A) and emerges normally from the opposite surface. If the refractive index of the material of the prism is μ, then the angle of incidence is nearly equal to:

(1) μA (2) $\frac{\mu A}{2}$ (3) $\frac{A}{2\mu}$ (4) $\frac{2A}{\mu}$

Sol. **1**

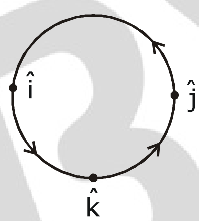


$1 \sin i = \mu . \sin A$
for small angle approximation
$\sin \theta = \theta$
$i = \mu A$

38. Find the torque about the origin when a force of $3\hat{j}$ N acts on a particle whose position vector is $2\hat{k}$ m.

(1) $-6\hat{i}$ Nm (2) $6\hat{k}$ Nm (3) $6\hat{i}$ Nm (4) $6\hat{j}$ Nm

Sol. **1**



$\vec{\tau} = \vec{r} \times \vec{F}$

$= 2\hat{k} \times 3\hat{j}$

$= 6\ (-\hat{i})$

39. In Young's double slit experiment, if the separation between coherent sources is halved and the distance of the screen from the coherent sources is doubled, then the fringe width becomes :

(1) four times (2) one-fourth (3) double (4) half

Sol. **1**

Fringewidth in YDSE is given by

$\beta = \frac{\lambda D}{d}$ $\beta' = \frac{\lambda 2D}{d/2} = 4\beta$

40. The energy required to break one bond in DNA is 10^{-20}J. This value in eV is nearly:

(1) 0.06 (2) 0.006 (3) 6 (4) 0.6

Sol. **1**

1.6×10^{-19} Joule = 1 eV

$$1 \text{ Joule} = \frac{1}{1.6 \times 10^{-19}}$$

$$\therefore 10^{-20} \text{ Joule} = \frac{10^{-20}}{1.6 \times 10^{-19}} = \frac{1}{1.6 \times 10} = 0.0625$$

41. When a uranium isotope $^{235}_{92}U$ is bombarded with a neutron, it generates $^{89}_{36}Kr$, three neutrons and :

(1) $^{101}_{36}Kr$ (2) $^{103}_{36}Kr$ (3) $^{144}_{56}Ba$ (4) $^{91}_{40}Zr$

Sol. **3**

$$^{235}_{92}U \rightarrow ^{89}_{36}k_r + ^{A}_{Z}Y + 3\,_0n^1$$

92 = 36 + Z; $\leftarrow$ A + 89 + 3 = 235 $\Rightarrow$ A = 144

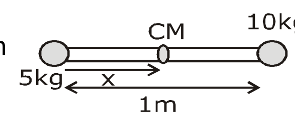
Z = 56

42. Two particles of mass 5kg and 10 kg respectively are attached to the two ends of a rigid rod of length 1m with negligible mass. The centre of mass of the system from the 5kg particle is nearly at a distance of:

(1) 67 cm (2) 80 cm (3) 33 cm (4) 50 cm

Sol. **1**

$$X_{CM} = \frac{5(0) + 10 \times 1}{10 + 5} = \frac{10}{15} = \frac{2}{3} = 0.67 \text{ m} = 67 \text{ cm}$$



43. Light with an average flux of 20 W/cm^2 falls on a non-reflecting surface at normal incidence having surface area 20 cm^2. The energy received by the surface during time span of 1 minute is:

(1) 24×10^3 J (2) 48×10^3 J (3) 10×10^3 J (4) 12×10^3 J

Sol. **1**

$$\frac{\text{Energy}}{\text{sec}} = 20 \text{ w/cm}^2 \times 20 \text{ cm}^2$$

= 400 w

$\therefore$ in 1 minute = 400 × 60

= 24000

44. The increase in the width of the depletion region in a p-n junction diode is due to:

(1) both forward bias and reverse bias (2) increase in forward current

(3) forward bias only (4) reverse bias only

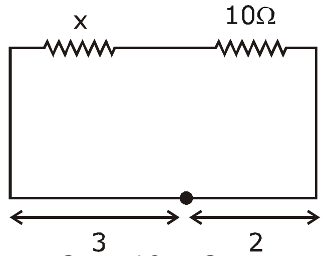
Sol. **4**

The increase in the width of the depletion region in a p-n junction diode is due to reverse bias only.

45. A resistance wire connected in the left gap of a metre bridge balances a 10 Ω resistance in the right gap at a point which divides the bridge wire in the ratio 3 : 2. If the length of the resistance wire is 1.5 m, then the length of 1Ω of the resistance wire is:

(1) 1.5×10^{-1} m (2) 1.5×10^{-2} m (3) 1.0×10^{-2} m (4) 1.0×10^{-1} m

Sol. **4**



$x \times 2\lambda = 10 \times 3\lambda$

$x = 15\Omega$

$\therefore 15\Omega \rightarrow 1.5$ m

$\therefore 1\Omega \rightarrow \frac{1.5}{15}$

$= 1 \times 10^{-1}$ m