NEET Exam. 2019 (5^{th} May 2019)

(Paper & Solution)

Code – S2

Q.91 Average velocity of a particle executing SHM in one complete vibration is :

(1) $\frac{A\omega^2}{2}$ (2) zero (3) $\frac{A\omega}{2}$ (4) $A\omega$

Ans. **[2]**

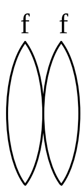
Sol. Average velocity = $\frac{\text{Total displacement}}{\text{time}} = \frac{0}{T} = 0$

Q.92 Two similar thin equi-convex lenses, of focal length *f* each, are kept coaxially in contact with each other such that the focal length of the combination is F_1. When the space between the two lenses is filled with glycerin (which has the same refractive index (μ = 1.5) as that of glass) then the equivalent focal length is F_2. The ratio $F_1 : F_2$ will be :

(1) 2 : 3 (2) 3 : 4 (3) 2 : 1 (4) 1 : 2

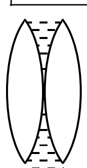
Ans. **[4]**

Sol.



$$\frac{1}{F_1} = \frac{1}{f} + \frac{1}{f}$$

$$\boxed{F_1 = f/2}$$



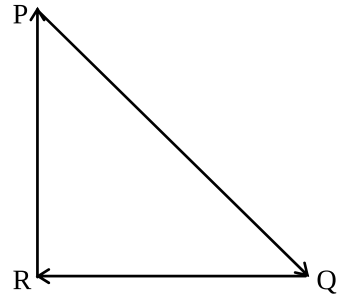
$$\frac{1}{F_1} = \frac{1}{f} + \left(-\frac{1}{f}\right) + \frac{1}{f}$$

$$\frac{1}{F_2} = \frac{1}{f}$$

$$\boxed{F_2 = f}$$

$$F_1 : F_2 = \frac{f}{2} : f = \frac{1}{2} : 1 = 1 : 2$$

Q.93 A particle moving with velocity $\vec{V}$ is acted by three forces shown by the vector triangle PQR. The velocity of the particle will :



(1) remain constant
(2) change according to the smallest force $\overrightarrow{QR}$
(3) increase
(4) decrease

Ans. **[1]**

Sol. Vector sum of all force is zero

$V \rightarrow$ remain same

Q.94 Ionized hydrogen atoms and α-particles with same momenta enters perpendicular to a constant magnetic field, B. The ratio of their radii of their paths $r_H : r_\alpha$ will be :

(1) 4 : 1
(2) 1 : 4
(3) 2 : 1
(4) 1 : 2

Ans. **[3]**

Sol. $r = \frac{mv}{qB} = \frac{p}{qB}$

$r \propto \frac{1}{q}$

$\frac{r_H}{r_\alpha} = \frac{q_\alpha}{q_H} = \frac{2e}{e}$

$r_H : r_\alpha = 2 : 1$

Q.95 Body A of mass 4m moving with speed u collides with another body B of mass 2m, at rest. The collision is head on and elastic in nature. After the collision the fraction of energy lost by the colliding body A is :

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

Ans. **[4]**

Sol. $v_2 = \frac{2m_1u_1 + u_2(m_2 - m_1)}{m_1 + m_2}$

$v_2 = \frac{2(4m)u + 0}{6m}$

$v_2 = \frac{4}{3}u$

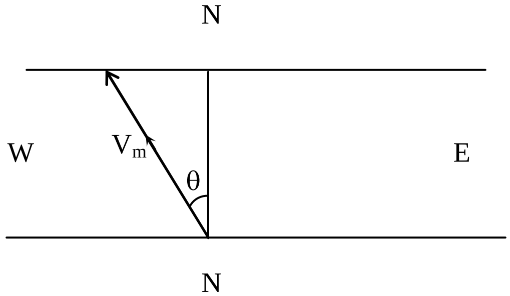
$\frac{\Delta E}{E} = \frac{\frac{1}{2}2mv_2^2}{\frac{1}{2}4mu^2} = \frac{\left(\frac{4}{3}u\right)^2}{2u^2} = \frac{8}{9}$

Q.96 The speed of a swimmer in still water is 20 m/s. The speed of river water is 10 m/s and is flowing due east. If he is standing on the south bank and wishes to cross the river along the shortest path, the angle at which he should make his strokes w.r.t. north is given by :

(1) 60º west (2) 45º west (3) 30º west (4) 0º

Ans. **[3]**

Sol.



$V_m \sin\theta = V_r$

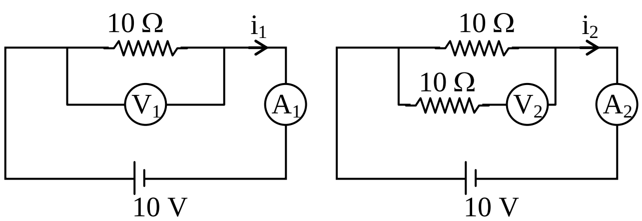
$20 \sin\theta = 10$

$\sin\theta = 1/2$

$\theta = 30^o$

So 30º west with respect to north

Q.97 In the circuits shown below, the readings of the voltmeters and the ammeters will be :

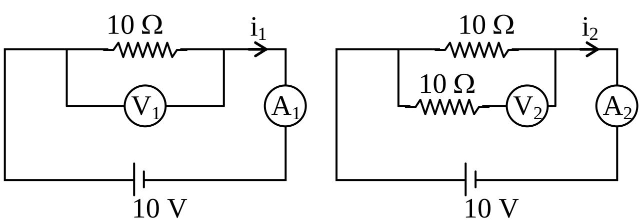


Circuit 1 **Circuit 2**

(1) $V_1 = V_2$ and $i_1 = i_2$ (2) $V_2 > V_1$ and $i_1 > i_2$ (3) $V_2 > V_1$ and $i_1 = i_2$ (4) $V_1 = V_2$ and $i_1 > i_2$

Ans. **[1]**

Sol.



Circuit 1 **Circuit 2**

$i_1 = \frac{10V}{10\Omega} = 1A$

$V_1 = 10$ V

$R_{V_2} = \infty$

$i_{\text{through voltmeter}} = 0$

$V_2 = 10$ V

$i_2 = 1$ A

$V_1 = V_2$

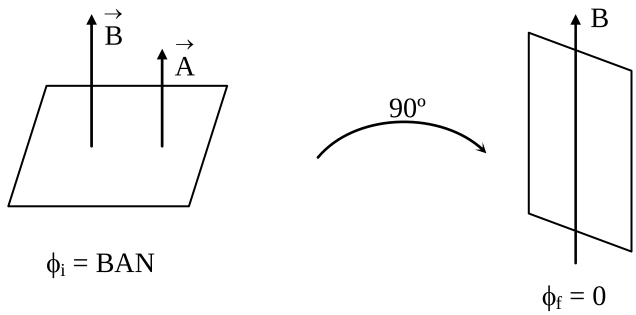
$i_1 = i_2$

Q.98 A 800 turn coil of effective area 0.05 m^2 is kept perpendicular to a magnetic field 5×10^{-5} T. When the plane of the coil is rotated by 90º around any of its coplanar axis in 0.1 s, the emf induced in the coil will be :

(1) 2×10^{-3} V (2) 0.02 V (3) 2 V (4) 0.2 V

Ans. **[2]**

Sol.



$$\text{emf} = \frac{\Delta\phi}{\Delta t} = \frac{BAN}{\Delta t}$$

$$= \frac{(5\times10^{-5})(0.05)(800)}{0.1} = \frac{200\times10^{-5}\times10^{-2}\times10^{2}}{10^{-1}} = 0.02 \text{ volt}$$

Q.99 At a point A on the earth's surface the angle of dip, δ = +25º. At a point B on the earth's surface the angle of dip, δ = –25º. We can interpret that :

(1) A is located in the northern hemisphere and B is located in the southern hemisphere

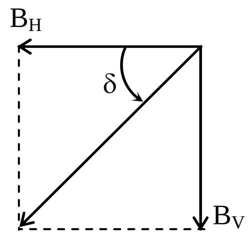
(2) A and B are both located in the southern hemisphere

(3) A and B are both located in the northern hemisphere

(4) A is located in the southern hemisphere and B is located in the northern hemisphere

Ans. **[1]**

Sol.



δ = +25

$B_V \rightarrow$ vertical downward $\rightarrow$ Northern hemisphere

A $\rightarrow$ Northern hemisphere

B $\rightarrow$ Southern hemisphere

Q.100 An electron is accelerated through a potential difference of 10,000 V. Its de Broglie wavelength is, (nearly) : ($m_e = 9 \times 10^{-31}$ kg)

(1) 12.2×10^{-14} m (2) 12.2 nm (3) 12.2×10^{-13} m (4) 12.2×10^{-12} m

Ans. **[4]**

Sol. $\lambda = \frac{12.27}{\sqrt{V}}\text{Å} = \frac{12.27}{\sqrt{10,000}}\text{Å}$

$= 12.27 \times 10^{-2}$ Å

$= 12.27 \times 10^{-12}$ m

Q.101 The displacement of a particle executing simple harmonic motion is given by $y = A_0 + A \sin\omega t + B \cos\omega t$. Then the amplitude of its oscillation is given by :

(1) $\sqrt{A_0^2 + (A+B)^2}$ (2) A + B (3) $A_0 + \sqrt{A^2 + B^2}$ (4) $\sqrt{A^2 + B^2}$

Ans. **[4]**

Sol. $y = A_0 + A \sin\omega t + B \cos\omega t$

amplitude of $A \sin\omega t + B \cos\omega t = \sqrt{A^2 + B^2}$

Q.102 α-particle consists of :

(1) 2 electrons and 4 protons only (2) 2 protons only

(3) 2 protons and 2 neutrons only (4) 2 electrons, 2 protons and 2 neutrons

Ans. **[3]**

Sol. α particle = He nucleus

2 protons

2 neutrons

Q.103 A hollow metal sphere of radius R is uniformly charged. The electric field due to the sphere at a distance r from the centre :

(1) zero as r increases for r < R, increases as r increases for r > R

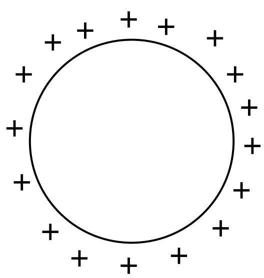
(2) decreases as r increases for r < R and for r > R

(3) increases as r increases for r < R and for r > R

(4) zero as r increases for r < R, decreases as r increases for r > R

Ans. **[4]**

Sol.



$E_{inside} = 0$

$E_{surface} = \frac{kQ}{R^2}$ = max.

$E_{outside} = \frac{kQ}{r^2}$

$E \propto \frac{1}{r^2}$

Q.104 In an experiment, the percentage of error occurred in the measurement of physical quantities A, B, C and D are 1%, 2%, 3% and 4% respectively. Then the maximum percentage of error in the measurement X, where $X = \frac{A^2 B^{1/2}}{C^{1/3} D^3}$, will be :

(1) –10% (2) 10% (3) $\left(\frac{3}{13}\right)$% (4) 16%

Ans. [4]

Sol. $X = \frac{A^2 B^{1/2}}{C^{1/3} D^3}$

$$\frac{\Delta X}{X} = \frac{2\Delta A}{A} + \frac{1}{2}\frac{\Delta B}{B} + \frac{1}{3}\frac{\Delta C}{C} + \frac{3\Delta D}{D}$$

$$= 2 \times 1\% + \frac{1}{2} \times 2\% + \frac{1}{3} \times 3\% + 3 \times 4\%$$

$$= 2 + 1 + 1 + 12$$

$$= 16\%$$

Q.105 A force F = 20 + 10y acts on a particle in y-direction where F is in newton and y in meter. Work done by this force to move the particle from y = 0 to y = 1 m is :

(1) 25 J (2) 20 J (3) 30 J (4) 5 J

Ans. [1]

Sol. F = 20 + 10 y

$$W = \int_0^1 (20 + 10y)\,dy$$

$$= 20[y]_0^1 + \left[\frac{10y^2}{2}\right]_0^1$$

$$= 20 + 5$$

$$= 25$$

Q.106 In which of the following processes, heat is neither absorbed nor released by a system ?

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

Ans. [4]

Sol. Adiabatic process

$\Delta Q = 0$

Q.107 In which of the following devices, the eddy current effect is **not** used ?

(1) electromagnet (2) electric heater

(3) induction furnace (4) magnetic braking in train

Ans. [2]

Sol. Electric heater is based on heating effects of current

Q.108 The unit of thermal conductivity is :

(1) $W\ m\ K^{-1}$ (2) $W\ m^{-1}\ K^{-1}$ (3) $J\ m\ K^{b\ 1}$ (4) $J\ m^{-1}\ K^{-1}$

Ans. **[2]**

Sol. $H = \frac{kA}{\ell}(\theta_1 - \theta_2)$

$k = \frac{H\ell}{A\theta}$

$= \frac{W.m}{m^2K}$

$= Wm^{-1}K^{-1}$

Q.109 A body weighs 200 N on the surface of the earth. How much will it weigh half way down to the centre of the earth?

(1) 250 N (2) 100 N (3) 150 N (4) 200 N

Ans. **[2]**

Sol. $g' = \frac{gr}{R} = \frac{gR}{2R} = \frac{g}{2}$

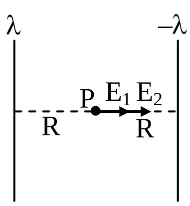
So weight will be 100 N.

Q.110 Two parallel infinite line charges with linear charge densities +λ C/m and –λ C/m are placed at a distance of 2R in free space. What is the electric field mid-way between the two line charges?

(1) $\frac{\lambda}{\pi \in_0 R}$ N/C (2) $\frac{\lambda}{2\pi \in_0 R}$ N/C (3) zero (4) $\frac{2\lambda}{\pi \in_0 R}$ N/C

Ans. **[1]**

Sol.



At P, $E = E_1 + E_2 = \frac{2k\lambda_1}{R} + \frac{2k\lambda_2}{R}$ $\therefore \lambda_1 = \lambda_2$

$= \frac{4k\lambda}{R} = \frac{\lambda}{\pi \in_0 R}$

Q.111 A mass m is attached to a thin wire and whirled in a vertical circle. The wire is most likely to break when :

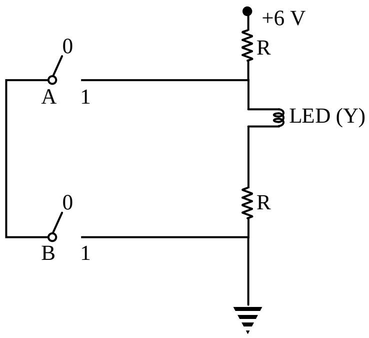
(1) the mass is at the lowest point (2) inclined at an angle of 60° from vertical

(3) the mass is at the highest point (4) the wire is horizontal

Ans. **[1]**

Sol. Tension at lowest point is maximum so will break at that point

Q.112



The correct Boolean operation represented by the circuit diagram drawn is :

(1) NAND (2) NOR (3) AND (4) OR

Ans. **[1]**

Sol. LED glows when Both switches are OFF if are one is ON or both ON, LED will be short and becomes OFF

A	B	Y(LED)
0 OFF	0 (OFF)	1 (ON)
0 (OFF)	1 (ON)	1(ON)
1 (ON)	0 (OFF)	1 (ON)
1 (ON)	1 (ON)	0 (OFF)

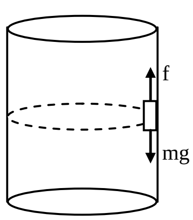
$y = \overline{(AB)}$ = NAND

Q.113 A block of mass 10 kg is in contact against the inner wall of a hollow cylindrical drum of radius 1 m. The coefficient of friction between the block and the inner wall of the cylinder is 0.1. The minimum angular velocity needed for the cylinder to keep the block stationary when the cylinder is vertical and rotating about its axis, will be : ($g = 10\ m/s^2$)

(1) 10 rad/s (2) $10\ \pi$ rad/s (3) $\sqrt{10}$ rad/s (4) $\frac{10}{2\pi}$ rad/s

Ans. **[1]**

Sol.



$f = mg$

$\mu m r\omega^2 = mg$

$\omega^2 = \frac{g}{r\mu}$

$= \frac{10}{1\times 0.1}$

$\omega = 10$

Q.114 A small hole of area of cross-section 2 mm^2 is present near the bottom of a fully filled open tank of height 2 m. Taking g = 10 m/s^2, the rate of flow of water through the open hole would be nearly :

(1) $2.23 \times 10^{-6}\ m^3/s$ (2) $6.4 \times 10^{-6}\ m^3/s$ (3) $12.6 \times 10^{-6}\ m^3/s$ (4) $8.9 \times 10^{-6}\ m^3/s$

Ans. **[3]**

Sol. Q = AV

$= A\sqrt{2gh}$

$= 2 \times 10^{-6}\sqrt{2 \times 10 \times 2}$

$= 2 \times 10^{-6}\sqrt{40}$

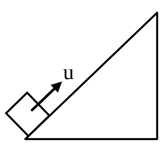
$= 12.6 \times 10^{-6}$

Q.115 When an object is shot from the bottom of a long smooth inclined plane kept at an angle 60° with horizontal, it can travel a distance x_1 along the plane. But when the inclination is decreased to 30° and the same object is shot with the same velocity, it can travel x_2 distance. Then $x_1 : x_2$ will be :

(1) $1:\sqrt{3}$ (2) $1:2\sqrt{3}$ (3) $1:\sqrt{2}$ (4) $\sqrt{2}:1$

Ans. **[1]**

Sol.



$v^2 = u^2 + 2as$

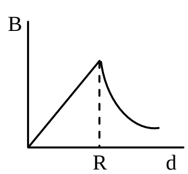
$0 = u^2 - 2g\sin\theta\ S$

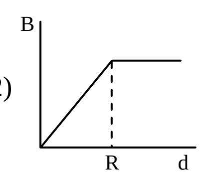
$S = \frac{u^2}{2g\sin\theta}$

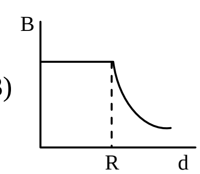
$S \propto \frac{1}{\sin\theta}$

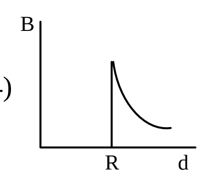
$\frac{x_1}{x_2} = \frac{\sin\theta_2}{\sin\theta_1} = \frac{\sin 30°}{\sin 60°} = \frac{1}{\sqrt{3}}$

Q.116 A cylindrical conductor of radius R is carrying a constant current. The plot of the magnitude of the magnetic field, B with the distance, d, from the centre of the conductor, is correctly represented by the figure :

(1)


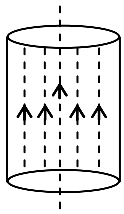
(2)


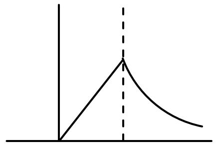
(3)


(4)


Ans. **[1]**

Sol.





$B_{inside} = \frac{\mu_0 id}{2\pi R^2}$

$B_{in} \propto d$

$B_{out} = \frac{\mu_0 i}{2\pi d}$

$B_{out} \propto \frac{1}{d}$

Q.117 A soap bubble, having radius of 1 mm, is blown from a detergent solution having a surface tension of 2.5×10^{-2} N/m. The pressure inside the bubble equals at a point Z_0 below the free surface of water in a container. Taking g = 10 m/s^2, density of water = 10^3 kg/m^3, the value of Z_0 is :

(1) 1 cm (2) 0.5 cm (3) 100 cm (4) 10 cm

Ans. **[1]**

Sol. $\rho g Z_0 = \frac{4T}{R}$

$10^3.10.Z_0 = \frac{4(2.5\times10^{-2})}{10^{-3}}$

$= \frac{100}{10^4}$

$Z_0 = 10^{-2}$

Z = 1 cm

Q.118 The work done to raise a mass m from the surface of the earth to a height h, which is equal to the radius of the earth, is :

(1) $\frac{1}{2}$ mgR (2) $\frac{3}{2}$ mgR (3) mgR (4) 2 mgR

Ans. **[1]**

Sol. $\Delta PE = \frac{GMm}{r_1} - \frac{GMm}{r_2}$

$= \frac{GMm}{R} - \frac{GMm}{2R}$

$= \frac{GMm}{2R} = \frac{mgR}{2}$

Q.119 Which of the following acts as a circuit protection device ?

(1) switch (2) fuse (3) conductor (4) inductor

Ans. **[2]**

Sol. Fuse is used as circuit protector.

Q.120 Two particles A and B are moving in uniform circular motion in concentric circles of radii r_A and r_B with speed v_A and v_B respectively. Their time period of rotation is the same. The ratio of angular speed of A to that of B will be :

(1) $r_B : r_A$ (2) 1 : 1 (3) $r_A : r_B$ (4) $v_A : v_B$

Ans. **[2]**

Sol. $\omega = \frac{2\pi}{T}$

$T \rightarrow$ same

$\omega_1 = \omega_2$

1 : 1

Q.121 A parallel plate capacitor of capacitance 20 μF is being charged by a voltage source whose potential is changing at the rate of 3 V/s. The conduction current through the connecting wires, and the displacement current through the plates of the capacitor, would be, respectively :

(1) 60 μA, zero (2) zero, zero (3) zero, 60 μA (4) 60 μA, 60 μA

Ans. **[4]**

Sol. Displacement current

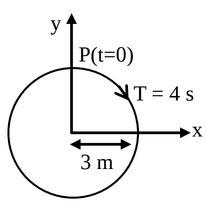
$i = C\frac{dV}{dt}$

$= 20 \times 10^{-6} \times 3$

$= 60\ \mu A$

in circuit displacement current = conductor current.

Q.122 The radius of circle, the period of revolution, initial position and sense of revolution are indicated in the fig.



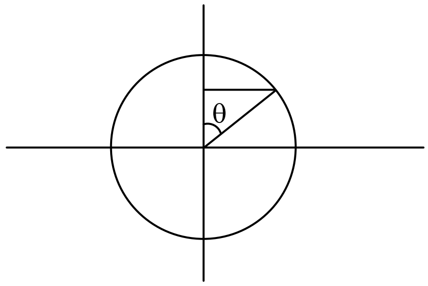
y-projection of the radius vector of rotating particle P is :

(1) $y(t) = 3\cos\left(\frac{3\pi t}{2}\right)$, where y in m (2) $y(t) = 3\cos\left(\frac{\pi t}{2}\right)$, where y in m

(3) $y(t) = -3\cos 2\pi t$, where y in m (4) $y(t) = 4\sin\left(\frac{\pi t}{2}\right)$, where y in m

Ans. **[2]**

Sol.



$y = r \cos \theta$

$y = 3 \cos \omega t$

$y = 3 \cos \frac{2\pi}{4} . t$

$y = 3 \cos \frac{\pi t}{2}$

Q.123 For a p-type semiconductor, which of the following statements is true ?

(1) Holes are the majority carriers and pentavalent atoms are the dopants

(2) Electrons are the majority carriers and pentavalent atoms are the dopants

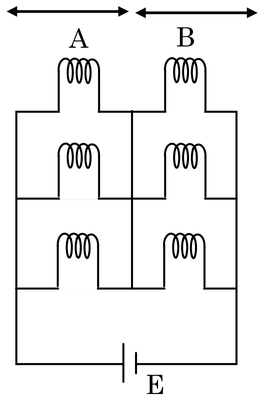
(3) Electrons are the majority carriers and trivalent atoms are teh dopants

(4) Holes are the majority carriers and trivalent atoms are the dopants

Ans. **[4]**

Sol. In P type semiconductor holes are majority charge carrier and trivalent impurities are mixed.

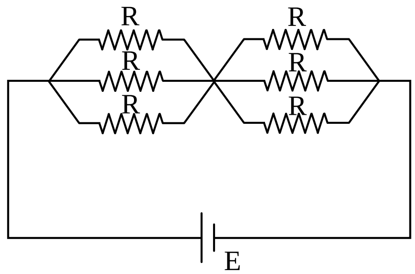
Q.124 Six similar bulbs are connected as shown in the figure with a DC source of emf E and zero internal resistance. The ratio of power consumption by the bulbs when (i) all are glowing and (ii) in the situation when two from section A and one from section B are glowing, will be -



(1) 1 : 2 (2) 2 : 1 (3) 4 : 9 (4) 9 : 4

Ans. [4]

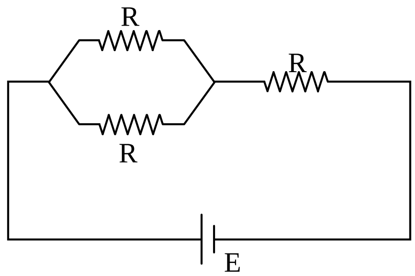
Sol. When all bulbs are glowing



$R_{eq} = \frac{R}{3} + \frac{R}{3} = \frac{2R}{3}$

Power $P_1 = \frac{3E^2}{2R}$ ….(i)

In case two



$R_{eq} = \frac{3R}{2}$

Power $P_2 = \frac{2E^2}{3R}$ ….(ii)

$\frac{P_1}{P_2} = \frac{3}{2} \times \frac{3}{2} = \frac{9}{4}$

Q.125 Increase in temperature of a gas filled in a container would lead to -

(1) decrease in its pressure

(2) decrease in intermolecular distance

(3) increase in its mass

(4) increase in its kinetic energy

Ans. [4]

Sol. $V \rightarrow$ constant

$T \uparrow \; P\uparrow \; KE \uparrow$

Q.126 In a double slit experiment, when light of wavelength 400 nm was used, the angular width of the first minima formed on a screen placed 1 m away, was found to be 0.2°. What will be the angular width of the first minima. If the entire experimental apparatus is immersed in water ? ($\mu_{water} = 4/3$)

(1) 0.05° (2) 0.1° (3) 0.266° (4) 0.15°

Ans. **[4]**

Sol. $\theta \propto \lambda$

$\lambda_1 = 400$ nm, $\theta_1 = 0.2°$, $\mu_{water} = 4/3$

$$\frac{\theta_1}{\theta_2} = \frac{\lambda_1}{\lambda_2} \qquad \mu = \frac{c}{v} = \frac{\lambda_1}{\lambda_2} = \frac{4}{3}$$

$$\frac{\theta_1}{\theta_2} = \frac{4}{3}$$

$$\theta_2 = \frac{3}{4}(\theta_1)$$

$$= \frac{3}{4}(0.2°) = 0.15°$$

Q.127 The total energy of an electron in an atom in an orbit is –3.4 eV. Its kinetic and potential energies are, respectively -

(1) 3.4 eV, – 6.8 eV (2) 3.4 eV, 3.4 eV

(3) – 3.4 eV, – 3.4 eV (4) – 3.4 eV, – 6.8 eV

Ans. **[1]**

Sol. Total energy = – [K.E]

$\therefore$ K.E. = + 3.4 eV

Potential energy = –2 (Total energy)

= – 6.8 eV

Q.128 Which colour of the light has the longest wavelength ?

(1) green (2) violet (3) red (4) blue

Ans. **[3]**

Sol. VIBGYOR

Red $\rightarrow$ max

Q.129 In total internal reflection when the angle of incidence is equal to the critical angle for the pair of media in contact, what will angle of refraction ?

(1) equal to angle of incidence (2) 90°

(3) 180° (4) 0°

Ans. **[2]**

Sol. In TIR

If $i = \theta_{cr}$

$r = 90°$

Q.130 A disc of radius 2 m and mass 100 kg rolls on a horizontal floor. Its centre of mass has speed of 20 cm/s. How much work is needed to stop it ?

(1) 2 J (2) 1 J (3) 3 J (4) 30 kJ

Ans. **[3]**

Sol. $w = \frac{1}{2}mV^2\left(1+\frac{K^2}{r^2}\right)$

$= \frac{1}{2} \times 100\ (20 \times 10^{-2})^2 \left(1+\frac{1}{2}\right)$

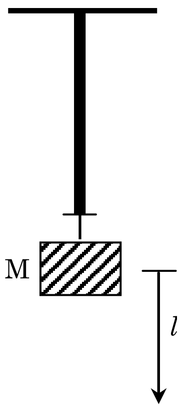
$= \frac{4}{2} \times \frac{3}{2} = 3\ J$

Q.131 When a block of mass M is suspended by a long wire of length L, the length of the wire becomes (L + l). The elastic potential energy stored in the extended wire is -

(1) $\frac{1}{2}Mgl$ (2) $\frac{1}{2}MgL$ (3) Mgl (4) MgL

Ans. **[1]**

Sol.



Loss in gravitational P.E. = Mgl

Elastic potential energy

$U = \frac{1}{2}\ Mgl$

Q.132 A solid cylinder of mass 2 kg and radius 4 cm is rotating about its axis at the rate of 3 rpm. The torque required to stop after 2π revolutions is-

(1) 12×10^{-4} Nm (2) 2×10^{6} Nm (3) 2×10^{-6} Nm (4) 2×10^{-3} Nm

Ans. **[3]**

Sol. $\omega_2^2 = \omega_1^2 + 2\alpha\theta$

$0 = \left(2\pi\frac{3}{60}\right)^2 - 2 \times 2\pi\ (2\pi)\alpha$

$\alpha = \frac{9}{60 \times 60 \times 2} = \frac{1}{800}$

$\tau = I\alpha = \frac{mr^2}{2}\alpha$

$= \frac{2 \times 16 \times 10^{-4}}{2} \times \frac{1}{800} = 2 \times 10^{-6}$

Q.133 Two point charges A and B, having charges +Q and –Q respectively, are placed at certain distance apart and force acting between them is F. If 25 % charge of A is transferred to B, then force between the charges becomes-

(1) $\frac{16F}{9}$ (2) $\frac{4F}{3}$ (3) F (4) $\frac{9F}{16}$

Ans. **[4]**

Sol. $F = \frac{KQQ}{r^2}$

$$F' = \frac{K\frac{3Q}{4}\times\frac{3Q}{4}}{r^2} = \frac{9F}{16}$$

Q.134 Pick the **wrong** answer in the context with rainbow.

(1) An observer can see a rainbow when his front is towards the sun

(2) Rainbow is a combined effect of dispersion, refraction and reflection of sunlight

(3) When the light rays undergo two internal reflections in a water drop, a secondary rainbow is formed

(4) The order of colours is reversed in the secondary rainbow

Ans. **[1]**

Sol. Rainbow can seen when back is towards the Sun.

Q.135 A copper rod of 88 cm and an aluminium rod of unknown length have their increase in length independent of increase in temperature. The length of aluminium rod is ($\alpha_{Cu} = 1.7 \times 10^{-5}\ K^{-1}$ and $\alpha_{Al} = 2.2 \times 10^{-5}\ K^{-1}$)

(1) 88 cm (2) 68 cm (3) 6.8 cm (4) 113.9 cm

Ans. **[2]**

Sol. $\Delta\ell_1 = \Delta\ell_2$

$\ell_1\alpha_1 = \ell_2\alpha_2$

$$\frac{\ell_1}{\ell_2} = \frac{\alpha_2}{\alpha_1}$$

$$\frac{88}{\ell_a} = \frac{2.2\times10^{-5}}{1.7\times10^{-5}}$$

$\ell_a = 68$ cm

Comment : In this question it should be difference in length instead of increase in length.