PHYSICS

BOOKS - NTA MOCK TESTS

NEET MOCK TEST 17

Physics

1. Light of wavelength 5000Å is incident over a slit of width $1\mu m$. The angular width of central maxima will be

A. 30°

B. 60°

C. 90°

D. 120°

Answer: B

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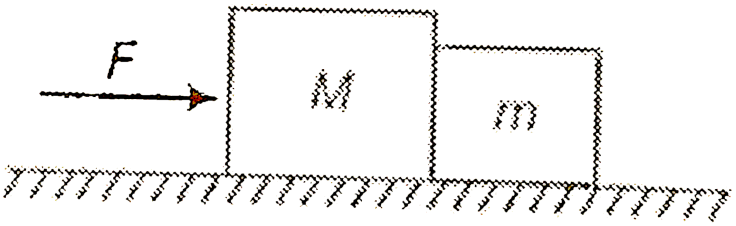
2. Two blocks of masses M = 3 kg and m = 2 kg are in contact on a horizontal table. A constant horizontal force F = 5 N is applied to

block M as shown. There is a constant frictional force of 2 N between the table and the block m but no frictional force between the table and the first block M, then acceleration of the two blocks is



A. $0.4ms^{-2}$

B. $0.6ms^{-2}$

C. $0.8ms^{-2}$

D. $1ms^{-2}$

Answer: B

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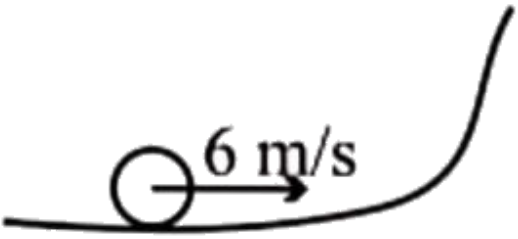
3. A disc of radius 0.1 m rolls without sliding on a horizontal surface with a velocity of $6ms^{-1}$. It then ascends a smooth continuous track as shown in figure. The height upto which it will

ascend is $\left(g = 10ms^{-2}\right)$



A. 2.4m

B. 0.9m

C. 2.7 m

D. 1.8 m

Answer: D

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4. A bob hangs from a rigid support by an inextensible string of length l. It is released from rest when string makes an agngle 60° with vertical . The speed of the bob at the lowest position is

A. $\sqrt{gl}$

B. $\sqrt{3gl}$

C. $\sqrt{2gl}$

D. $\sqrt{5gl}$

Answer: A

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5. The activity of a sample of radioactive material A_1 at time t_1 and A_2 at time $t_2(t_2 > t_1)$. Its mean life is T.

A. $A_1 t_1 = A_2 t_2$

B. $\frac{A_1 + A_2}{t_2 - t_1} =$ constant

C. $A_2 = A_1 e^{(t_1 - t_2)/T}$

D. $A_2 = A_1 e^{(t_1/Tt_2)}$

Answer: C

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6. Light rays of wavelength $6000A^{\circ}$ and of photon intensity $39.6Wm^{-2}$ is incident on a metal surface. If only one percent of photons incident on the surface of electrons emitted per second unit area from the surface will be [Planck constant $=6.64 \times 10^{-34} J-S$,Velocity of light $=3 \times 10^{8} ms^{-1}$]

A. 12×10^{18}

B. 10×10^{18}

C. 12×10^{17}

D. 12×10^{19}

Answer: C

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7. Microscope is an optical instrument which

A. enlarges the object

B. increases the visual angle formed by the object at the eye

C. decreases the visual angle formed by the object at the eye

D. brings the object nearer

Answer: B

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8. The maximum intensity in young's double-slit experiment is I_0. Distance between the slit is $d = 5\lambda$, where λ is the wavelength of monochromatic light used in the experiment. What will be the intensity of light in front of one of the slits on a screen at a distance $D = 10d$?

A. $\frac{I_0}{2}$

B. $\frac{3}{4}I_0$

C. $\frac{I_0}{4}$

D. I_0

Answer: A

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9. A thin glass prism of $\mu = 1.5$ is immersed in water of $\mu = 1.33$. The ratio of deviation of the ray in water to that in air for the same prism is

A. $1:4$

B. $1:2$

C. $1:8$

D. $1:3$

Answer: A

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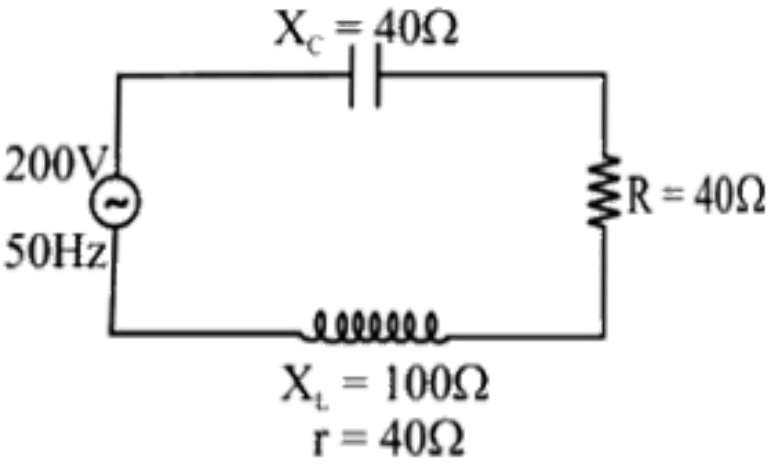
10. The power factor of the following circuit will be



A. 0.2

B. 0.4

C. 0.6

D. 0.8

Answer: D

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11. A uniform magnetic field existsin region given by $\overrightarrow{B} = 3\hat{i} + 4\hat{j} + 5\hat{k}$. A rod of length $5m$ is placed along y-axis is moved along x-axis with constant speed $1m/\sec$. Then the magnitude of induced $e.m.f$ in the rod is :

A. zero

B. 25V

C. 20V

D. 15V

Answer: B

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12. Magnetic susceptibility of a paramagnetic substance is

A. 0.003

B. 0.012

C. 0.018

D. 0.0045

Answer: B

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13. A rectangular loop of metallic wire is of length a and breadth b and carries a current i. The magnetic field at the centre of the loop is

A. $\frac{\mu_0 i}{4\pi}\frac{8\sqrt{a^2+b^2}}{ab}$

B. $\frac{\mu_0 i}{4\pi}\frac{4\sqrt{a^2+b^2}}{ab}$

C. $\frac{\mu_0 i}{4\pi}\frac{2\sqrt{a^2+b^2}}{ab}$

D. $\frac{\mu_0 i}{4\pi}\frac{\sqrt{a^2+b^2}}{ab}$

Answer: A

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14. Resistance of 100Ω and 200Ω are connected in series with 220 V mains. When a voltmeter of 1000Ω resistance is connected in parallel to100Ω , then the reading of voltmeter is

A. 82.5 volts

B. 6.87 volts

C. 587 .5 volts

D. 58.75 volts

Answer: A

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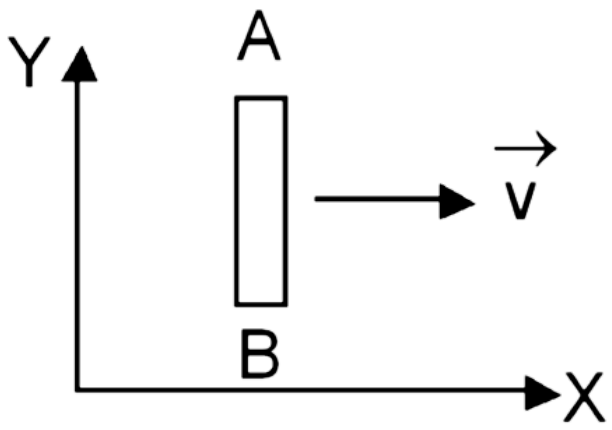
15. A conductor rod AB moves parallel to X-axis in a uniform magnetic field, pointing in the

positive Z-direction. The end A of the rod gets-



A. positively charged

B. negatively charged

C. neutral

D. first positively charged and then negatively charged

Answer: A

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16. In a compound microscope, the focal lengths of two lenses are $1.5cm$ and $6.25cm$ an object is placed at $2cm$ form objective and the final image is formed at $25cm$ from eye lens. The distance between the two lenses is

A. 6.00 cm

B. 7.75 cm

C. 9.25 cm

D. 11.00 cm

Answer: D

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17. A freshly prepared radioactive source of half-life $2h$ emits radiation of intensity which is 64 times the permissible safe level. The minimum time after which it would be possible to work safely with this source is

A. 6h

B. 12h

C. 24h

D. 128 h

Answer: D

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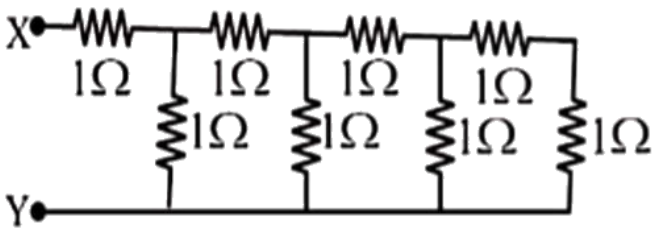
18. Figure shows an infinite ladder network of resistances. The equivalent resistance between

points X and Y is



A. infinite

B. 3Ω

C. 8.62Ω

D. 1.62Ω

Answer: D

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19. A coil of water of resistance 50Ω is embedded in a block of ice and a potential difference of 210 V is applied across it. The amount of ice which melts in 1 second is [latent heat of fusion of ice $= 80calg^{-1}$]

A. 0.262g

B. 2.62g

C. 26.2g

D. 0.0262g

Answer: B

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20. A small drop of water falls from rest through a large height h in air, the final velocity is

A. $\propto \sqrt{h}$

B. $\propto h$

C. $\propto \left(\frac{1}{h}\right)$

D. almost independent of h

Answer: D

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21. Four point charge $q, -q, 2Q$ and Q are placed in order at the corners A, B, C and D of a square. If the field at the midpoint of CD is zero then the value of q/Q is $\frac{5\sqrt{5}}{x}$. Find the value of x.

A. 1

B. 2

C. $\frac{2\sqrt{2}}{5}$

D. $\frac{5\sqrt{5}}{2}$

Answer: D

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22. The electric potential V at any point (x,y, z) in space is given by $V = 4x^2V$. The electric field E (in $\frac{V}{m}$) at the point (1,0,2) is

A. $+8$ in x direction

B. 8 in - x direction

C. 16 in $+x$ direction

D. 16 in -x direction

Answer: B

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23. Two spheres A and B have diameters in the ratio $1:2$, densities in the ratio $2:1$ and specific heat in the ratio $1:3$. Find the ratio of their thermal capacities.

A. $1:6$

B. $1:12$

C. $1:3$

D. $1:4$

Answer: B

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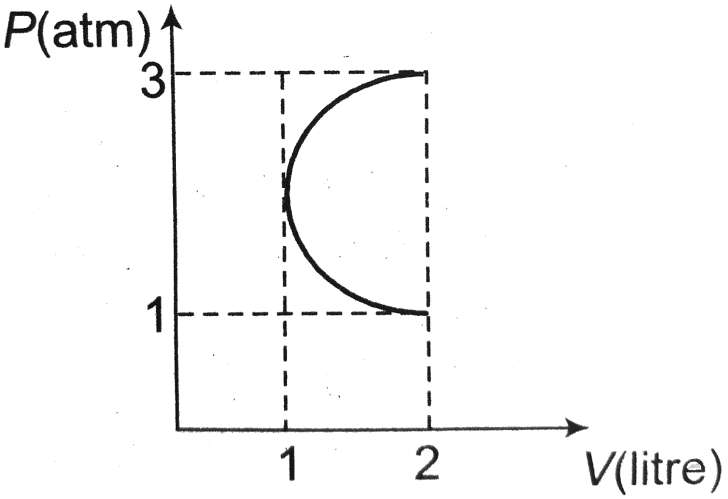
24. In the $P-V$ diagram shown in figure ABC is a semicircle. The work done in the

process ABC is



A. zero

B. $\frac{\pi}{2}$

C. $\frac{\pi}{4}$

D. 4

Answer: B

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25. A sphere and a cube of same material and same total surface area are placed in the same evaculated space turn by turn after they are heated to the same temperature. Find the ratio of their initial rates of cooling in the enclosure.

A. $\sqrt{\frac{\pi}{6}}:1$

B. $\sqrt{\frac{\pi}{3}}:1$

C. $\frac{\pi}{\sqrt{6}}:1$

D. $\frac{\pi}{\sqrt{3}}:1$

Answer: A

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26. Two stationary soruces of sound, S_1 and S_2 having an equal frequency are fixed some distance apart. The position A is left of S_1 , position B in the middle of the two sources

and positionC is to the right of S_2. An observer starts moving with velocity V_0 from position A towards S_1, then

A. beats for three position A,B and C will be heard

B. beats will be heard from A and C but not in case of B

C. beats will be not heard for A and C but will be heard for B

D. beats will be not heard for three position of A,B and C

Answer: C

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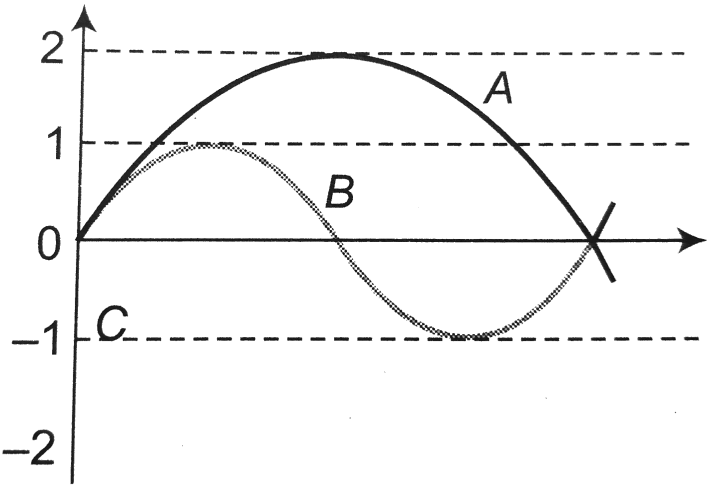

27.

The displacement time graph for two sound waves A and B are shown in the figure. Then the ratio of their intensities I_A / I_B is equal to

A. $1:4$

B. $1:16$

C. $1:2$

D. $1:1$

Answer: D

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28. A and B are two points on uniform metal ring whose centre is O The angle $AOB = \theta$ A and B are maintaind at two different constant temperatures When $\theta = 180^\circ$ the rate of total heat flow from A to B is $1.2W$ When $\theta = 90^\circ$ this rate will be .

A. $0.6W$

B. $0.9W$

C. $1.6W$

D. $1.8W$

Answer: C

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29. The displacement of a particle (in meter) from its mean position is given by the

equation $y = 0.2\left(\cos^2\frac{\pi t}{2} - \sin^2\frac{\pi t}{2}\right)$, The motion of the above particle is

A. not simple harmonic

B. simple harmonic with amplitude 0.2m

C. simple harmonic with the period double that of a second's pendulum

D. simple harmonic with amplitude 0.4 m

Answer: B

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30. The escape velocity from the earth is about 11 km/s. The escape velocity from a planet having twice the radius and the twice mean density as the earth, is

A. $31.11 kms^{-1}$

B. $11 kms^{-1}$

C. $5.5 kms^{-1}$

D. $15.5 kms^{-1}$

Answer: A

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31. A small block of super dense material has mass $2 \times 10^{24} kg$. It is at a height $h << R$. It falls towards the earth.Find its speed when it is at a height $\frac{h}{2}$

A. $\sqrt{\frac{2gh}{3}}$

B. $\sqrt{\frac{3gh}{4}}$

C. $\sqrt{\frac{3gh}{5}}$

D. $\sqrt{\frac{gh}{2}}$

Answer: B

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32. The position vector of a particle is $\vec{r} = \left(3\hat{i} + 4\hat{j}\right)$ metre and its angular velocity $\vec{\omega} = \left(\hat{j} + 2\hat{k}\right) rads^{-1}$ then its linear velocity is (in ms^{-1})

A. $-\left(8\hat{i} - 6\hat{j} + 3\hat{k}\right)$

B. $\left(3\hat{i} + 6\hat{j} + 8\hat{k}\right)$

C. $-\left(3\hat{i} + 6\hat{j} + 6\hat{k}\right)$

D. $\left(6\hat{i}+8\hat{j}+3\hat{k}\right)$

Answer: A

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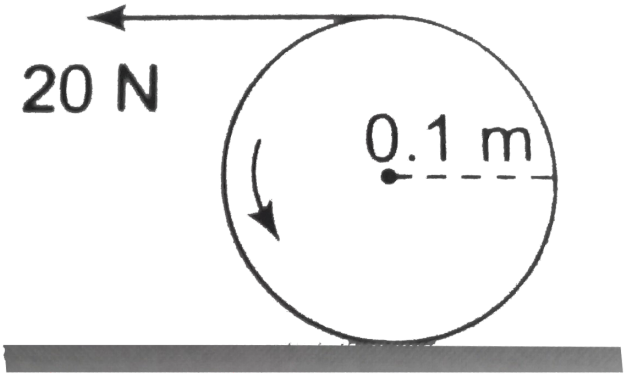
33. The rope shown in figure is wound around a cylinder of mass $4kg$ and moment of inertia $0.02kgm^2$ about the cylinder axis. If the cylinder rolls without slipping, then the linear

acceleration of its centre of mass is.



A. $6.7ms^{-2}$

B. $10.0ms^{-2}$

C. $9.0ms^{-2}$

D. none of these

Answer: A

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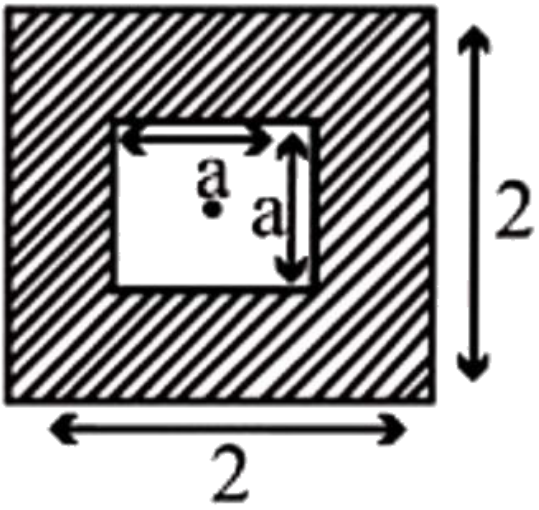
34. A square of a side a is cut from a square of side 2a as shown in the figure. Mass of this square with a hole is M. Then its moment of inertia about an axis passing through its centre of mass and perpendicular to its plane

will be



A. $\frac{Ma^2}{6}$

B. $\frac{2Ma^2}{6}$

C. $\frac{4Ma^2}{6}$

D. $\frac{5Ma^2}{6}$

Answer: D

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35. Assuming that potential energy of spring is zero when it is stretched by $\frac{x_0}{2}$, its potential energy when it is compressed by x_0 is

A. $\frac{3}{8}kx_0^2$

B. $-\frac{3}{4}kx_0^2$

C. $\frac{3}{4}kx_0^2$

D. $\frac{1}{8}kx_0^2$

Answer: A

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36. The solid rubber balls A and B having masses 200 and 400 gm respectively are moving in opposite directions with velocity of A equal to 0.3 m / s . After collision the two balls come to rest, then the velocity of B is

A. $0.15ms^{-1}$

B. $-0.15ms^{-1}$

C. $1.5ms^{-1}$

D. none of these

Answer: B

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37. A particle of mass 100 gm moves in a potential well given by $U = 8x^2 - 4x + 400$ joule. Find its acceleration at a distance of 25 cm from equilibrium in the positive direction

A. $4ms^{-1}$

B. $40ms^{-1}$

C. $-40ms^{-1}$

D. $-4ms^{-1}$

Answer: C

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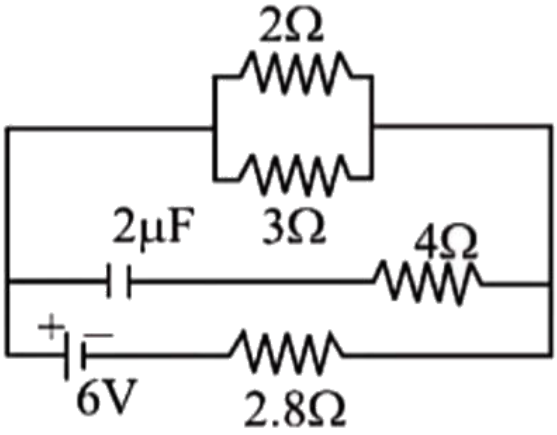
38. In the figure shown, the capacity of the condenser C is $2\mu F$. The current in 2Ω resistor

is



A. 9A

B. 0.9 A

C. $\frac{1}{9}A$

D. $\frac{1}{0.9}A$

Answer: B

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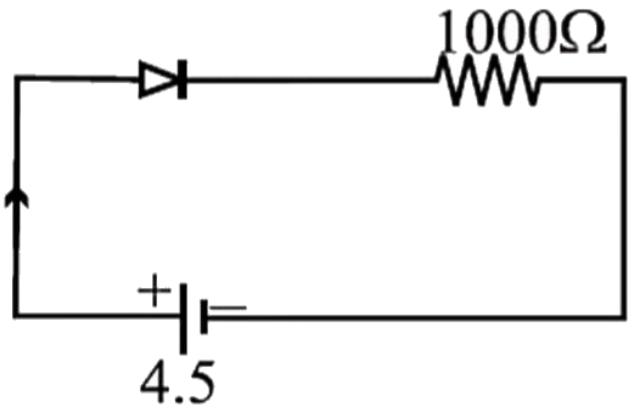
39. A P-N junction diode connected to a battery of e.m.f. 4.5 V and an external resistance of 1000Ω. What is the value of current in the circuit, if potential barrier in the diode $= 0.5V$



A. 4A

B. 4mA

C. 5A

D. 5mA

Answer: B

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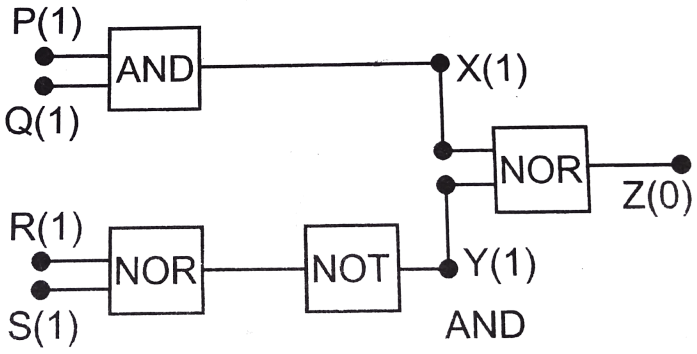
40. The circuit diagram (see fig.) shows a 'logic combination' with the states outputs X, Y and Z given for input P, Q, R and S all at

state 1 (i.e., high). When inputs P and R change to state 0 i.e., low) with inputs Q and S still at 1, the condition of output X, Y and Z chages to



A. $X = 0, Y = 0, Z = 0$

B. $X = 1, Y = 1, Z = 1$

C. $X = 0, Y = 1, Z = 0$

D. $X = 1, Y = 0, Z = 0$

Answer: C

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41. A solid sphere of radius R has charge q uniformly distributed over its volume. The distance from it surfce at which the electrostatic potential is equal to half of the potential at the centre is

A. R

B. $\frac{R}{2}$

C. $\frac{R}{3}$

D. 2R

Answer: C

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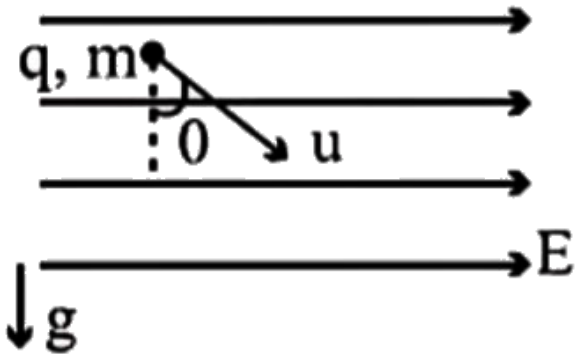
42. A particle of mass m and charge q is thrown from a point in space where uniform gravitational field & electric field are present.The particle



(1) may follow a straight line

(2) may follow a circular path

(3) may follow a parabolic apth

A. 1 & 2 are correct

B. 1 & 3 are correct

C. 2& 3 are correct

D. all these are correct

Answer: B

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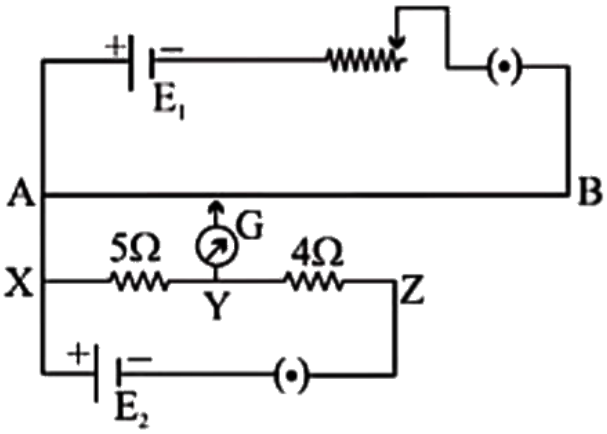
43. In a potential meter arrangement shown in fig. The balancing length for potential difference across X,Y points is found to be 45.5 cm. Then the balancing length for potential

difference across (Y) and (Z) would be



A. 45.50 cm

B. 56.87 cm

C. 36.40 cm

D. none of the above

Answer: C

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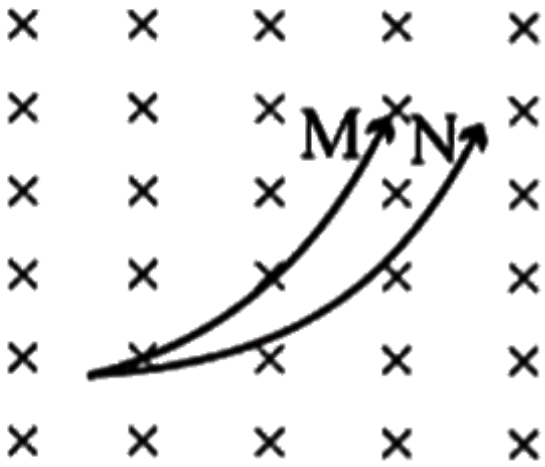
44. Two charged particle M and N are projected with same velocity in a uniform magnetic field. Then M and N respectively.



A. an electron and a proton

B. a deuteron and a photon

C. a deuteron and an electron

D. a proton and α particle

Answer: D

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45. The average radius of an air cored made toroid is 0.1 m and it has 500 turns. If it carries

0.5 ampere current, then the magnetic field inside it is :

A. 5×10^{-4}

B. 5×10^{-3}

C. 5×10^{-2}

D. 2×10^{-3}

Answer: A

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