



PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 58

Physics

1. An X - ray tube produces a continuous spectrum of radiation with its shortest wavelength of $45 \times 10^{-2} \text{ \AA}$. The maximum

energy of a photon in the radiation in eV is

$$(h = 6.62 \times 10^{-34} \text{ Js}, c = 3 \times 10^8 \text{ ms}^{-1})$$

A. 27 , 500

B. 22, 500

C. 17 , 500

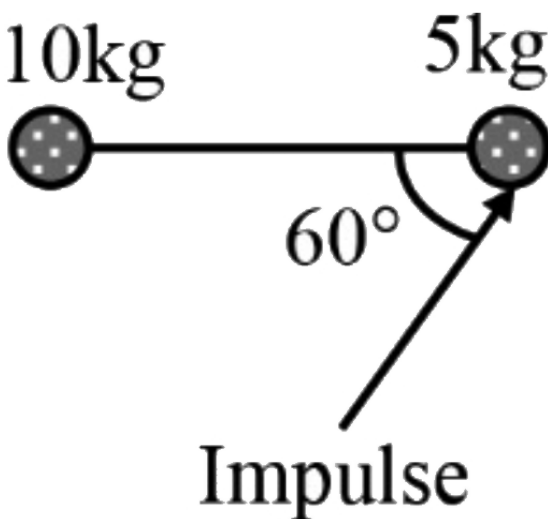
D. 12 , 500

Answer: A



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2. Two point masses connected by an ideal string are placed on a smooth horizontal surface as shown in the diagram. A sharp impulse of 10 kg m s^{-1} is given to the 5 kg mass at an angle of 60° to the line joining the masses. The velocity of the 10 kg mass just after the impulse will be



A. $\frac{2}{3}ms^{-1}$

B. $\frac{1}{3}ms^{-1}$

C. $2ms^{-1}$

D. zero

Answer: B



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3. A car turns a corner on a slippery road at a constant speed of 10 m/s . If the coefficient of

friction is 0.5, the minimum radius of the arc in meter in which the car turns is

A. 20

B. 10

C. 5

D. 4

Answer: A



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4. At a temperature of $30^{\circ}C$, the susceptibility of ferromagnetic material is found to be ' χ ' its susceptibility at $333^{\circ}C$ is

A. 0.5χ

B. 2χ

C. 11.1χ

D. 0.09χ

Answer: A



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5. A wire made of aluminum having resistivity $\rho = 2.8 \times 10^{-8} \Omega - m$ with a circular cross - section and has a radius of 2×10^{-3} m. A current of 5 A flows through the wire . If the voltage difference between the ends is 1 V , the length of the wire in m is

A. 50

B. 60

C. 90

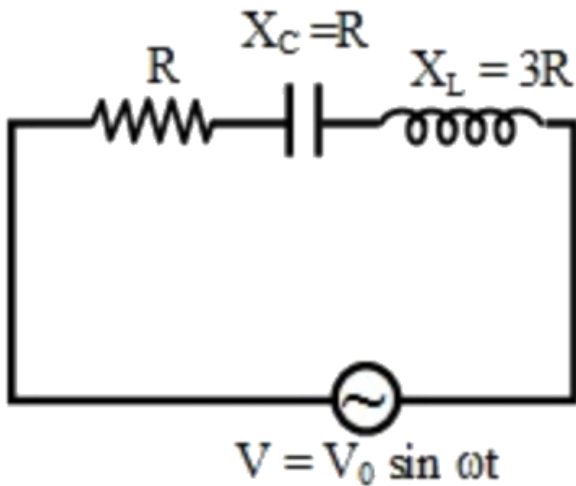
D. 120

Answer: C



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6. The power dissipated in the adjacent circuit is -



A. $\frac{V_0^2}{R}$

B. $\frac{V_0^2}{5R}$

C. $\frac{V_0^2}{\sqrt{5}R}$

D. $\frac{V_0^2}{10R}$

Answer: D

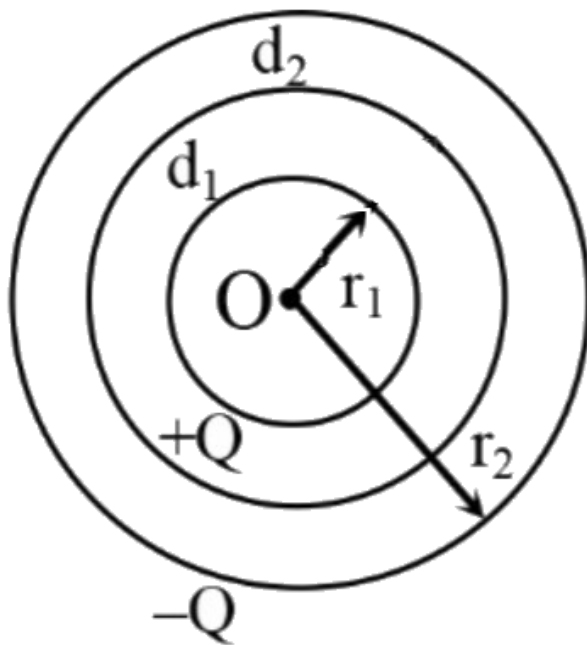


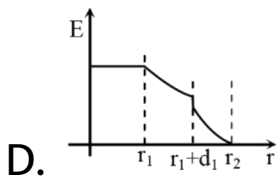
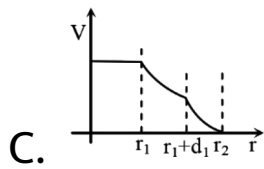
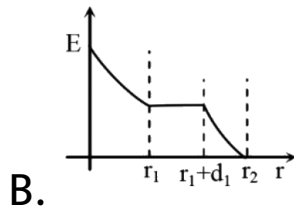
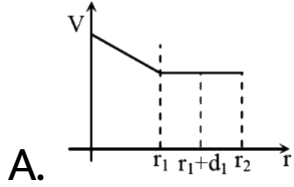
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7. Two concentric conducting spheres of radii r_1 and r_2 ($r_1 < r_2$) carry electric charges of

$+Q$ and $-Q$ respectively . The region between the sphere is filled with two insulating layers of dielectric constant ϵ_1 and ϵ_2 and width d_1 and d_2 respectively. Variation of the potential and electric field with radial distance from O is given . Select the correct one .

(assume V at $r_2 = 0$)





Answer: C



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8. Two identical satellites are moving around the Earth in circular orbits at heights $3R$ and R respectively where R is the radius of the Earth. The ratio of their kinetic energies is x . Find x .

A. 2:1

B. 1:2

C. 3:1

D. 2:3

Answer: B



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9. A body takes 5 minutes for cooling from $50^{\circ}C$ to $40^{\circ}C$ Its temperature comes down to $33.33^{\circ}C$ in next 5 minutes. Temperature of surroundings is

A. $15^{\circ}C$

B. $20^{\circ}C$

C. $25^{\circ}C$

D. $10^{\circ}C$

Answer: B



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10. When water is converted into ice, its entropy

A. Increases

B. Decreases

C. Remains unchanged

D. First decreases and then increases

Answer: B



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11. A length of wire carries a steady current i . It is bent first to form a circular plane coil of one turn. The same length is now bent more sharply to give three loops of smaller radius. The magnetic field at the centre caused by the same current is

- A. One - third of its first value
- B. Unaltered
- C. Three times of its initial value

D. Nine times of its initial value

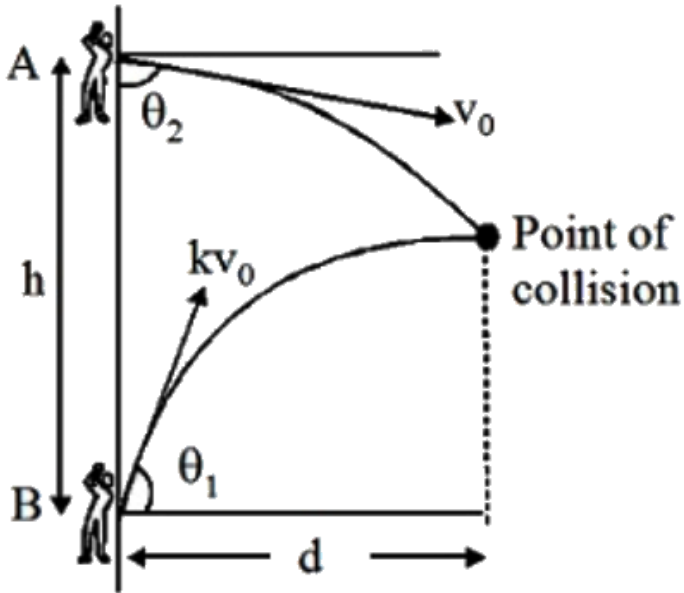
Answer: D



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12. At the same instant , two boys throw balls A and B from the positions shown with a speed v_0 and kv_0 respectively , where k is a constant. For what value of k , balls will collide

? Relevant data is available in the figure .



- A. $\frac{\cos \theta_2}{\cos \theta_1}$
- B. $\frac{\sin \theta_2}{\cos \theta_1}$
- C. $\frac{\tan \theta_2}{\tan \theta_1}$
- D. $\frac{\cot \theta_2}{\cot \theta_1}$

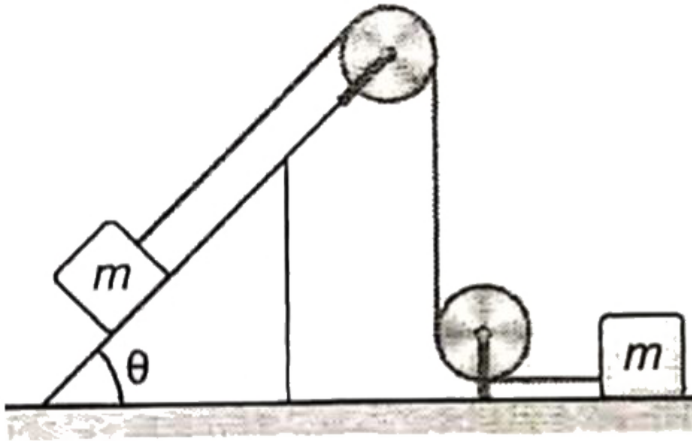
Answer: B



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13. For the system shown in the figure, the inclined plane is fixed, all the pulleys are light and friction is absent every where. The tension

in the string will be



A. $\frac{2}{3}mg \sin \theta$

B. $\frac{3}{2}mg \sin \theta$

C. $\frac{1}{2}mg \sin \theta$

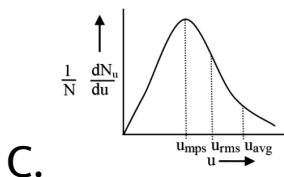
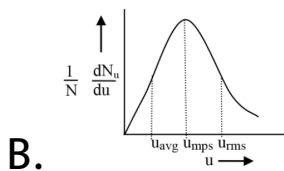
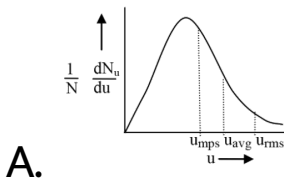
D. $2mg \sin \theta$

Answer: C

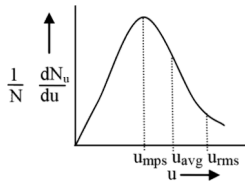


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14. Which of the following plot is correct about Maxwell's speed distribution law ?



D.



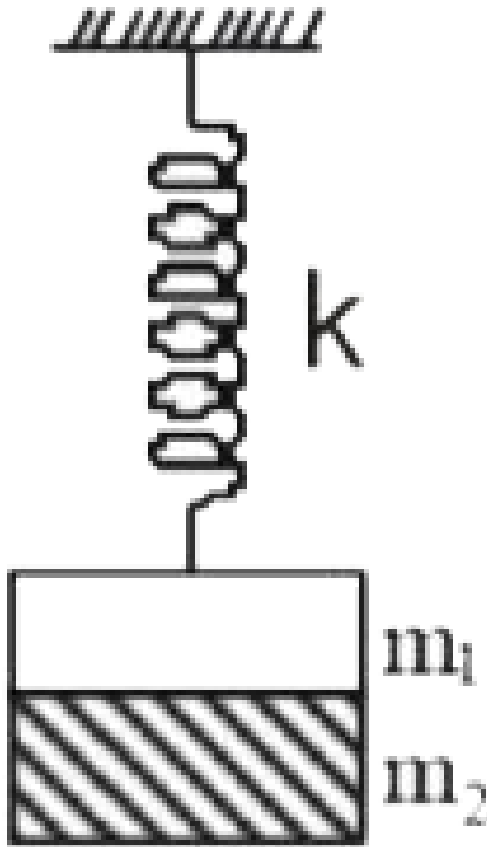
Answer: D



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15. Two masses m_1 and m_2 are suspended together by a massless spring of constant K . When the masses are in equilibrium, m_1 is removed without disturbing the system. Then

the angular frequency of oscillation of m_2 is -



A. $\omega = \sqrt{\frac{k}{m_2}}$

B. $\omega = \sqrt{\frac{k}{m_2 - m_1}}$

C. Can't be determined

D. None of these

Answer: A



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16. Light of energy 2.0 eV falls on a metal of work function 1.4 eV . The stopping potential is

A. 0.6 V

B. 2.0 V

C. 3.4 V

D. 1.4 V

Answer: A



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17. The level of water in a tank is 5 m high . A hole of the area 10cm^2 is made in the bottom of the tank . The rate of leakage of water from the hole is

A. $10^{-2}m^3s^{-1}$

B. $10^2m^3s^{-1}$

C. $10m^3s^{-1}$

D. $10^{-4}m^3s^{-1}$

Answer: A



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18. An equilateral prism produces a minimum deviation of 30° . The angle of incidence is.

A. 30°

B. 45°

C. 15°

D. 60°

Answer: B



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19. A solid sphere and a hollow sphere of equal mass and radius are placed over a rough horizontal surface after rotating it about its

mass centre with same angular velocity ω_0 .

Once the pure rolling starts let v_1 and v_2 be the linear speeds of their centres of mass.

Then

A. $v_1 = v_2$

B. $v_1 > v_2$

C. $v_1 < v_2$

D. Data is insufficient

Answer: C



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20. If we add impurity to a metal those atoms also deflect electrons . Therefore ,

A. The electrical and thermal conductivities both increase

B. The electrical and thermal conductivities both decrease

C. The electrical conductivity increase but thermal conductivity decrease

D. The electrical conductivity decrease but thermal conductivity increases

Answer: B



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21. Two vessel separately contains two ideal gases A and B at the same temperature, the pressure of A being twice that of B. under such conditions, the density of A is found to be 1.5

times the density of B. the ratio of molecular weight of A and B is

A. $\frac{3}{4}$

B. 2

C. $\frac{1}{2}$

D. $\frac{2}{3}$

Answer: A



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22. Which of the following physical quantities has neither dimensions nor unit ?

A. Angle

B. Luminous intensity

C. Coefficient of friction

D. Current

Answer: C



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23. The ratio of intensities of consecutive maxima in the diffraction pattern due to a single slit is

A. $1 : 2 : 3$

B. $1 : 4 : 9$

C. $1 : \frac{2}{\pi^2} : \frac{3}{\pi^2}$

D. $1 : \frac{4}{9\pi^2} : \frac{4}{25\pi^2}$

Answer: D



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24. Two uniform wires of a the same material are vibrating under the same tension. If the first overtone of the first wire is equal to the second overtone of the second wire and radius of the first wire is twice the radius of the second wire, then the ratio of the lengths of the first wire to second wire is

A. $\frac{1}{3}$

B. $\frac{1}{4}$

C. $\frac{1}{5}$

D. $\frac{1}{6}$

Answer: A



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25. The potential energy of a system increased if work is done

A. Upon the system by a non conservative force

B. By the system against a conservative force

C. By the system against a non -
conservative force

D. Upon the system by a conservation force

Answer: D



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26. A particle A has charge $+q$ and a particle B has charge $+4q$ with each of them having the same mass m . When allowed to fall from rest through the same electric potential

difference, the ratio of their speed $\frac{v_A}{v_B}$ will become

A. 4:1

B. 1:4

C. 1:2

D. 2:1

Answer: C



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27. Hammer of mass M strikes a nail of mass 'm' with a velocity 20 m/s into a fixed wall. The nail penetrates into the wall to a depth of 1 cm. The average resistance of the wall to the penetration of the nail is

A. $\left(\frac{M^2}{m + m} \right) \times 10^3$

B. $\frac{2M^2}{M + m} \times 10^4$

C. $\frac{M + m}{M^2} \times 10^2$

D. $\frac{M^2}{M + m} \times 10^2$

Answer: B



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28. Consider the earth as a uniform sphere of mass M and radius R . Imagine a straight smooth tunnel made through the earth which connects any two points on its surface. Show that the motion of a particle of mass m along this tunnel under the action of gravitation would be simple harmonic. Hence, determine the time that a particle would take to go from one end to the other through the tunnel.

A. $2\pi \sqrt{\frac{R^3}{GM}}$

B. $\pi \sqrt{\frac{R^3}{GM}}$

C. $\frac{\pi}{2} \sqrt{\frac{R^3}{GM}}$

D. None of these

Answer: B



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29. A short bar magnet has a magnetic moment of 10 Am^2 . If its length is 10 cm, then

the pole strength of the dipole is

A. 200 A m

B. 100 A m

C. 300 A m

D. 50 A m

Answer: A



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30. In potentiometer experiment, null point is obtained at a particular point for a cell on potentiometer wire x cm long. If the length of the potentiometer wire is increased without changing the cell, the balancing length will
(Driving source is not changed)

A. increase

B. decreases

C. not change

D. become zero

Answer: A



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31. A uniformly wound solenoid coil of self inductance $1.8 \times 10^{-4} H$ and resistance 6Ω is broken up into two identical coils. These identical coils are then connected in parallel across a $12V$ battery of negligible resistance. The time constant and steady state current will be

A. $0.1 \times 10^{-4} \text{ s}$

B. $0.2 \times 10^{-4} \text{ s}$

C. $0.3 \times 10^{-4} \text{ s}$

D. $0.4 \times 10^{-4} \text{ s}$

Answer: C



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32. Two identical metal plates are given positive charges Q_1 and Q_2 ($< Q_1$) respectively. If they are now brought close

together to form a parallel plate capacitor with capacitance C , the potential difference between them is

A. $\frac{Q_1 + Q_2}{2C}$

B. $\frac{Q_1 + Q_2}{C}$

C. $\frac{Q_1 - Q_2}{C}$

D. $\frac{Q_1 - Q_2}{2C}$

Answer: D



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33. The weight of a body at earth's surface is W . At a depth halfway to the centre of the earth, it will be (assuming uniform density in the earth)

A. W

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

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

D. $\frac{W}{8}$

Answer: B



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34. A metal rod of Young's modulus Y and coefficient of thermal expansion α is held at its two ends such that its length remains constant. If its temperature is raised by $t^\circ C$, the linear stress developed in it is

A. $\frac{\alpha t}{Y}$

B. $\frac{Y}{\alpha E}$

C. $Y\alpha t$

D. $\frac{1}{Y\alpha t}$

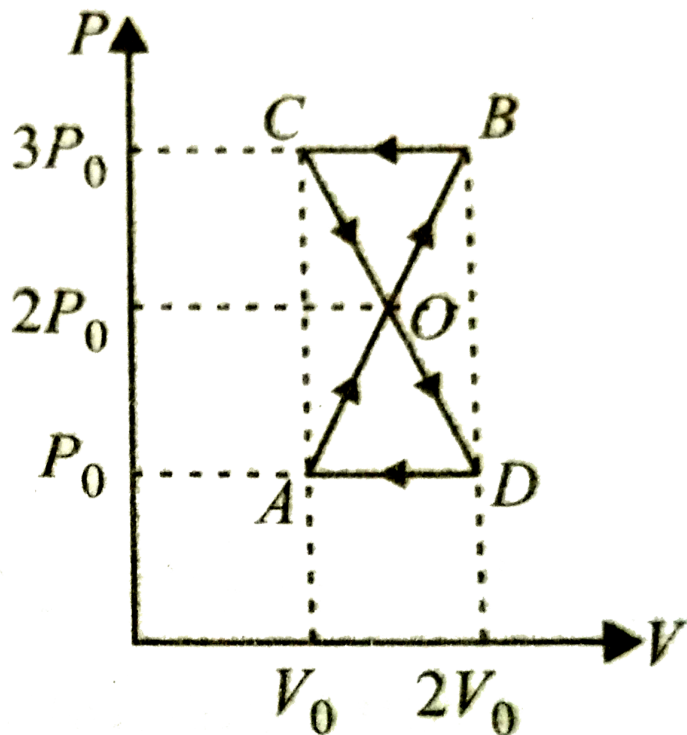
Answer: C



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35. A thermodynamical system undergoes cyclic process ABCDA as shown in figure work

done by the system is



A. Zero

B. $2P_0V_0$

C. P_0V_0

D. $\frac{3}{2}P_0V_0$

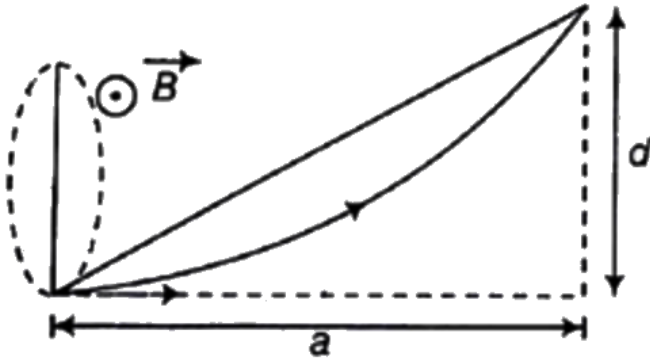
Answer: A



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36. A charged particle q enters a region of uniform magnetic field B (out of page) and is deflected distance d after travelling a horizontal distance a . The magnitude of the

momentum of the particle is



A. $\frac{qB}{2} \left[\frac{a^2}{d} + d \right]$

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

C. Zero

D. $2qB$

Answer: A



37. An airplane, diving at an angle of 53.0° with the vertical releases a projectile at an altitude of 730 m. The projectile hits the ground 5.00 s after being released. What is the speed of the aircraft?

A. 282m.s^{-1}

B. 202m.s^{-1}

C. 182m.s^{-1}

D. 102m.s^{-1}

Answer: B



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38. A man of mass 60 kg climbed down using an elevator . The elevator had an acceleration of $4m.s^{-2}$. If the acceleration due to gravity is $10m.s^{-2}$, the man's apparent weight on his way down is

A. 60 N

B. 240 N

C. 360 N

D. 840 N

Answer: C



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39. F_{pp} , F_{nn} and F_{np} are the nuclear forces between proton - proton , neutron - neutron and neutron - proton respectively . Then relation between them is

A. $F_{pp} = F_{nn} \neq F_{np}$

B. $F_{pp} \neq F_{nn} = F_{np}$

C. $F_{pp} = F_{nn} = F_{np}$

D. $F_{pp} \neq F_{nn} \neq F_{np}$

Answer: C



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40. A body is vibrating in simple harmonic motion with an amplitude of 0.06 m and

frequency of 15 Hz . The velocity and acceleration of body is

A. $9.80ms^{-1}$ and $9.03 \times 10^2ms^{-2}$

B. $8.90ms^{-1}$ and $8.21 \times 10^2ms^{-2}$

C. $6.82ms^{-1}$ and $7.62 \times 10^2ms^{-2}$

D. $5.65ms^{-1}$ and $5.32 \times 10^2ms^{-2}$

Answer: D



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41. A uniform electric field and a uniform magnetic field exist in a region in the same direction. An electron is projected with velocity pointed in the same direction. The electron will

A. Be deflected to the left without increase in speed

B. Be deflected to the right without increase in speed

C. Not be deflected but its speed will decrease

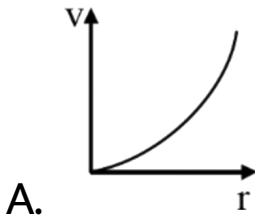
D. No be deflected but its speed will increase

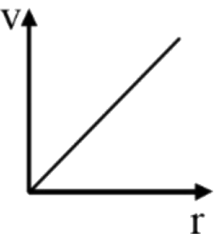
Answer: C



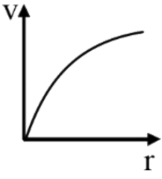
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42. Terminal velocity (V) of a spherical object varies with a radius of object (r) -

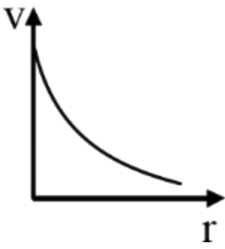




B.



C.



D.

Answer: A

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43. What is the angle of incidence for an equilateral prism of refractive index $\sqrt{3}$ so that the ray is parallel to the base inside the prism?

A. 30°

B. 45°

C. 60°

D. Either 30° or 60°

Answer: C



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44. A sphere of mass m and radius r rolls on a horizontal plane without slipping with a speed u . Now it rolls up vertically, then maximum height it would be attain will be

A. $\frac{3u^2}{4g}$

B. $\frac{5u^2}{2g}$

C. $\frac{7u^2}{10g}$

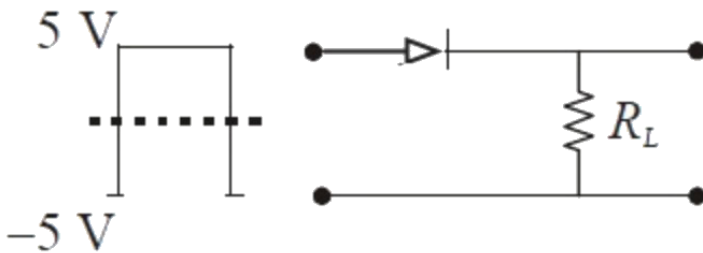
D. $\frac{11u^2}{9g}$

Answer: C

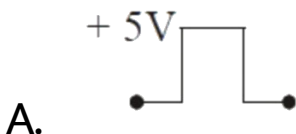


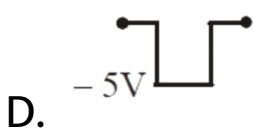
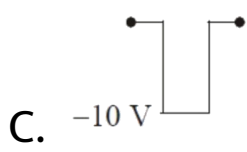
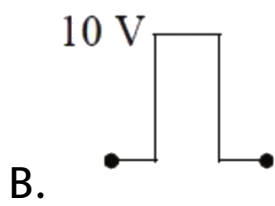
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45. If in a p - n junction diode , a square input signal of 10 V is applied as shown



Then the output signal across R_L will be





Answer: A

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