PHYSICS

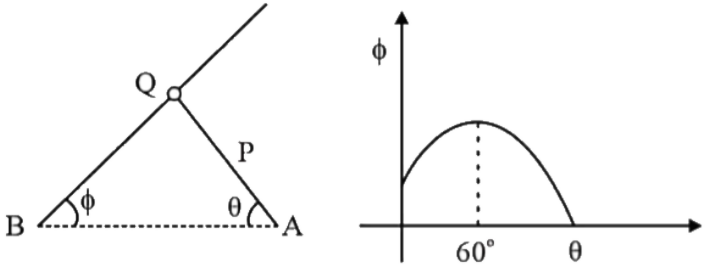
BOOKS - NTA MOCK TESTS

NEET MOCK TEST 8

Physics Single Choice

1. A rod P of length 1 m, is hinged at one end A there is a ring attached to the other end. Another long rod Q is hinged at B and it

passes through the ring. The rod P is rotated about an axis which is perpendicular to the plane is which both rods are present and the variations between the angles θ and ϕ are plotted as shown. The distance between the hinges A and B is



A. 3 m

B. 1 m

C. 2 m

D. $2\sqrt{2}m$

Answer: C

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2. A diatomic molecule is formed by two atoms which may be treated as mass points m_1 and m_2 joined by a massless rod of length r. Then the moment of inertia of molecule about an

axis passing through centre of mass and perpendicular to the rod is:

A. Zero

B. $(m_1 + m_2)r^2$

C. $\left(\frac{m_1 m_2}{m_1 + m_2}\right) r^2$

D. $\left(\frac{m_1 + m_2}{m_1 m_2}\right) r^2$

Answer: C

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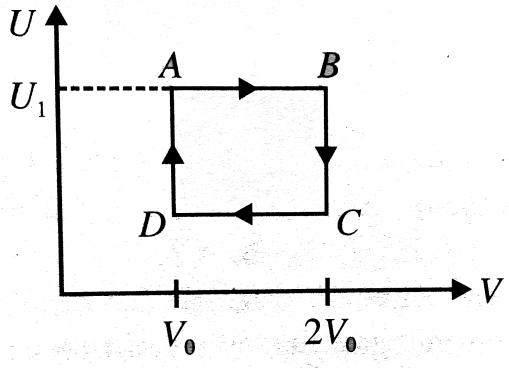
3. One mole of an ideal gas has an interal energy given by $U = U_0 + 2PV$, where P is the pressure and V the volume of the gas. U_0 is a constant. This gas undergoes the quasi $-$ static cyclic process $ABCD$ as shown in the $U - V$ diagram.



The gas must be

A. 2R

B. 3R

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

D. 4R

Answer: B

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4. A big explosion on the moon cannot be heard on the earth because

A. the explosion produces high frequency sound waves which are inaudible.

B. sound waves require a material medium for propagation.

C. sound waves are absorbed in the atmosphere of moon.

D. sound waves are absorbed in the earth's atmosphere.

Answer: B

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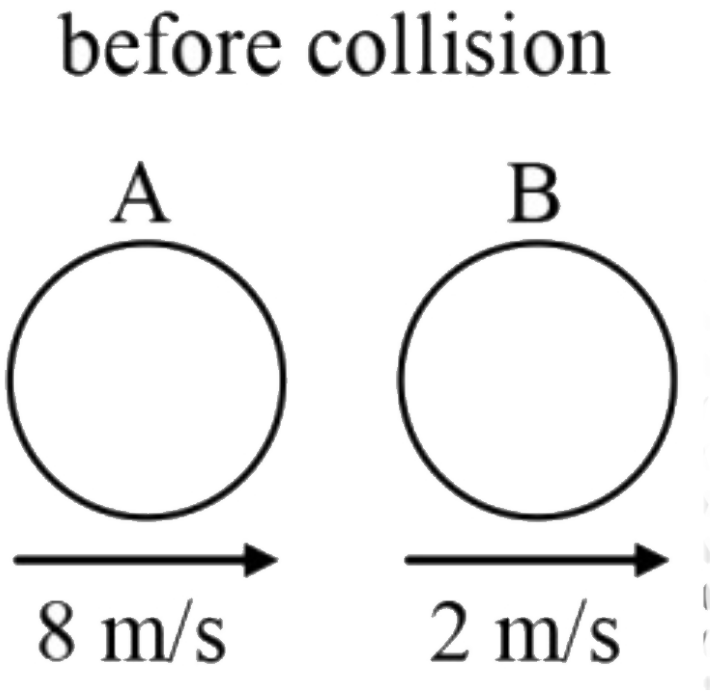
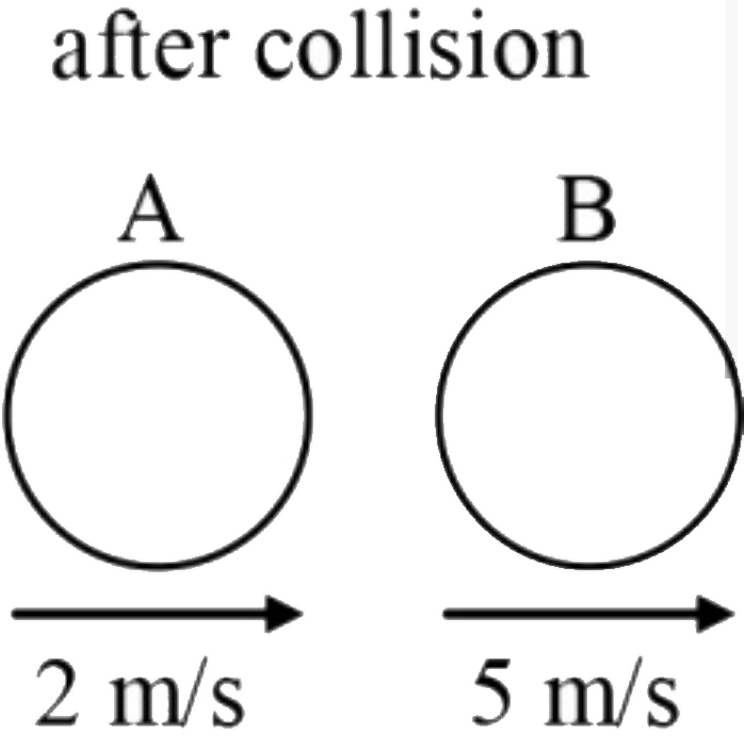
5. The two diagrams show the situation before and after a collision between two spheres A and B of equal radii moving along the same straight line on a smooth horizontal surface. The coefficient of restitution e is


before collision
A
B
8 m/s
2 m/s



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

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

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

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

Answer: B

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6. Unpolarized light of intensity I_0 is incident on surface of a block of glass at brewster's angle. In that case, which one of the following statements is true-

A. transmitted light is partially polarized with intensity $\frac{I_0}{2}$

B. transmitted light is completely polarized with intensity less than $\frac{I_0}{2}$

C. reflected light is partially polarized with intensity $\frac{I_0}{2}$

D. reflected light is completely polarized with intensity less than $\frac{I_0}{2}$

Answer: D

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7. In the ideal double-slit experiment, when a glass-plate (refractive index 1.5) of thickness t is introduced in the path of one of the interfering beams (wavelength λ), the intensity at the position where the central maximum occurred previously remains unchanged. The minimum thickness of the glass-plate is

A. 2λ

B. $\frac{2\lambda}{3}$

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

D. λ

Answer: A

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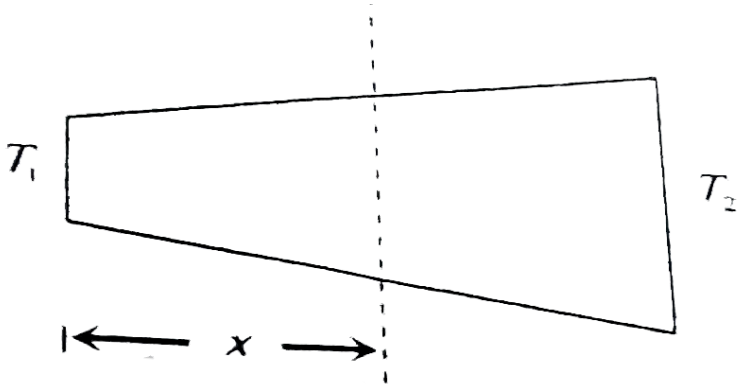
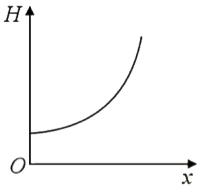
8. Radius of a conductor increases uniformly from left end to right end as shown in fig.



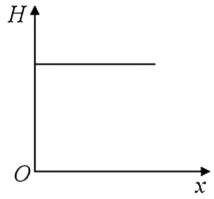
Material of the conductor is isotropic and its

curved surface is thermally isolated from surrounding. Its ends are maintained at temperatures T_1 and $T_2(T_1 > T_2)$: If, in steady state, heat flow rate is equal to H , then which of the following graphs is correct

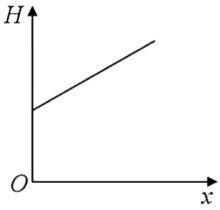
A.

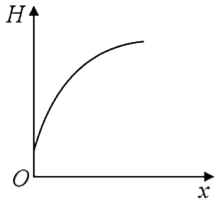


B.



C.



D. 

Answer: B

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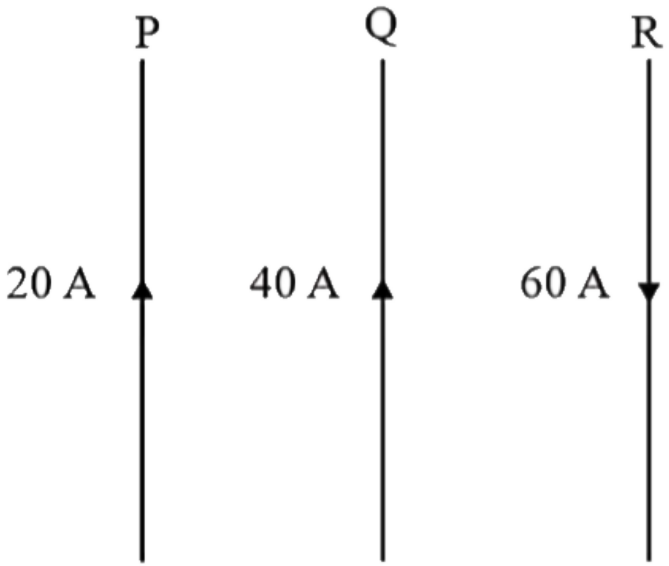
9. P, Q and R are long straight wires in air, carrying currents as shown. The force on Q is

directed



A. to the left

B. to the right

C. perpendicular to the plane of the diagram

D. along the current in Q

Answer: A

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10. A particle is projected vertically upward with velocity u from a point A, when it returns to the point of projection .

A. average velocity is zero

B. displacement is zero

C. average speed is u

D. average speed is $\frac{u}{2}$

Answer: C

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11. A rotating wheel changes angular speed from 1800 rpm to 3000 rpm in 20 s. What is the angular acceleration assuming to be uniform?

A. $60\pi \ \ \mathrm{rad\,s^{-2}}$

B. $90\pi \ \ \mathrm{rad\,s^{-2}}$

C. $2\pi \ \ \mathrm{rad\,s^{-2}}$

D. $40\pi \ \ \mathrm{rad\,s^{-2}}$

Answer: C

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12. Two spring P and Q having stiffness constants k_1 and $k_2(< k_1)$, respectively are stretched equally. Then

A. more work is done to stretch Q

B. more work is done to stretch P

C. their force constants will become equal

D. equal work is done on both the springs

Answer: B

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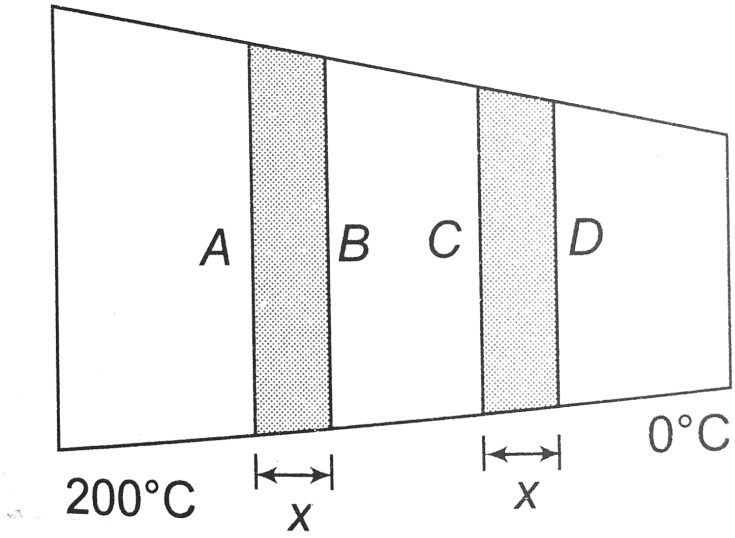
13. Two ends of a conducting rod of varying cross-section are maintained at $200^{\circ}C$ and

$0^\circ C$ respectively. In steady state:



A. temperature difference across AB and CD are equal

B. temperature difference across AB and CD are equal

C. temperature difference across AB is greater than that of across CD

D. temperature difference across AB is less than that of across CD

Answer: C

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14. A function is $y = x^3$. The approximate value of the function at $x = 2.0001$ is possibly (choose the closest answer possible)

A. 8.0006

B. 8.0008

C. 8.0012

D. 8.0015

Answer: C

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15. A ideal gas $(\gamma = 1.5)$ is expanded adiabatically. How many times has the gas to

be expanded to reduce the root mean square velocity of molecules 2.0 times

A. 4 times

B. 16 times

C. 8 times

D. 2 times

Answer: B

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16. Four particles each of mass M move along a circle of radius R under the action of their mutual gravitational attraction the speed of each particles is

A. $\sqrt{\frac{GM}{R}}$

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

C. $\sqrt{\frac{GM}{R}\left(1+2\sqrt{2}\right)}$

D. $\frac{1}{2}\sqrt{\frac{GM}{R}\left(1+2\sqrt{2}\right)}$

Answer: D

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17. The heat generated in a circuit is given by $Q = I^2Rt$, where I is current , R is resistance, and t is time . If the percentage errors in measuring I and R are 2% and 1%, respectively , then the maximum error in measuring heat will be

A. 2%

B. 3%

C. 4%

D. 6%

Answer: D

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18. Under the action of a force a 2 kg body moves such that its position x in meters as a function of time t is given by $x = \frac{t^4}{4} + 3$. Then work done by the force in first two seconds is

A. 6 J

B. 10 J

C. 7 J

D. 64 J

Answer: D

19. The threshold frequency for a metallic surface corresponds to an energy of $6.2eV$ and the stopping potential for a radiation

incident on this surface is $5V$. The incident radiation lies in

A. ultra - violet region

B. infra - red region

C. visible region

D. x - ray region

Answer: A

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20. The earth's magnetic field always has a vertical component except at the

A. magnetic equator

B. magnetic poles

C. geographic north pole

D. latitude 45°

Answer: A

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21. Transition between three energy levels in a particular atom give rise to three Spectral line of wavelength , in increasing magnitudes. λ_1, λ_2 and λ_3. Which one of the following equations correctly relates λ_1, λ_2 and λ_3?

A. $\lambda_1 = \lambda_2 - \lambda_3$

B. $\lambda_1 = \lambda_3 - \lambda_2$

C. $\frac{1}{\lambda_1} = \frac{1}{\lambda_2} + \frac{1}{\lambda_3}$

D. $\frac{1}{\lambda_2} = \frac{1}{\lambda_3} + \frac{1}{\lambda_1}$

Answer: C

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22. A solenoid of 1.5 metre length and 4.0 cm diameter posses 10 turn per cm. A current of 5 ampere is flowing through it. The magnetic induction at axis inside the solenoid is

A. $2\pi \times 10^{-3}T$

B. $2\pi \times 10^{-5}T$

C. $4\pi \times 10^{-2}T$

D. $4\pi \times 10^{-3}T$

Answer: A

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23. If two mirrors are keps at 60° to each other, then the number of images formed by them is

A. 5

B. 6

C. 7

D. 8

Answer: A

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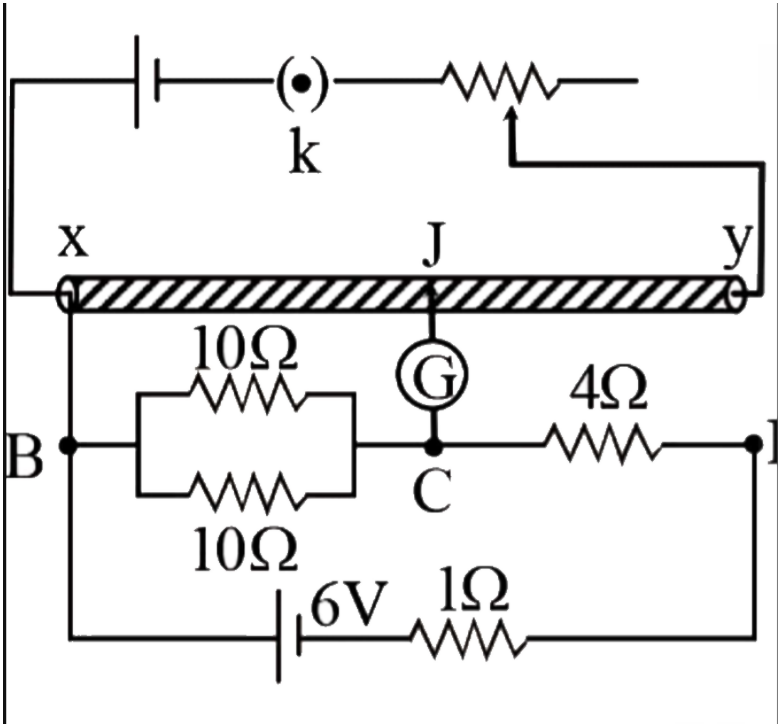
24. If the balance length corresponding to points B and C is 40 cm on the potentiometer wire, the balance length corresponding to

point C and D is



A. 25 cm

B. 32 cm

C. 50 cm

D. 64 cm

Answer: B

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25. A laser light of wavelength 660 nm is used to weld Retina detachment. If a laser pulse of width 60 ms and power 0.5 kW is used, the approximate number of photons in the pulse are (Take Planck's Constant, $h = 6.62 \times 10^{-34} Js$)

A. 10^{22}

B. 10^{19}

C. 10^{20}

D. 10^{18}

Answer: C

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26. The amplitude and time period in SHM are 0.8 cm and 0.2 sec respectively. If the initial phase is $\pi/2$ radian, then the equation representing SHM is -

A. $y = 0.8 \cos 10\pi t$

B. $y = 0.8 \sin \pi t$

C. $y = 3 \times 0.8 \sin \pi t$

D. $y = 0.8 \sin 10\pi t$

Answer: A

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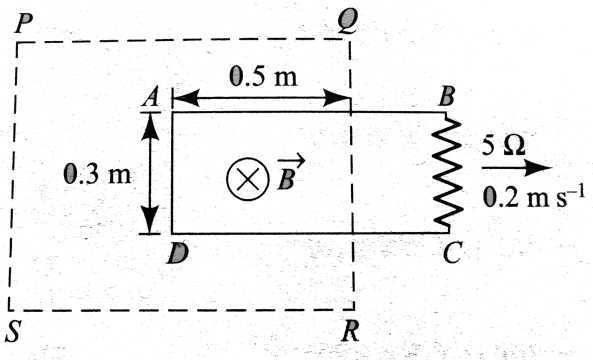
27. A circuit $ABCD$ is held perpendicular to the uinform magnetic field of $B = 5 \times 10^{-2} T$ extending over the region $PQRS$ and

directed into the plane of the paper. The cicuit is moving out of the field at a uin form speed of $0.2ms^{-1}$ for $1.5s$. During this time, the current in the 5Ω resistor is



A. 0.6 mA from B to C

B. 0.9 mA from B to C

C. 0.9 mA from C to B

D. 0.6 mA from C to B

Answer: A

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28. Half lives of two isotopes X and Y of a material are known to be 2×10^9 years and 4×10^9 years respectively. If a planet was formed with equal number of these isotopes, then the current age of planet, given that

currently the material has 20 % of X and 80 % of Y by number, will be

A. 2×10^9 years

B. 4×10^9 years

C. 6×10^9 years

D. 8×10^9 years

Answer: D

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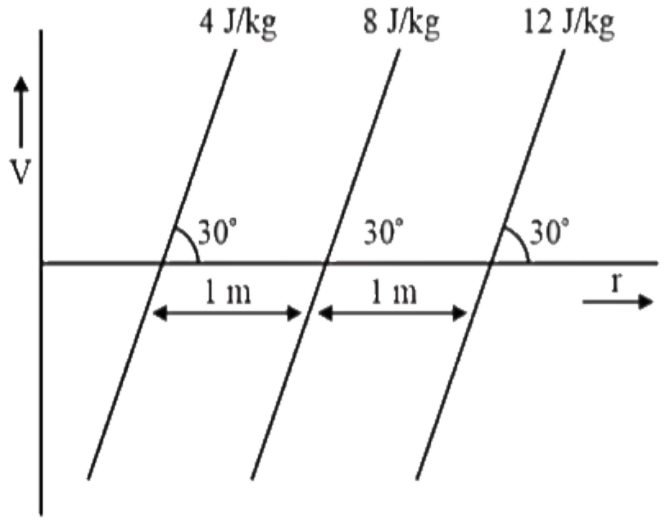
29. Gravitational potential V versus distance r graph is represented in the figure. The magnitude of gravitational field intensity is equal to



A. 8 N/Kg

B. 4 N/Kg

C. 6 N/Kg

D. 2 N/Kg

Answer: A

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30. Four persons K,L,M,N are initially at the four corners of a square of side d. Each person now moves with a uniform speed v in such a way that K always moves directly towards L, L directly towards M, M directly towards N, and

N directly towards K. The four persons will meet at a time..... .

A. $\frac{d}{v}$

B. $\frac{d}{2v}$

C. $\frac{2d}{v}$

D. The four persons will never meet

Answer: A

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31. A ball of mass $2kg$ and another of mass $4kg$ are dropped together from a 60 feet tall building . After a fall of 30 feet each towards earth , their respective kinetic energies will be the ratio of

A. $1:\sqrt{2}$

B. $\sqrt{2}:1$

C. $1:4$

D. $1:2$

Answer: D

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32. Two magnets of magnetic moments $4Am^2$ and $3Am^2$ are joined to form a cross $(+)$, then the magnetic moment of the combination is

A. $4Am^2$

B. $1Am^2$

C. $7Am^2$

D. $5Am^2$

Answer: D

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33. With respect to the potential of emitter, base and collector, a NPN transistor conducts when

A. both collector and emitter are positive with respect to the base

B. collector is positive and emitter is negative with respect to the base

C. collector is positive and emitter is at same potential as the base

D. both collector and emitter are negative with respect to the base

Answer: B

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34. $400cc$ volume of gas having $\gamma = \frac{5}{2}$ is suddenly compressed to $100cc$. If the initial pressure is P, the final pressure will be

A. $P/32$

B. 8P

C. 32P

D. 16P

Answer: C

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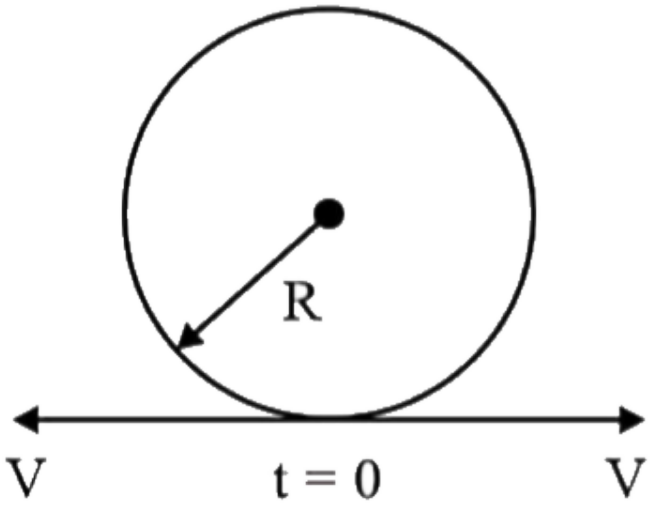
35. The endpoints of a conducting string (shaped as a circular loop) of constant length are being pulled at a constant velocity v as

shown in the figure. There exists a uniform magnetic field B is space which is perpendicular to the circular loop. If the loop always remains circular during the motion of its endpoints, them the emf induced in the loop at $t = \dfrac{\pi R}{2v}$ is



A. 2BRv

B. BRv

C. 4BRv

D. 0.5 BRv

Answer: B

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36. An air bubble of radius 1 mm is located at a depth of 20 cm below water level. The excess pressure inside the bubble above the

atmospheric pressure is [Given, the surface tension of water is $0.075\ \mathrm{Nm}^{-1}$ and density is $1000\ \mathrm{kg\ m}^{-3}$]

A. 2110 Pa

B. 2210 Pa

C. 2260 Pa

D. 2310 Pa

Answer: A

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37. A man of weight mg is moving up in a rocket with acceleration $4\ g$. The apparent weight of the man in the rocket is

A. Zero

B. 4 mg

C. 5 mg

D. mg

Answer: C

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38. A small conducting sphere of radius r is lying concentrically inside a bigger hollow conducting sphere of radius R. The bigger and smaller spheres are charged with Q and $q(Q > q)$ and are insulated from each other. The potential difference between the spheres will be

A. $\frac{1}{4\pi\varepsilon_0}\left[\frac{q}{r} - \frac{q}{R}\right]$

B. $\frac{1}{4\pi\varepsilon_0}\left[\frac{q}{r} + \frac{q}{R}\right]$

C. $\frac{1}{4\pi\varepsilon_0}\left[\frac{q}{r} - \frac{Q}{R}\right]$

D. $\frac{1}{4\pi\varepsilon_0}\left[\frac{q}{r} + \frac{Q}{R}\right]$

Answer: A

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39. The deflection in a moving coil galvanometer is

A. directly proportioanl to the torsional constant

B. directly proportional to the number of turns in the coil

C. inversely proportioanl to the area of the coil

D. inversely proportional to the current flowing

Answer: B

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40. If for hydrogen $C_P - C_V = m$ and for nitrogen $C_P - C_V = n$, where C_P and C_V refer to specific heats per unit mass

respectively at constant pressure and constant volume, the relation between m and n is (molecular weight of hydrogen = 2 and molecular weight or nitrogen = 14)

A. m = 14n

B. n = 7n

C. m = 9n

D. n = 16n

Answer: A

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41. A positively charged ball hangs from a long silk thread. Electric field at a certain point (at the same horizontal level of ball) due to the ball is E. If now put a postive test charge q_0 at this point and measure $\frac{F}{q_0}$, then E

A. $> \frac{E}{q_0}$

B. $< \frac{F}{q_0}$

C. $= \frac{F}{q_0}$

D. none of these

Answer: A

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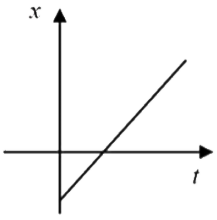
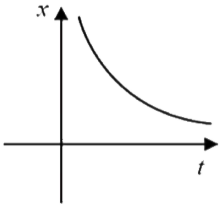
42. Which of the following graphs represents the motion of a particle moving with constant velocity?



(i)



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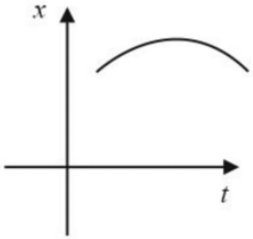

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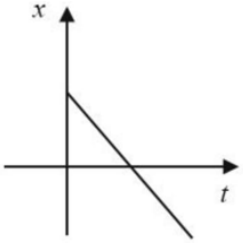

(iv)

A. graphs (i) and (iii)

B. graphs (i) and (iv)

C. graphs (i) and (ii)

D. graph (i)

Answer: B

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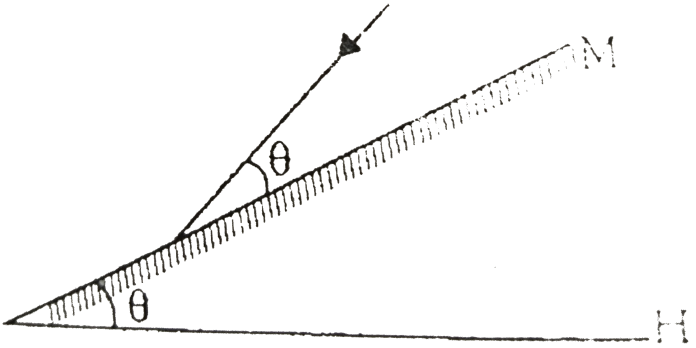
43. A mirror is inclined at an angle of θ with the horizontal. If a ray light is incident at an angle θ as shown , then the angle made by

reflected ray with the horizontal is



A. θ

B. 2θ

C. $\theta/2$

D. zero

Answer: D

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44. The bob of a simple pendulum is a spherical hollow ball filled with water. A plugged hole near the bottom of the oscillating bob gets suddenly unplugged. During observation, till water is coming out, the time period of oscillation would

A. first increases then decrease back to the origial value

B. first decreases then increase back to the original value

C. remains unchanged

D. increases towards a saturation value

Answer: A

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45. What is angle between electric field and equipotential surface?

A. 90° always

B. 0° always

C. 0° to 90°

D. 0° to 180°

Answer: A

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