PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET TEST 102

Physics

1. Which of the following links lines of the H-atom spectrum belongs to the Balmer series ?

A. $1025Å$

B. $1218Å$

C. $4861Å$

D. $18751Å$

Answer: C

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2. The energy required for transition in a Hydrogen atom from 1^{st} energy level to the 2^{nd} energy level is E. Then , which of the

following transitions is possible for the same energy in Helium atom ?

A. $2 \rightarrow 3$

B. $2 \rightarrow 4$

C. $1 \rightarrow 2$

D. $1 \rightarrow 3$

Answer: B

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3. A body of mass M at rest explodes into three pieces, two of which of mass M//4 each are thrown off in perpendicular directions eith velocities of $3m/s$ and $4m/s$ respectively. The third piece will be thrown off with a velocity of

A. $1.5ms^{-1}$

B. $2.0ms^{-1}$

C. $2.5ms^{-1}$

D. $3.0ms^{-1}$

Answer: C

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4. A particle of mass m moving in the x direction with speed 2v is hit by another particle of mass 2m moving in they y direction with speed v. If the collision is perfectly inelastic, the percentage loss in the energy during the collision is close to :

A. $62\ \%$

B. $44\ \%$

C. $50\ \%$

D. $56\ \%$

Answer: D

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5. A body moves along a circular path of radius 10m and the coefficient of friction is 0.5.What should be its angular speed $\left(\in rads^{-1} \right)$, if is not to slip from the surface ? $\left(Given, g = 9.8ms^{-2} \right)$

A. 5

B. 10

C. 0.1

D. 0.7

Answer: D

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6. A small magnet of dipole moment M is kept on the arm of a deflection magnetometer set in tan A position at a distance of $0.2m$. If the

deflection is 60°, find the value of $P\left(B_H = 0.4 \times 10^{-4} T\right)$.

A. 2.77A m^2

B. 8A m^2

C. 0.2A m^2

D. 0.9A m^2

Answer: A

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7. Two wires that are made up of two different materials whose specific resistance are in the ratio 2 : 3, length 3 : 4 and area 4 : 5. The ratio of their resistances is

A. $6:5$

B. $6:8$

C. $5:8$

D. $1:2$

Answer: C

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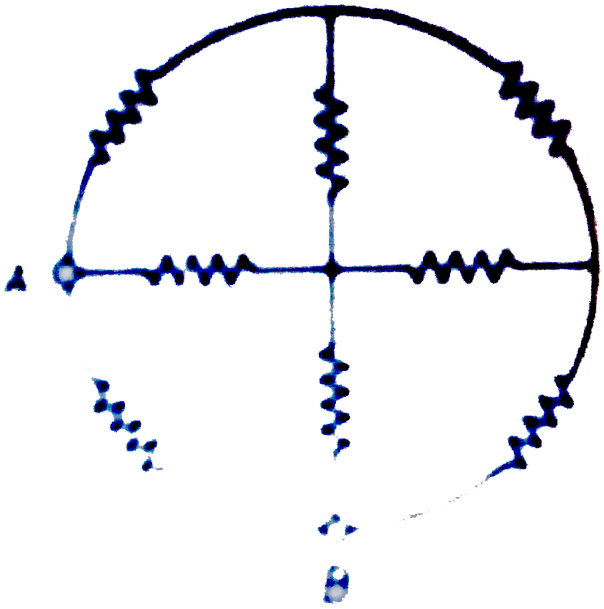
8. Eight resistances each of resistance 5Ω are connected in the circuit as shown in figure. The equivalent resistance between A and B is



A. $\frac{8}{3}\Omega$

B. $\frac{16}{3}\Omega$

C. $\frac{15}{7}\Omega$

D. $\frac{19}{2}\Omega$

Answer: A

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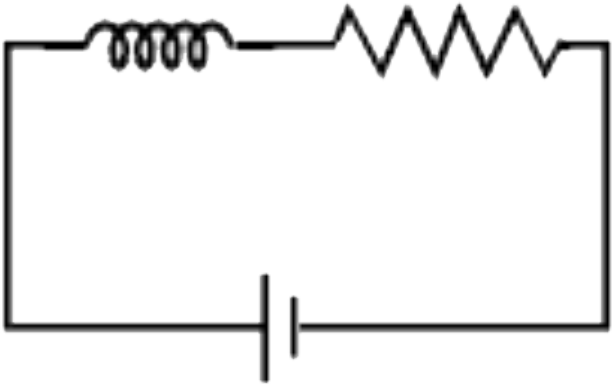
9. Time constant of the given circuit is τ If the battery is replaced by an ac source having voltage $V = V_0 \cos \omega t$, power factor or the

circuit will be



A. ωT

B. $\frac{1}{\sqrt{1+(\omega\tau)^2}}$

C. $\sqrt{1-(\omega\tau)^2}$

D. None

Answer: B

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10. An ideal transformer converts 220 V AC to 3.3 kV AC to transmit a power of 4.4 kW. If primary coil has 600 turns, then alternating current in secondary coil is

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

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

C. $\frac{5}{3}A$

D. $\frac{7}{3}A$

Answer: B

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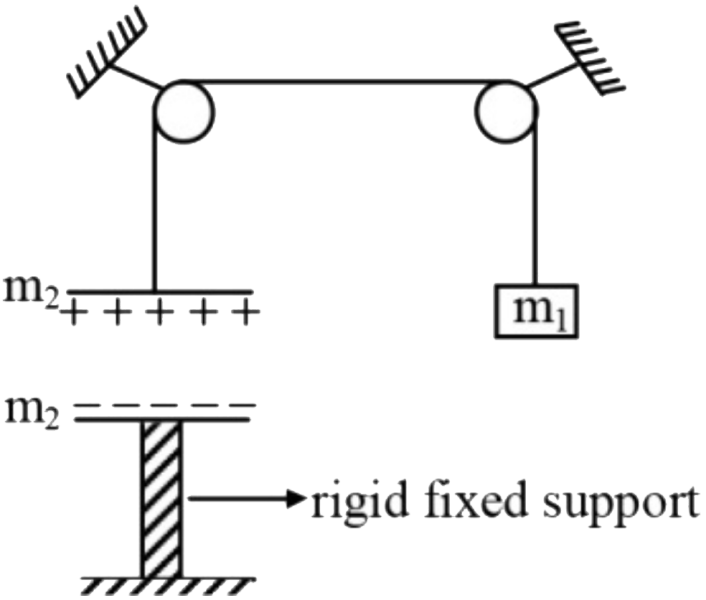
11. In the given figure a capacitor of plate area A is charged up to charge q . The mass of each plate is m_2 The lower plate is rigidly fixed. Find the value of m_1 so that the system remains in

equilibrium -



A. $m_2 + \frac{q^2}{\varepsilon_0 A g}$

B. m_2

C. $\frac{q^2}{2\varepsilon_0 A g} + m_2$

D. $2m_2$

Answer: C

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12. A charge Q is uniformly distributed over the surface of two conducting concentric spheres of radii R and r (Rgtr). Then, potential at common centre of these spheres is

A. $\frac{KQ(R+r)}{Rr}$

B. $\frac{KQ(R+r)}{(R^2+r^2)}$

C. $\frac{KQ}{\sqrt{R^2+r^2}}$

D. $KQ\left(\frac{1}{R}-\frac{1}{r}\right)$

Answer: B

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13. A satellite which is geostationary in a particular orbit is taken to another orbit. Its distance from the centre of earth in new orbit is 2 times that of the earlier orbit. The time period in the second orbit is

A. 24 h

B. 48 h

C. $48\sqrt{2}h$

D. $\frac{48}{\sqrt{2}}h$

Answer: C

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14. If g is the acceleration due to gravity on earth's surface, the gain of the potential energy of an object of mass m raised from the

surface of the earth to a height equal to the radius R of the earth is

A. $2mgR$

B. mgR

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

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

Answer: C

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15. A monatomic gas initially at $17^{\circ}C$ has suddenly compressed adiabatically to one-eighth of its original volume. The temperature after compression is

A. 887 K

B. 36.25 K

C. 2320 K

D. 1160 K

Answer: D

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16. Five moles of hydrogen gas are heated from $30^\circ C$ to $60^\circ C$ at constant pressure. Heat given to the gas is (given $R = 2cal/mol$ degrees)

A. 750 cal

B. 630 cal

C. 1050 cal

D. 1470 cal

Answer: C

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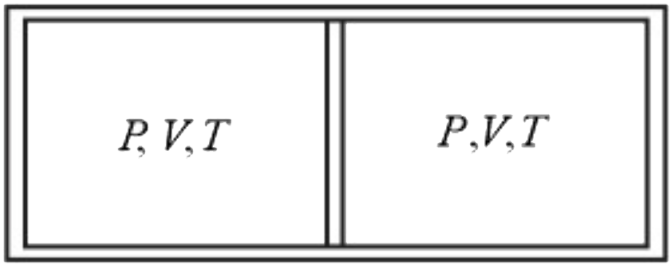
17. A cylindrical vessel made of thermally insulating material is divided into two equal parts by an insulating and. Movable piston. Both parts contain ideal monoatomic gas . The gas in the left part is supplied heat such that the volume of right part becomes one-eight of its initial volume . Work done by the gas in the

right part is



A. $\frac{-9}{2}PV$

B. $\frac{9}{2}PV$

C. $-3PV$

D. 3PV

Answer: A

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18. A current carrying circular coil is bent so as to convert it into a double loop, both the loops being concentric and are carrying current in the same direction. If B is the initial magnetic field at the centre, the final magnetic field at the centre will be

A. zero

B. B

C. 2B

D. 4B

Answer: D

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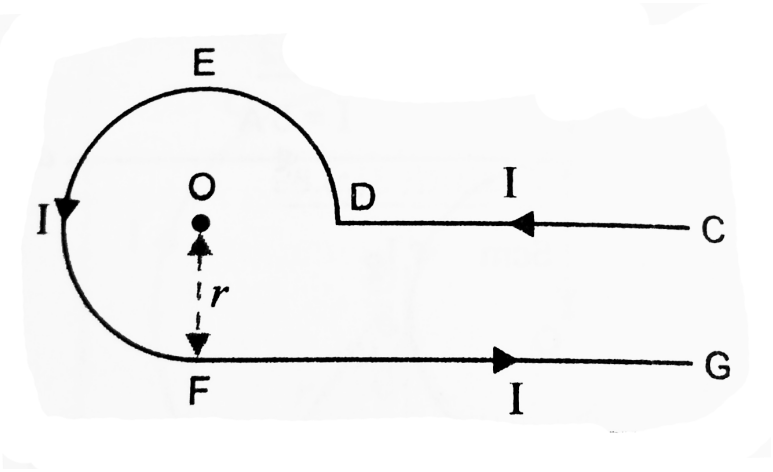
19. A current I is flowing in a conductor shaped as shown in figure. The radius of the curved part is r and length of straight portion is very large. Find the magnetic field induction at the

centre O.



A. $\frac{\mu_0 I}{4\pi R}\left(\frac{3\pi}{2}+1\right)$

B. $\frac{\mu_0 I}{4\pi R}\left(\frac{3\pi}{2}-1\right)$

C. $\frac{\mu_0 I}{4\pi R}\left(\frac{\pi}{2}+1\right)$

D. $\frac{\mu_0 I}{4\pi R}\left(\frac{\pi}{2}-1\right)$

Answer: A

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20. A car is moving along a straight road with a uniform acceleration. It passes through two points P and Q separated by a distance with velocity $30km/h$ and $40km/h$ respectively. The velocity of the car midway between P and Q is

A. $33.3 \ \mathrm{km\ h^{-1}}$

B. $20\sqrt{2} \ \mathrm{km\ h^{-1}}$

C. $25\sqrt{2} \ \mathrm{km\ h^{-1}}$

D. $35 \ \mathrm{km\ h^{-1}}$

Answer: C

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21. The x and y coordinates of a particle at any time t are given by $x = 2t + 4t^2$ and $y = 5t$, where x and y are in metre and t in second. The acceleration of the particle at t = 5 s is

A. $40 \ \mathrm{m\ s^{-2}}$

B. $20 \ \mathrm{m\,s^{-2}}$

C. $8 \ \mathrm{m\,s^{-2}}$

D. Zero

Answer: C

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22. The force required to move a body up a rough inclined plane is double the force required to prevent the body from sliding down the plane. The coefficient of friction

when the angle of inclination of the plane is 60° is .

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

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

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

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

Answer: C

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23. A man weighing $80kg$ is standing on a trolley weighting $320kg$. The trolley is resting on frictionless horizontal rails. If the man starts walking on the trolley along the rails at speed $1m/s$ (w.r.t. to trolley) then after $4s$ his displacement relative to the ground will be :

A. 5 m

B. 4.8 m

C. 3.2 m

D. 3.0

Answer:

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24. Starting with a sample of pure $.^{66}Cu, 7/8$ of it decays into Zn in 15 minute. The corresponding half-life is:

A. 10 minutes

B. 15 minutes

C. 5 minutes

D. 7.5 minutes

Answer: C

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25. Activity of a radioactive sample decreases to (1/3)rd of its original value in 3 days. Then, in 9 days its activity will become

A. $(1/27)$ of the original value

B. $(1/9)$ of the original value

C. $(1/18)$ of the original value

D. $(1/3)$ of the original value

Answer: A

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26. A simple spring has length l and force constant K. It is cut into two springs of lengths $l_1 \text{and} l_2$ such that $l_1 = nl_2$ (n = an integer). The force constant of spring of length l_1 is

A. $\frac{kn}{n+1}$

B. $\frac{k(n+1)}{n}$

C. $\frac{k(n-1)}{n}$

D. $\frac{kn}{n-1}$

Answer: B

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27. A mass is suspended from a vertica spring which is executing SHM of frequency 5 Hz. The spring is unstretched at the highest point of oscillation. Maximum speed of the mass is

(take, acceleration due to gravity, $g = 10m/s^2$

)

A. $2\pi ms^{-1}$

B. πms^{-1}

C. $\frac{1}{2\pi}ms^{-1}$

D. $\frac{1}{\pi}ms^{-1}$

Answer: D

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28. Ultraviolet light of wavelength 300nn and intensity $1.0Wm^{-2}$ falls on the surface of a photosensitive material. If one per cent of the incident photons produce photoelectrons, then the number of photoelectrons emitted per second from an area of 1.0 cm^2 of the surface is nearly

A. $2.13 \times 10^{11} s^{-1}$

B. $1.5 \times 10^{12} s^{-1}$

C. $3.02 \times 10^{12} s^{-1}$

D. None of these

Answer: B

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29. when a monochromatic point source of light is at a distance 0.2 m from a photoelectric cell, the saturation current and cut-off voltage are 12.0 mA and 0.5 V. If the same source is placed 0.4 m away from the

photoelectric cell, then the saturation current and the stopping potential respectively are

A. 4 mA and 1 V

B. 3 mA and 1 V

C. 12 mA nad 0.5 V

D. 3 mA nad 0.5 V

Answer: D

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30. The cylindrical tube of a spray pump has a cross-section of $8cm^2$, one end of which has 40 fine holes each of area $10^{-8}m^2$. If the liquid flows inside the tube with a speed of $0.15m\ \min^{-1}$, the speed with which the liquid is ejected through the holes is.

A. $50ms^{-1}$

B. $5ms^{-1}$

C. $0.05ms^{-1}$

D. $0.5ms^{-1}$

Answer: B

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31. A big water drop is formed by the combination of 'n' small water drops of equal radii. The ratio of the surface energy of 'n' drops to the surface energy of big drop is

A. $n^2 : 1$

B. $n : 1$

C. $\sqrt{n} : 1$

D. $\sqrt[3]{n}:1$

Answer: D

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32. A fish looking up through the water sees the outside world contained in a circular horizon. If the refractive index of water is $\frac{4}{3}$ and the fish is 12 cm below the surface, the radius of this circle is cm is

A. $\frac{36}{\sqrt{5}}$

B. $36\sqrt{5}$

C. $\frac{36}{\sqrt{7}}$

D. $36\sqrt{7}$

Answer: C

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33. Two identical thin planoconvex glass lenses (refractive index 1.5) each having radius of curvature of 20 cm are placed with their convex surfaces in contact at the centre. The

intervening space is filled with oil of refractive index 1.7 The focal length of the combination is

A. $-20cm$

B. $-25cm$

C. $-50cm$

D. 50 cm

Answer: C

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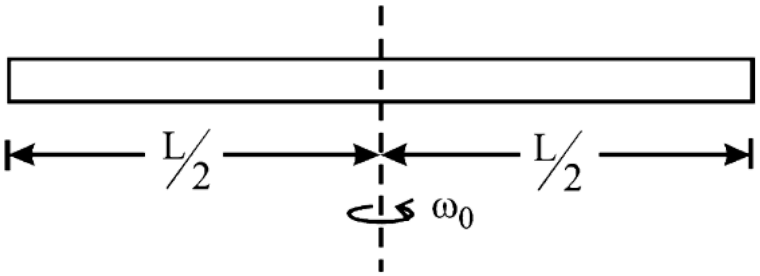
34. A smooth uniform rod of length L and mass M has two identical beads of negligible size each of mass m which can slide freely along the rod. Initially the two beads are at the centre of the rod and the system is rotating with an angular velocity ω_0 about an axis perpendicular to the rod and passing through the midpoint of the rod. There are no external forces. When the beads reach the ends of the rod, the angular velocity of the

system is .....



A. $\frac{M\omega_0}{M+3m}$

B. $\frac{M\omega_0}{M+6m}$

C. $\frac{(M+6m)\omega_0}{M}$

D. ω_0

Answer: B

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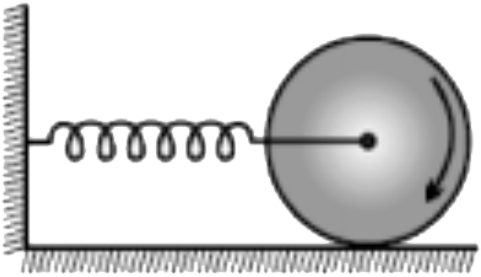
35. A disc of mass M and radius R has a spring of constant k attached to its center , the other end of the spring being fixed to a vertical wall. If the disk rolls without slipping on a level floor, how far to the right does the centre of mass move , if Initially the spring was unstretched and the angular speed of the disc

was ω_0



A. $R\omega\sqrt{(2M/3k)}$

B. $R\omega\sqrt{(3M/2k)}$

C. $R\omega\sqrt{(M/k)}$

D. $R\omega\sqrt{(M/2k)}$

Answer: B

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36. p-type semiconductor is

A. Positively charged

B. Negatively charged

C. Neutral

D. None of the given

Answer: C

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37. For the expression $P = X + XY$, how many gates are required for its implementation ?

A. 2

B. 1

C. 3

D. None of the above

Answer: D

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38. One mole of ideal gas goes through process $P = \frac{2V^2}{1+V^2}$. Then change in temperature of gas when volume changes from $V = 1m^2$ to $2m^2$ is :

A. $-\frac{4}{5R}K$

B. $\frac{11}{5R}K$

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

D. 2 K

Answer: B

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39. If the error in measuring the radius of the sphere is 2% and that in measuring its mass is 3%, Then the error in measuring density of materials the sphere is:

A. $5\ \%$

B. $7\ \%$

C. $9\ \%$

D. $11\ \%$

Answer: C

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40. In the experiment of diffraction at a single slit, if the slit width is decreased, the width of the central maximum

A. Remains the same

B. Increase

C. Decrease

D. Can be any of these depending on the intensity of the source

Answer: B

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41. Two polaroids are kept crossed to each other . If one of them is rotated an angle 60° , the percentage of incident light now transmitted through the system is

A. $10\ \%$

B. $20\ \%$

C. $25\ \%$

D. $12.5\ \%$

Answer: D

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42. The ratio of speed of sound in neon to that in water vapours at any temperature (when molecular weight of neon is $2.02 \times 10^{-2} kgmol^{-1}$

A. 1.1

B. 1.7

C. 1.9

D. 1.3

Answer: A

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43. Find beat frequency if the motion of two particles is given by

$y_1 = 0.25 \sin(310t)$

$y_2 = 0.25 \sin(316t)$

A. 3

B. $\frac{3}{\pi}$

C. $\frac{6}{\pi}$

D. 6

Answer: B

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44. A particle moves from position $r_1 = \left(3\hat{i} + 2\hat{j} - 6\hat{k}\right)$ m to position $r_2 = \left(14\hat{i} + 13\hat{j} + 9\hat{k}\right)$ m under the action of

a force $\left(4\hat{i}+\hat{j}-3\hat{k}\right)$ N , then the work done is

A. 46 J

B. 56 J

C. 86 J

D. 10 J

Answer: D

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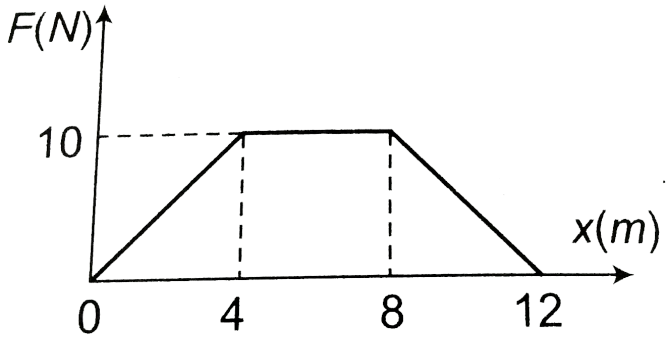

45.

A particle of mass 0.1 kg is subjected to a force which varies with distance as shown in figure. If it starts its journey from rest at $x = 0$, its velocity at $x = 12m$ is

A. $0ms^{-1}$

B. $40ms^{-1}$

C. $20\sqrt{2}ms^{-1}$

D. $20ms^{-1}$

Answer: B

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