PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 110

Physics

1. The radius of hydrogen atom in its ground state is $5.3 \times 10^{-11} m$. After collision with an electron it is found to have a radius of

$21.2 \times 10^{-11} m$. What is the principle quantum number of n of the final state of the atom ?

A. n = 4

B. n = 2

C. n = 16

D. n = 3

Answer: B

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2. An electron is moving in an orbit of a hydrogen atom from which there can be a maximum of six transition. An which there can be a maximum of three transition. Find ratio of the velocities of the electron in these two orbits.

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

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

C. $\frac{5}{4}$

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

Answer: D

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3. Three identical spheres of mass M each are placed at the corners of an equilateral triangle of side 2 m. Taking one of the corners as the origin, the position vector of the centre of mass is

A. $\sqrt{3}\left(\hat{i}-\hat{j}\right)$

B. $\frac{\hat{i}}{\sqrt{3}}+\hat{j}$

C. $\frac{\hat{i}+\hat{j}}{3}$

D. $\hat{i}+\frac{\hat{j}}{\sqrt{3}}$

Answer: D

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4. A solid cube of the edge a is molten and moulded in eight identical small solid cubes and are placed on one other on a straight line with the edge of the bottom cube on the same

horizontal plane on which big cube was placed , then the vertical shift in the centre of mass is

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

B. $2a$

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

D. $3a$

Answer: A

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5. A disc initially at rest , is rotated about its axis with uniform angular acceleration . In the first 2 s, it rotates an angle θ . In the next 2s, the disc rotates through an angle

A. θ

B. 2θ

C. 3θ

D. 4θ

Answer: C

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6. If the magnetic dipole of moment of an atom of diamagnetic material, paramagnetic material and ferromagnetic material are donated by μ_d, μ_p and μ_f respectively, then:

A. $\mu_d = 0$ and $\mu_p \neq 0$

B. $\mu_p \neq 0$ and $\mu_p = 0$

C. $\mu_p = 0$ and $\mu_f \neq 0$

D. $\mu_d \neq$ and $\mu_f \neq 0$

Answer: A

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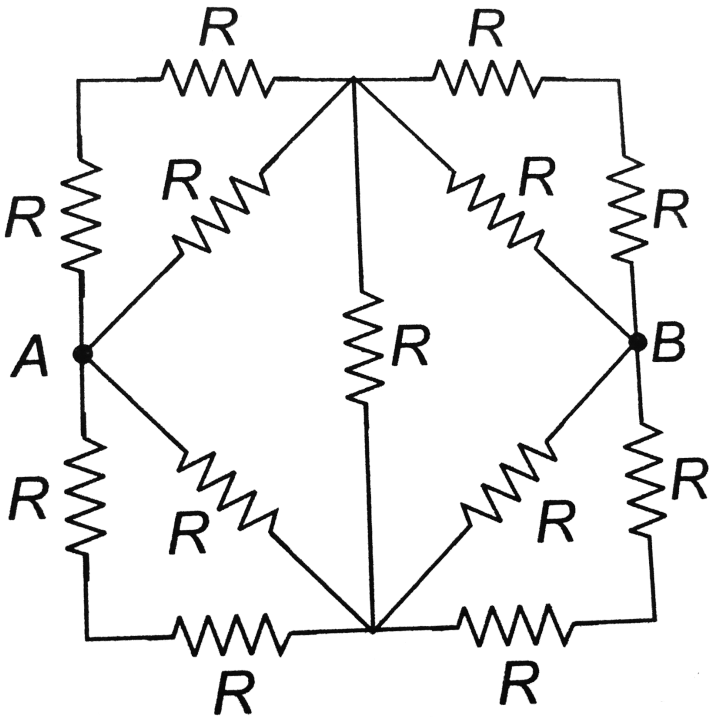
7. Thirteen resistances each of resistance R ohm are connected in the circuit as shown in the figure below. The effective resistance

between A and B is



A. $R\Omega$

B. $\frac{2R}{3}\Omega$

C. $\frac{4R}{3}\Omega$

D. $2R\Omega$

Answer: B

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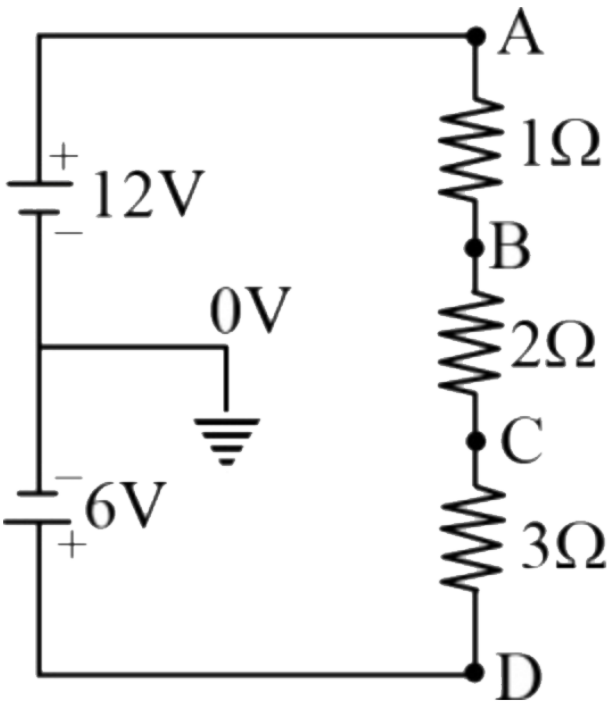
8. In the circuit diagram shown in figure, the potentials of the points B, C and D are

respectively.



A. $12V, 10V, 6V$

B. $11V, 9V, 6V$

C. $11V, 9V, 0V$

D. $12V, 10V, 0V$

Answer: B

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9. An inductor coil and a capacitor and a resistance of 5Ω are connected in series to an a.c. source of rms voltage 30 V. When the frequency of the source is varied, a maximum r.m.s. current of 5 A is observed. If this inductor is connected in parallel with a resistance 5Ω to a battery of emf 25 V and

internal resistance 2.0Ω, the current drawn from the battery is

A. $\frac{150}{17}A$

B. $2.5A$

C. $\frac{125}{33}A$

D. $\frac{125}{99}A$

Answer: A

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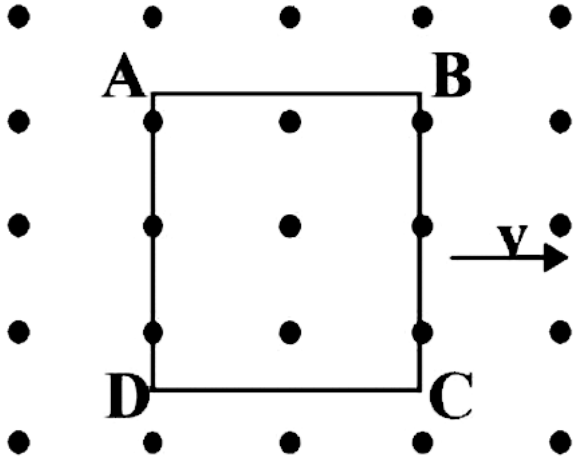
10. A metallic square loop ABCD is moving in its own plane with velocity v in a uniform magnetic field perpendicular to its plane as shown in the figure. An electric field is induced



A. In AD, But not in BC

B. In BC, But not in AD

C. Neither in AD nor in BC

D. In both AD and BC

Answer: D

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11. Two bodies A and B of definite shape are placed near one another. Electrostaitc attraction is found between the bodies, then

A. Both bodies must be positively charged

B. Both bodies must be negatively charged

C. Both bodies must be oppestively charged

D. Both A may be neutral

Answer: D

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12. The insulated spheres of radii R_1 and R_2 having charges Q_1 and Q_2 respectively are connected to each other. There is

A. no change in the energy of the system

B. an increases in the energy of the system

C. always a decrease in the energy of the system

D. a decrease in energy of the system unless $Q_1R_2 = Q_2R_1$

Answer: D

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13. Two planets A and B have the same averge density . Their radii R_A and R_B are such that $R_A : R_B = 3:1$. If g_A and g_B are the acceleration due to gravity at the surfaces of the planets, the $g_A : g_B$ equals

A. $3:1$

B. $1:3$

C. $1:9$

D. $\sqrt{3}:1$

Answer: A

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14. Gravitational force acts on a particle due to fixed uniform solid sphere. Neglect other forces. Then particle

A. always moves normal to the radial direction.

B. always moves in the radial direction only

C. always moves in circular orbit

D. experiences a force directed along the radial direction only.

Answer: D

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15. There are two thin spheres A and B of the same material and same thickness. They behave like black bodies, Radius of A is double that of B and Both have same temperature T. When A and B are kept in a room of

temperature $T_0 (< T)$, the ratio of their rates of cooling is (assume negligible heat exchange between A and B).

A. $2:1$

B. $1:1$

C. $4:1$

D. $8:1$

Answer: B

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16. if quantity of heat 1163.4 J supplied to one mole of nitrogen gas , at room temperature at constant pressure , then the rise in temperature is

A. 54 K

B. 28 K

C. 65 K

D. 40 K

Answer: D

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17. One mole of an ideal monatomic gas at temperature T_0 expands slowly according to the law $P = kV$ (k is constant). If the final temperature is $4T_0$ then heat supplied to gas is

A. $2RT_0$

B. $\frac{3}{2}RT_0$

C. $6RT_0$

D. $\frac{RT_0}{2}$

Answer: C

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18. Two particle X and Y having equal charge, after being accelerated through the same potential difference enter a region of uniform magnetic field and describe circular paths of radii R_1 and R_2 respectively. The ratio of the mass of X to that of Y is

A. $\frac{r_1}{r_2}$

B. $\sqrt{\frac{r_1}{r_2}}$

C. $\left[\frac{r_2}{r_1}\right]^2$

D. $\left[\frac{r_1}{r_2}\right]^2$

Answer: D

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19. A proton and a deuteron with the same initial kinetic energy enter a magnetic field in a direction perpendicular to the direction of the

field.The ratio of the radii of the circular trajectories described by them is

A. $1:4$

B. $1:\sqrt{2}$

C. $1:1$

D. $1:2$

Answer: B

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20. A jogger running at 9 kmph alongside a railway track is 240 metres ahead of the engine of a 120 metre long train running at 45 kmph in the same direction. In how much time will the train pass the jogger? $3.6\ sec$ b. $36\ sec$ c. $18\ sec$ d. $72\ sec$

A. 3.6 s

B. 18 s

C. 36 s

D. 72 s

Answer: C

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21. Rain, driven by the wind, falls on a railway compartment with a velocity of $20ms^{-1}$, at an angle of 30° to the vertical. The train moves, along the direction of wind flow, at a speed of $108kmh^{-1}$. Determine the apparent velocity of rain for a person sitting in the train.

A. $20\sqrt{7}ms^{-1}$

B. $10\sqrt{7}ms^{-1}$

C. $15\sqrt{7}ms^{-1}$

D. $10\sqrt{7}kmh^{-1}$

Answer: B

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22. A man of $50kg$ is standing at one end on a boat of length $25m$ and mass $200kg$.If he starts running and when he reaches the other

end, has a velocity $2ms^{-1}$ with respect to the boat.The final velocity of the boat is

A. $\frac{2}{5}$

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

C. $\frac{8}{5}$

D. $\frac{8}{5}$

Answer: A

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23. The rear side of a truck is open and a box of 40 kg mass is placed 5 m from the open end The coefficient of friction between the box and the surface below it is 0.15 On a straight road the truck starts from rest and accelerates with $2m/s^2$ At what distance from the starting point does the box fall off the truck ? Ignore the size of the box .

A. 20 m

B. 30 m

C. 40 m

D. 50 m

Answer: A

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24. An alpha particle of energy $5MeV$ is scattered through 180° by a found uramiam nucleus . The distance of closest approach is of the order of

A. $5.3 \times 10^{-12}m$

B. $5.3 \times 10^{-13} m$

C. $5.3 \times 10^{-14} m$

D. $5.3 \times 10^{-15} m$

Answer: C

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25. The fraction of atoms of radioactive element that decays in 6 days is 7/8. the fraction that decays in 10 days will be

A. $\frac{77}{80}$

B. $\frac{71}{80}$

C. $\frac{31}{32}$

D. $\frac{15}{16}$

Answer: C

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26. The kinetic energy of a particle executing SHM is 16J. When it is in its mean position. If the amplitude of oscillation is 25cm and the

mass of the particle is 5.12 kg, the time period of its oscillation in second is

A. $20\pi s$

B. $2\pi s$

C. $\pi / 5s$

D. $5\pi s$

Answer: C

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27. The amplitude of a simple pendulum is 10 cm. When the pendulum is at a displacement of 4 cm from the mean position, the ratio of kinetic and potential energies at that point is

A. 5.25

B. 2.5

C. 4.5

D. 7.5

Answer: A

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28. A photon of light enters a block of glass after travelling through vacuum. The energy of the photon on entering the glass block

A. Increases because its associated wavelength decreases

B. Decreases because the speed of the radiation decreases

C. The same because the speed of radiation and the associated wavelength do not

change

D. The same because the frequency of the radiation does not change

Answer: D

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29. A parallel beam of light is incident normally on a plane surface absorbing 40% of the light and reflecting the rest. If the incident beam

carries 60 W of power, the force exerted by it on the surface is

A. $3.2 \times 10^{-8} N$

B. $3.2 \times 10^{-7} N$

C. $5.12 \times 10^{-7} N$

D. $5.12 \times 10^{-8} N$

Answer: B

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30. There is a hole at the bottom of a large open vessel. If water is filled upto a height h, it flows out in time t. if water is filled to a height 4h, it will flow out in time

A. 2 t

B. 4 t

C. 16 t

D. None of these

Answer: A

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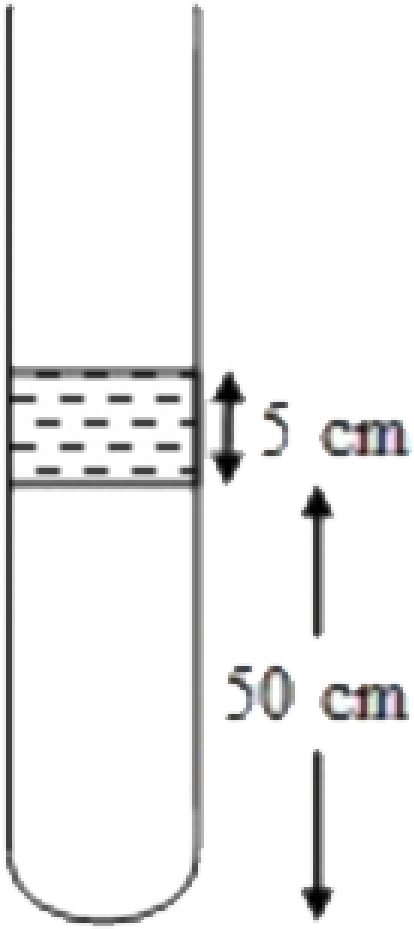
31. A vertical tube of length 100 cm contains a mercury pallet of length 5 cm as shown in the figure. The length of the tube above mercury pallet if the tube is inverted is nearly:

(atmospheric pressure = 75 cm Hg of Hg)



A. 56 cm

B. 57 cm

C. 60 cm

D. 50 cm

Answer: B

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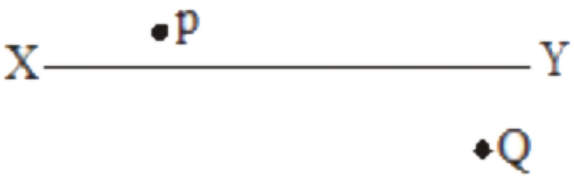
32. Two points p and Q lie on either side of an axis XY as shown. It is desired to produce an image of p at Q using a spherical mirror, with

XY as the optic axis. The mirror must be



A. Converging and positioned to the left of p

B. Diverging and positioned to the left of p

C. Converging and positioned to the right of Q

D. Diverging and positioned to the right of Q

Answer: A

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33. A compound microscope having magnifying power 35 with its eye - piece of focal length 10 cm. Assume that the final image is at least distance of distinct vision then the magnification produced by the objective is

A. -4

B. 5

C. 10

D. -10

Answer: D

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34. If the earth shrinks such that its mass does not change but radius decreases to one-quarter of its original value then one complete day will take

A. 96 h

B. 48 h

C. 6 h

D. 1.5 h

Answer: D

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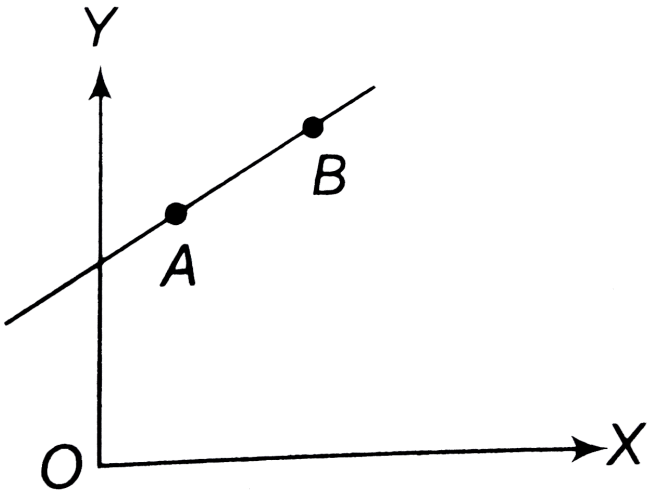
35. A particle of mass m moves in the XY plane with a velocity v along the straight line AB. If the angular momentum of the particle

with respect to origin O is L_A when it is at A and L_B when it is at B, then



A. $L_A > L_B$

B. $L_A = L_B$

C. The relationship between L_A and L_B depends upon the slope of the line AB

D. $L_A < L_B$

Answer: B

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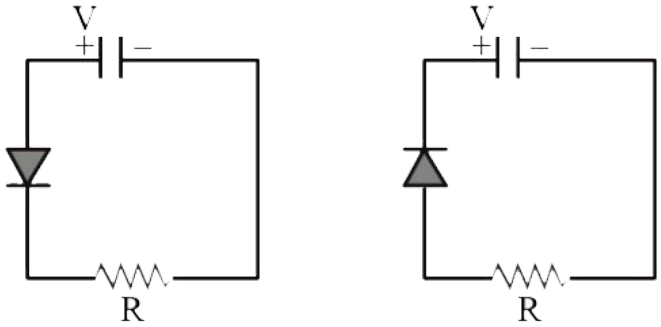
36. Two identical capacitors A and B are charged to the same potential V and are connected in two circuits at t = 0 as shown in figure. The charge of the capacitors at a time t

= CR are respectively -



A. VC, VC

B. $\frac{VC}{e}, VC$

C. $VC, \frac{VC}{e}$

D. $\frac{VC}{e}, \frac{VC}{e}$

Answer: B

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37. A charge of 8.0 mA in the emitter current brings a charge of 7.9 mA in the collector current. The values of α and β are

A. $0.99, 90$

B. $0.96, 79$

C. $0.97, 99$

D. $0.99, 79$

Answer: D

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38. A bubble is at the bottom of the lake of depth h. As the bubble comes to sea level, its radius increases three times. If atmospheric pressure is equal to l metre of water column, then h is equal to

A. 26 l

B. l

C. 25 l

D. 30 l

Answer: A

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39. Choose the wrong statement for zero error and zero correction.

A. If the zero of the vernier scale does not coincide with the zero of the main scale then the instrument is said to be having a zero error.

B. Zero correction has a magnitude equal to zero error but sign is opposite to that of the zero error.

C. Zero error is positive when the zero of vernier scale lies to the left of the zero of the main scale.

D. Zero error is negative when the zero of vernier scale lies to the left of zero of main scale

Answer: C

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40. Consider an interference pattern between two coherent sources. If I_1 and I_2 be intensities at points where the phase difference are $\frac{\pi}{3}$ and $\frac{2\pi}{3}$ and respectively , then the intensity at maxima is

A. $\frac{I_2 - 3I_1}{2}$

B. $\frac{I_1 - 3I_2}{2}$

C. $\frac{3I_2 + I_1}{2}$

D. $\frac{3I_1 - I_2}{2}$

Answer: D

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41. If a torch is used in place of monochromatic light in Young's experiment what will happen?

A. Fringe will appear for a moment then, it will disappear

B. Fringes will occur as from monochromatic light

C. Only bright fringes will appear

D. No fringes will appear

Answer: D

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42. Two strings A and B of lengths, $L_A = 80cm$ and $L_B = xcm$ respectively are used separately in a sonometer. The ratio of

their densities (d_A / d_B) is 0.81. The diameter of B is one -half that of A. If the strings have the same tension and fundamental frequency the value of x is

A. 33

B. 102

C. 144

D. 130

Answer: C

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43. A string of density $7.5gcm^{-3}$ and area of cross - section $0.2mm^2$ is stretched under a tension of 20 N. When it is plucked at the mid-point, the speed of the transverse wave on the wire is

A. $116ms^{-1}$

B. $40ms^{-1}$

C. $200ms^{-1}$

D. $5900ms^{-1}$

Answer: A

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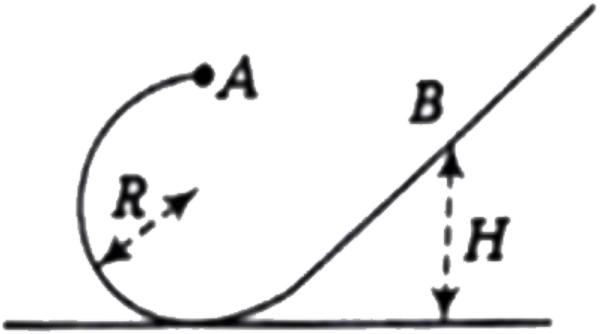
44. A small bead of mass M slides on a smooth wire that is bent in a circle of radius R. It is released at the top of the circular part of the wire (point A in the figure) with a negligibly small velocity. Find the height H where the

bead will reverse direction



A. R

B. 2 R

C. $\frac{3R}{2}$

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

Answer: B

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45. The potential energy for a force filed $\overrightarrow{F}$ is given by $U(x, y) = \cos(x + y)$. The force acting on a particle at position given by coordinates $(0, \pi/4)$ is

A. $-\frac{1}{\sqrt{2}}\left(\hat{i} + \hat{j}\right)$

B. $\frac{1}{\sqrt{2}}\left(\hat{i} + \hat{j}\right)$

C. $\left(\frac{1}{2}\hat{i} + \frac{\sqrt{3}}{2}\hat{j}\right)$

D. $\left(\frac{1}{2}\hat{i} - \frac{\sqrt{3}}{2}\hat{j}\right)$

Answer: B

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