PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 76

Physics

1. Time taken by the sunlight to pass thought a slab of 4 cm and reflective index 1.5 is .....s.

A. 2×10^{10}

B. 2×10^{-8}

C. 2×10^{8}

D. 2×10^{-10}

Answer: D

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2. Identify the logic operation carried out by the following circuit

A. AND

B. NAND

C. NOR

D. OR

Answer: D

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3. What is the voltage across an ideal p-n junction diode for shown circuit?

A. 0.7 V

B. 1 V

C. 2 V

D. 0 V

Answer: C

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4. An automobile travelling at 50 km h^{-1} ,can be stopped at a distance of 40 cm by applying brakes. If the same automobile is travelling at

$90kmh^{-1}$,all others conditions remaining the same and assuming no skidding, the minimum stopping distance in cm is

A. 72

B. 92.5

C. 102.6

D. 129.6

Answer: D

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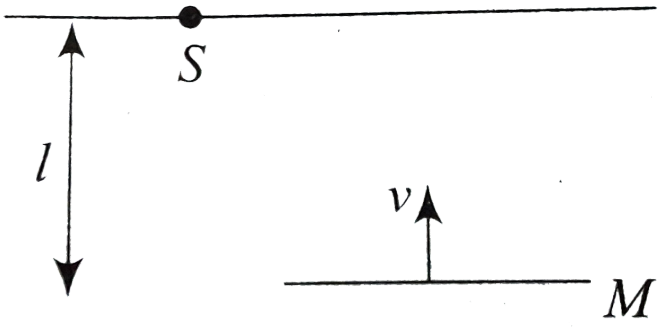
5. A plane mirror M is arranged parallel to a wall W at a distance l from it. The light produced by a point source S kept on the wall is reflected by the mirror and produces a patch of light on the wall. The mirroo moves with velocity v towards the wall.

Which of the following statement(s) is/are



correct?

A. The spot of light will move with the speed v on the wall

B. The spot of light will move on the wall

C. As the mirror comes closer the spot of light will become larger and shift away from the wall with speed larger than v.

D. The size of the light spot on the wall remains the same

Answer: D

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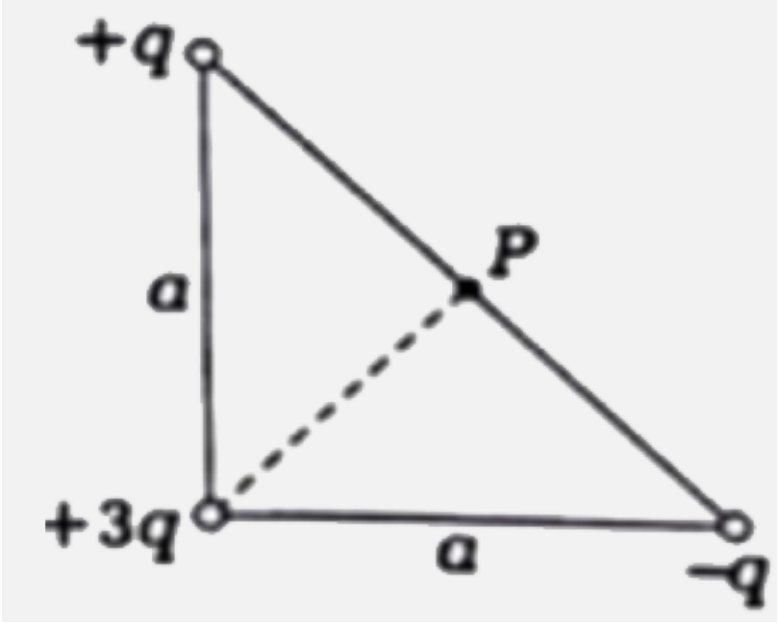
6. A right isosceles triangle of side a has changes q, 3q and - q arranged on its verticals as shown in the figure. What is the electric potential at P midway between the line connecting the + q and – q charges ?



A. $\frac{3q}{r\varepsilon_0 a}$

B. $\frac{3q}{\sqrt{2}\pi\psi lon_0 a}$

C. $\frac{q}{\pi\varepsilon_0 a}$

D. $\frac{3q}{2\sqrt{2}\pi\varepsilon_0 a}$

Answer: D

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7. A stone of mass 1 kg tied to a string 4 m long and is rotated at constant speed of 40

m/s a vertical circle. The ratio of the tension at the top and the bottom, is $\left(g = 10 \ \ \mathrm{m}/\mathrm{s}^2\right)$

A. $11:12$

B. $39:41$

C. $41:39$

D. $12:11$

Answer: B

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8. The potential difference between A and B in the following circuit is

A. 4 V

B. 5.6 V

C. 2.8 V

D. 6 V

Answer: A

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9. A person observes that the full length of a train subtends an angle of 15° If the distance between the train and the person is 3 km , the length of the train, calculated the parallax method , in meters is

A. 45

B. 45π

C. 250π

D. 75π

Answer: C

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10. The work that must be done in lifting a body of weight P from the surface of the earth to a height h is

A. $\frac{PRh}{R-h}$

B. $\frac{R+h}{PRh}$

C. $\frac{PRh}{R+h}$

D. $\frac{R-h}{PRh}$

Answer: C

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11. Which of the following are electromagnetic waves?

A. Cosmic rays

B. Gamma rays

C. β^+ -rays

D. β^- - rays

Answer: B

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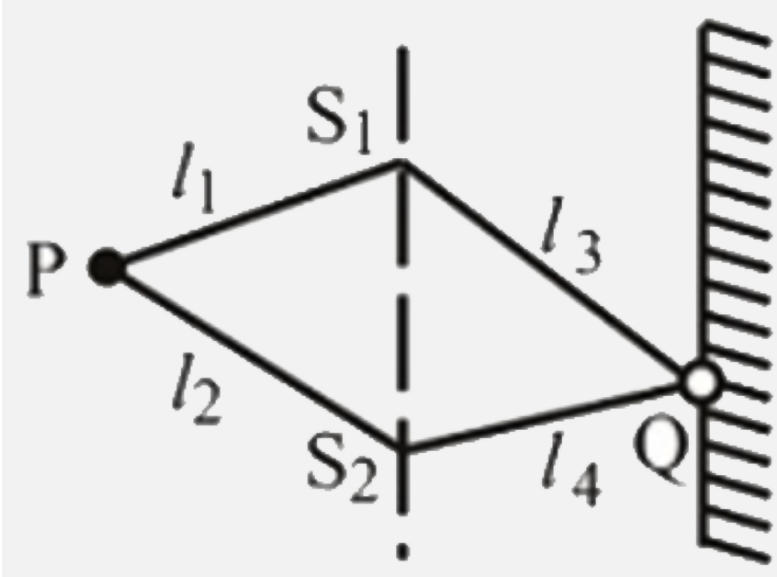
12. Two identical narrow slits S_1 and S_2 are illuminated by the light of a wavelengthλ from a point source P. If , as shown in the diagram above , the light is then allowed to fall on a screen , and if n is a positive integer , the

condition for destructive interference at Q is



A. $(l_1 - l_2) = (2n + 1)\lambda/2$

B. $(l_3 - l_4) = (2n + 1)\lambda/2$

C. $(l_1 + l_2) - (l_3 + l_4) = n\lambda$

D. $(l_1 + l_3) - (l_2 + l_4) = (2n + 1)\lambda/2$

Answer: D

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13. A wheel of radius 2 m rolls on the ground with uniform velocity $4ms^{-1}$. . The relative acceleration of the topmost point of the wheel with respect to the bottom - most point of the wheel is

A. $8ms^{-2}$

B. $16ms^{-2}$

C. $4ms^{-2}$

D. $32ms^{-2}$

Answer: B

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14. A current of 5A is flowing at 220V in the primary coil of a transformer. If the voltage produced in the secondary coil is 2200V and 50% of power is lost, then the current in the secondary coil will be –

A. 0.25 A

B. 2.5 A

C. 0.5 A

D. $5A$

Answer: A

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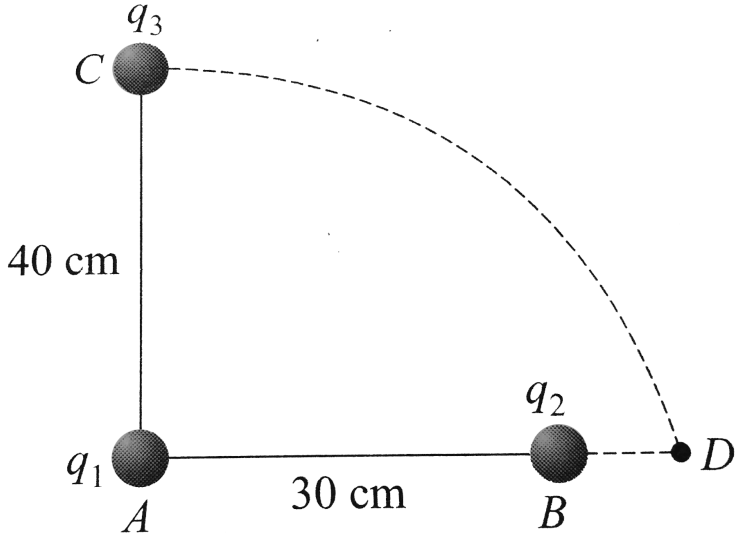
15. Two charges q_1 and q_2 are placed $30cm$ apart, as shown in the figure. A third charge q_3 is moved along the arc of a circle of radius

$40cm$ from C to D. The change in the potential energy o fthe system is $\frac{q_3}{4\pi\varepsilon_0}k.$, where k is



A. $8q_1$

B. $6q_1$

C. $8q_2$

D. $6q_2$

Answer: C

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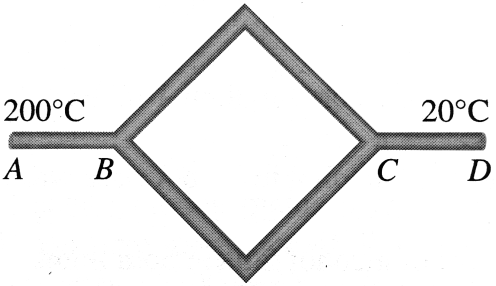

16.

Six identical cunducting rods are joined as shown in Fig. Points A and D are maintained at temperatures $200^{\circ}C$ and $20^{\circ}C$ respectively. The temperature of junction B will be

A. $120^\circ C$

B. $100^\circ C$

C. $140^\circ C$

D. $80^\circ C$

Answer: C

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17. A radioactive sample S_1 having the activity A_1 has twice the number of nucleic as another sample S_2 of activity A_2. If $A_2 = 2A_1$, then

the ratio of half-life of S_1 to the half-life of S_2 is

A. $1:2$

B. $2:1$

C. $4:1$

D. $1:4$

Answer: C

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18. The dimensional formula for permittivity of free space (ε_0) in the equation $F = = \frac{1}{4\pi\varepsilon_0}, \frac{q_1 q_2}{r^2}$, where symbols have usual meaning is

A. $\left[M^1 L^3 A^{-2} T^{-4}\right]$

B. $\left[M^{-1} L^{-3} T^4 A^2\right]$

C. $\left[M^{-1} L^{-3} A^{-2} T^{-4}\right]$

D. $\left[M^1 L^3 T^2 A^{-4}\right]$

Answer: B

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19. 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 (ρ_A / ρ_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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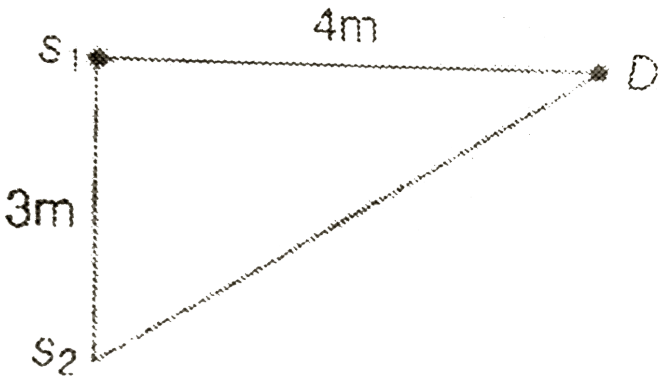
20. In the figure , the intensity of waves arriving at D from two coherent soucrces s_1 and $s_2 is I_0$. The wavelength of the wave is

$\lambda = 4m$. Resultant intensity at D will be



A. $4I_0$

B. I_0

C. $2I_0$

D. zero

Answer: C

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21. Ionization energy of He^+ ion at minimum energy position is

A. 13.6 eV

B. 27.2 eV

C. 54.4 eV

D. 68.0 eV

Answer: C

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22. A particle moves along x-axis as

$x = 4(t-2) + a(t-2)^2$

Which of the following is true?

A. The initial velocity of the particle is

$4ms^{-1}$

B. The acceleration of particle is 2a

C. The particle is at origin at t = 0

D. None of the above

Answer: B

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23. A disc of radius R and mass M is pivoted at the rim and it set for small oscillations. If simple pendulum has to have the same period as that of the disc, the length of the simple pendulum should be

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

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

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

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

Answer: D

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24. Power supplied to a particle of mass 4 kg varies with time as $P = \frac{3t^2}{2}$ watt. Here t in second. If velocity of particle at t = 0 is v = 0, the velocity of particle at time t = 2s will be

A. 1 m/s

B. 4 m/s

C. 2 m/s

D. $2\sqrt{2}$ m/s

Answer: C

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25. For an electron in the third orbit Bohr hydrogen atom, the moment of linear momentum is

A. $n\pi$

B. $2\pi h$

C. $\frac{2h}{\pi}$

D. $\frac{h}{\pi}$

Answer: D

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26. Radiations of two photon's energy, twice and ten times the work function of metal are incident on the metal surface successsively.

The ratio of maximum velocities of photoelectrons emitted in two cases is

A. $1:2$

B. $1:3$

C. $1:4$

D. $1:1$

Answer: B

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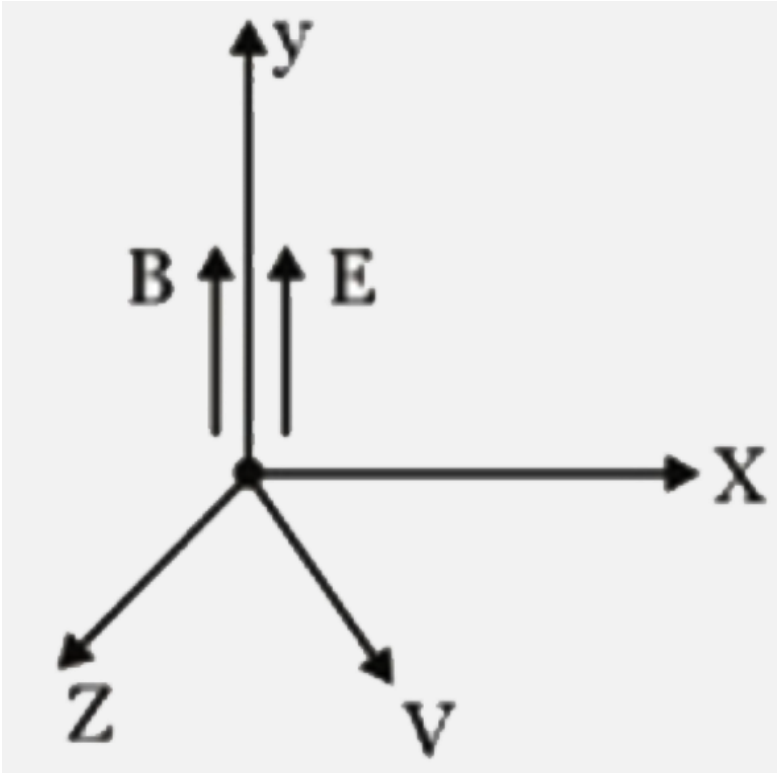
27. A positive charge particle having change q and mass m has velocity $\overrightarrow{v} = v\left(\frac{\hat{i}+\hat{k}}{\sqrt{2}}\right)$ in the magnetic field B at the origin . Its speed as the function of y is :



A. $\sqrt{v^2 + \frac{qE}{2m}y}$

B. $\sqrt{\left(\frac{B}{E}\right)^2 + v^2 + \frac{qE}{2m}y}$

C. $\sqrt{v^2 + \frac{2qE}{m}y}$

D. None of the above

Answer: C

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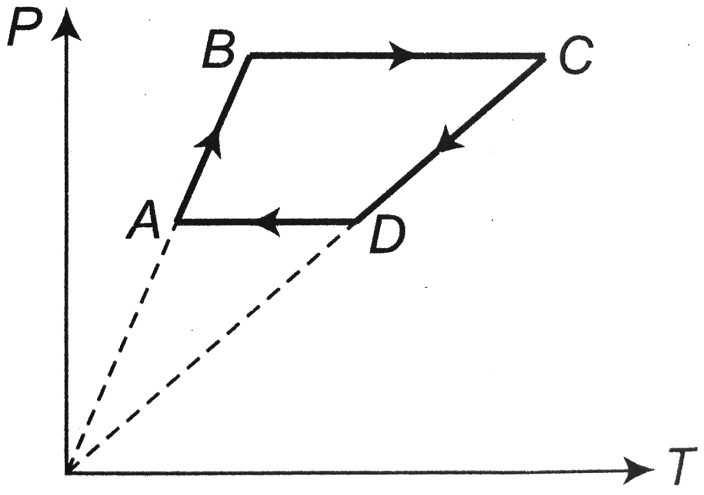
28. Six moles of an ideal gas performs a cycle shown in figure. If the temperature are

$T_D = 600K$, $T_B = 800K$, $T_C = 2200K$ and

$T_D = 1200K$, the work done per cycle is



A. 20 kJ

B. 30 kJ

C. 40 kJ

D. 60 kJ

Answer: C

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29. A spring is stretched by applying a load to its free end. The strain produced in the spring is

A. Volumetric

B. Shear

C. Longitudinal and shear

D. Longitudinal

Answer: C

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30. A metal rod of length 'L' and cross-sectional area 'A' is heated through $'T'^{\circ} C$ What is the force required to prevent the expansion of the rod lengthwise ?

A. $\frac{YA\alpha T}{1-\alpha T}$

B. $\frac{YA\alpha T}{1+\alpha T}$

C. $\frac{1-\alpha T}{YA\alpha T}$

D. $\frac{(1+\alpha T)}{YA\alpha T}$

Answer: B

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31. The length of a magnet is large compared to its width and breadth. The time period of its oscillation in a vibration magnetometer is $2s$. The magnet is cut along its length into three equal parts and these parts are then placed on each other with their like poles

together . The time period of this combination will be

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

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

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

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

Answer: A

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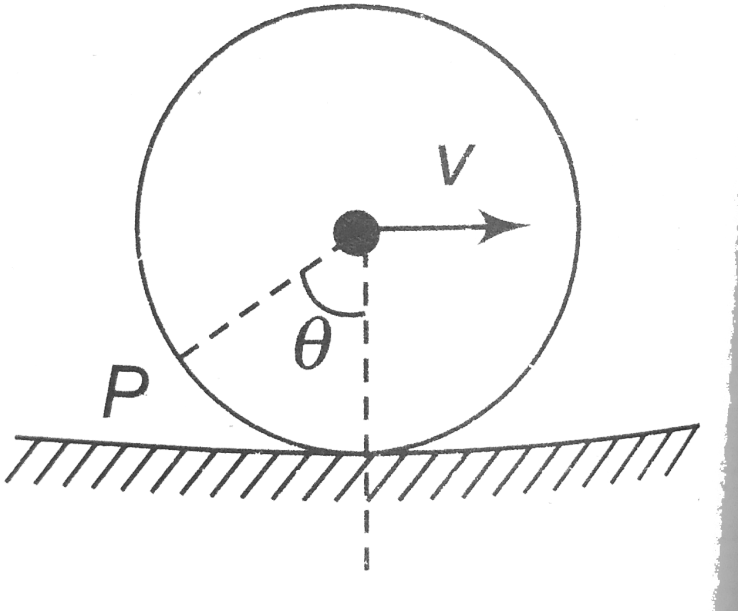
32. A hoop rolls on a horizontal ground without slipping with linear speed v. Speed of a particle P on the circumference of the hoop at angle θ is :



A. $2v\sin\left(\frac{\theta}{2}\right)$

B. $v \sin \theta$

C. $2v \cos\left(\frac{\theta}{2}\right)$

D. $v \cos \theta$

Answer: A

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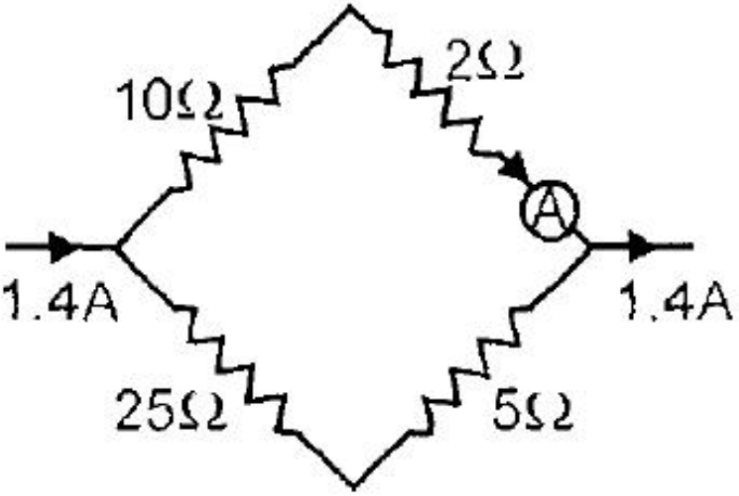
33. The ammeter reading in the given circuit of

Fig . is -



A. $\frac{15}{32}$ A

B. $\frac{14}{33}$ A

C. $\frac{17}{33}$ A

D. $\frac{15}{31}$ A

Answer: A

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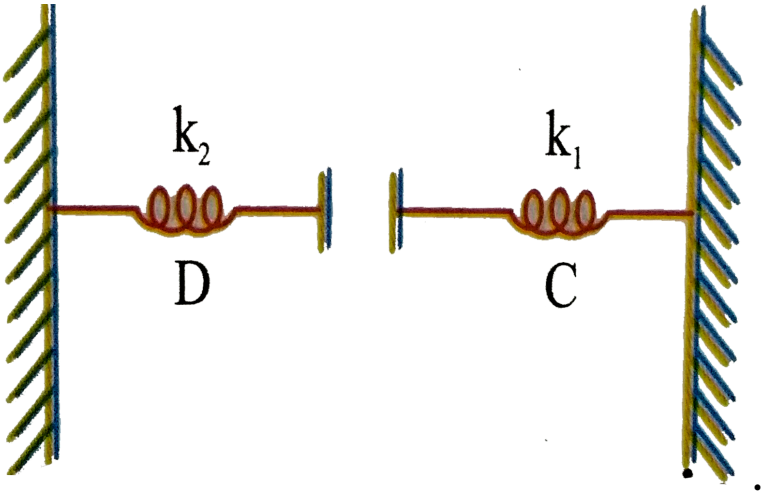
34. In the given figure the capacitor of plate area A is charged upto charge q. The ratio of elongations (neglect force gravity) in springs C and D at equilibrium position is.



A. $\frac{k_1}{k_2}$

B. $\frac{k_2}{k_1}$

C. $k_1 k_2$

D. None of these

Answer: B

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35. A gaseous mixture consists of 16g of helium and 16 g of oxygen. The ratio $\frac{C_p}{C_v}$ of the mixture is

A. 1.4

B. 1.54

C. 1.59

D. 1.62

Answer: D

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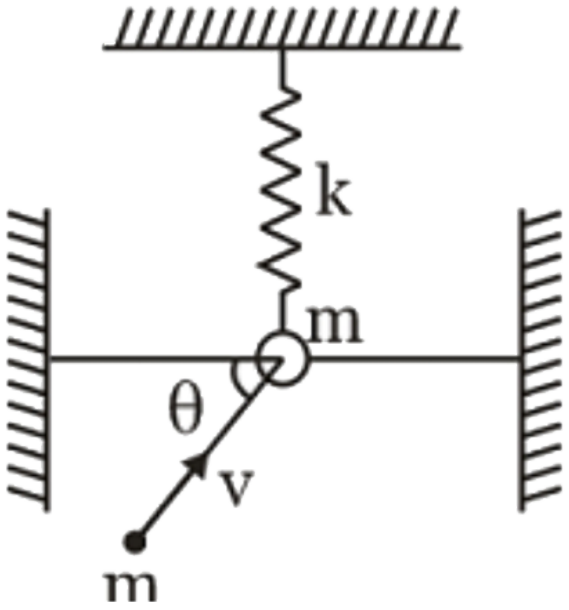
36. An underformed spring of spring constant k is connected to a bead of mass m which can move along a frictionless rod as shown in the

figure. If the particle strikes the bead at an angle of 45° with the horizontal and sticks to it, then the maximum elongation of the spring after the collision is



A. $\frac{v}{4}\sqrt{\frac{m}{2k}}$

B. $\frac{v}{2}\sqrt{\frac{m}{k}}$

C. $\frac{v}{2}\sqrt{\frac{m}{2k}}$

D. $\frac{v}{4}\sqrt{\frac{m}{k}}$

Answer: B

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37. A magnetic wire of dipole moment $4\pi Am^2$ is bent in the form of semicircle. The new magnetic moment is

A. $4\pi Am^2$

B. $8\pi Am^2$

C. $4Am^2$

D. None of these

Answer: C

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38. A radioactive sample S_1 having an activity of $5\mu Ci$ has twice the number of nuclei as another sample S_2 which has an activity of $10\mu Ci$. The half-lives of S_1 and S_2 can be

A. 20 yr and 5 yr, respectively

B. 20 yr and 10 yr , respectively

C. 10 yr each

D. 5 yr . each

Answer: A

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39. The position Vectors of two identical particles with respect to the origin in the three-dimensional coordinator system are

r_1 and r_2 The position of the centre of mass of the system is given by

A. $r_1 + r_2$

B. $2(r_1 + r_2)$

C. $r_1 - r_2$

D. $\frac{r_1 + r_2}{2}$

Answer: D

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40. In Young's double slit experiment the light emitted from source has $\lambda = 6500\text{Å}$ and the distance between th two slits is 1 mm. Distance between the screen and slit is 1 metre. Distance between third dark and fifth birth fringe will be :

A. 3.2 mm

B. 1.63 mm

C. 0.585 mm

D. 2.31 mm

Answer: B

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41. The force required just to move a body up an inclined plane is double the force required just to prevent the body sliding down. If the coefficient of friction is 0.25 , the angle of inclination of the plane is

A. $\tan^{-1}\left(\frac{3}{4}\right)$

B. $\tan^{-1}\left(\frac{1}{4}\right)$

C. 45°

D. 30°

Answer: A

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42. A large number of droplets, each of radius a, coalesce to form a bigger drop of radius b. Assume that the energy released in the process is converted into the kinetic energy of

the drop. The velocity of the drop is $\sigma =$ surface tension, $\rho =$ density)

A. $\sqrt{\frac{T}{\rho}\left(\frac{1}{r}-\frac{1}{R}\right)}$

B. $\sqrt{\frac{2T}{\rho}\left(\frac{1}{r}-\frac{1}{R}\right)}$

C. $\sqrt{\frac{4T}{\rho}\left(\frac{1}{r}-\frac{1}{R}\right)}$

D. $\sqrt{\frac{6T}{\rho}\left(\frac{1}{r}-\frac{1}{R}\right)}$

Answer: D

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43. A body projected at an angle θ to the horizontal with kinetic energy E_k . The potential energy at the highest point of the trajectory is

A. E_k

B. $E_k \cos^2 \theta$

C. $E_k \sin^2 \theta$

D. $E_k \tan^2 \theta$

Answer: C

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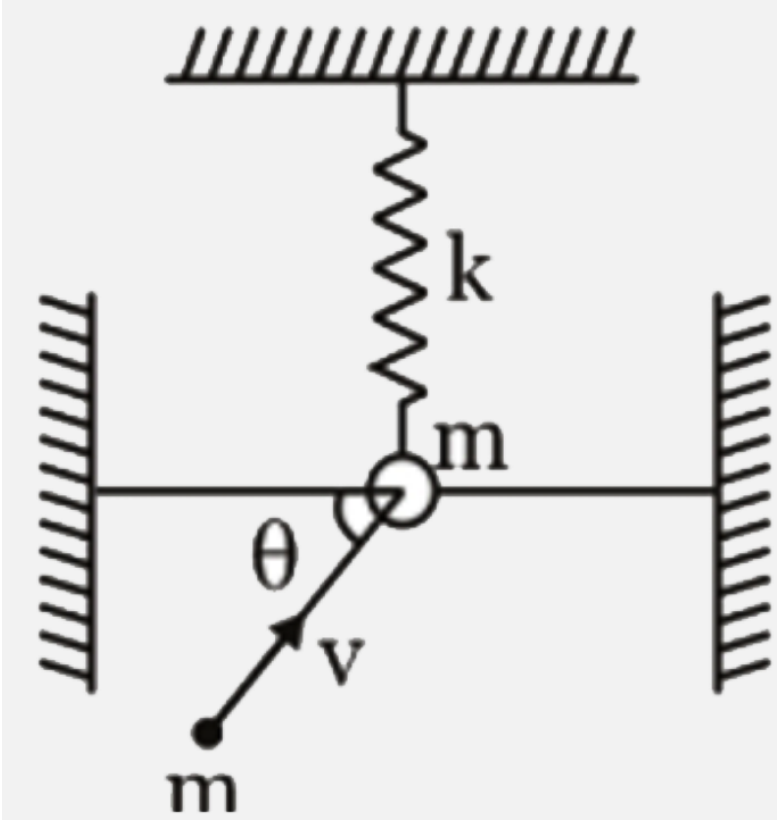
44. Two rods OA and OB of equal length and madd are lying on xy plane as shown in figure . Let $I_x, I_y \text{ and } I_z$ be the moment of inertias of both the rods about x,y and z axis respectively . Then moment of inertias of the combined rod

system is



A. $I_x = I_y > I_z$

B. $I_x = I_y < I_z$

C. $I_x > I_y > I_z$

D. $I_z > I_y > I_x$

Answer: B

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45. Einsteins photoelectric equation is

A. Light is emitted only when electrons jump between orbits

B. Light is absored in quanta of energy E = hv

C. Electrons are restricted to orbits of angular momentum $n\frac{h}{2\pi}$ where n is an integer

D. Electrons are associated with wave of wavelength $\lambda = \frac{h}{p}$ where p is the momentum

Answer: B

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