



PHYSICS

NTA MOCK TESTS ENGLISH

NTA NEET SET 31

Physics

1. Assuming the mass of the earth as $6.64 \times 10^{24} \text{ kg}$ and the average mass of the atoms that make up the earth as 40 u (atomic

mass. Unit) , the number of atoms in the earth
is approximately

A. 10^{30}

B. 10^{40}

C. 10^{50}

D. 10^{60}

Answer: C



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2. A block of mass 1 kg moving with a speed of 4 ms^{-1} , collides with another block of mass 2 kg which is at rest. The lighter block comes to rest after collision. The loss in KE of the system is

A. 8 J

B. $4 \times 10^{-7}\text{ J}$

C. 4 J

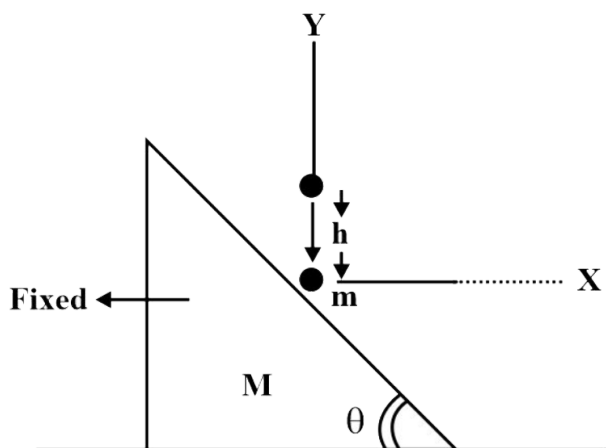
D. 0 J

Answer: C



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3. A ball of mass m is dropped onto a smooth fixed wedge of inclination θ . The collision is perfectly elastic. If after the collision, the x component of the velocity of the block is $\sqrt{2gh}$, then θ is



A. 30°

B. 45°

C. 60°

D. 15°

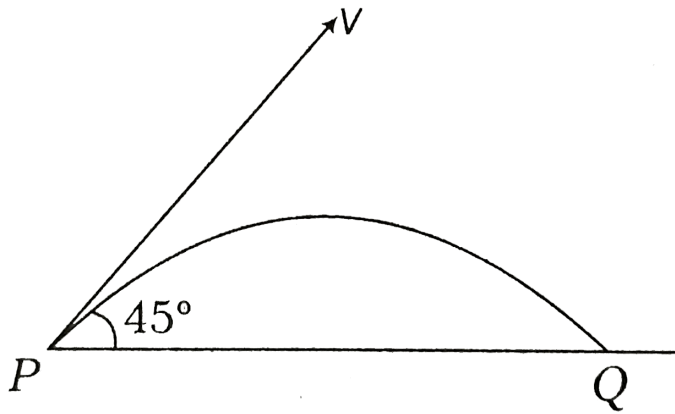
Answer: B



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4. A projectile of mass m is fired with velocity v from a point P , as shown. Neglecting air resistance, the magnitude of the change in

momentum between the points P and arriving at Q is



A. zero

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

C. $mv\sqrt{2}$

D. $2mv$

Answer: C



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5. The linear velocity of a point on the surface of earth at a latitude of 60° is

A. $\frac{800}{3}ms^{-1}$

B. $\frac{800\pi}{3}ms^{-1}$

C. $800 \times \frac{5}{18}ms^{-1}$

D. $\frac{2000\pi}{27}ms^{-1}$

Answer: D



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6. Above Curie temperature:-

A. a paramagnetic substance becomes
diamagnetic

B. a paramagnetic substance becomes
paramagnetic

C. a paramagnetic substance becomes
ferromagnetic

D. a ferromagnetic substance becomes
paramagnetic

Answer: D



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7. In meter bridge , the balancing length from
left is found to be 20 cm when standard

connected of 1Ω is in right gap . The value of unknown resistance is

A. 0.4Ω

B. 0.5Ω

C. 4Ω

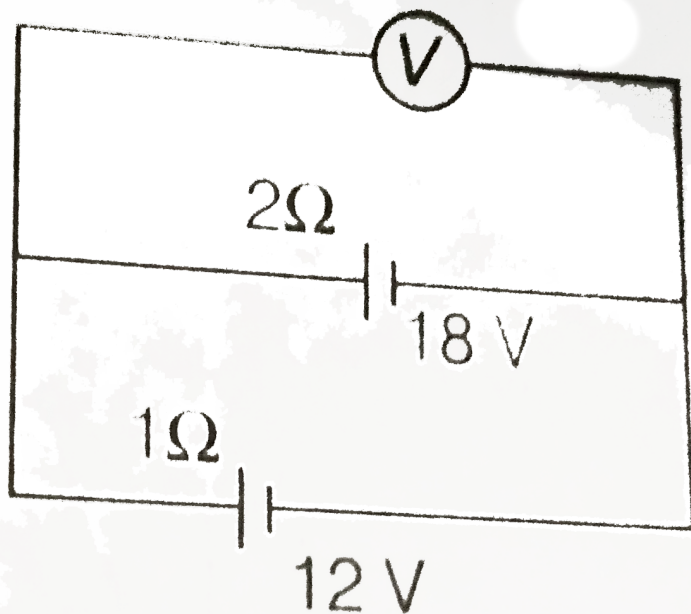
D. 0.25Ω

Answer: D



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8. Two batteries, one of emf 18V and internal resistance 2Ω and the other of emf 12V and internal resistance 1Ω , are connected as shown. The voltmeter V will record a reading of



A. 30 V

B. 18 V

C. 15 V

D. 14 V

Answer: D



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9. A battery has an open circuit potential difference 10 V between the terminals. When loads 9Ω and 4Ω are connected one by one

across the battery , the power in the load resistance is the same. The amount of heat approximately generated in one second in the load when a load of 5Ω is connected across the battery will be

A. $10.4J$

B. $9J$

C. $6.8J$

D. $4.13J$

Answer: D



10. Which of the following operations will not increase the sensitivity of a potentiometer?

A. Increase in the number of wires of the potentiometer.

B. Reducing the potential gradient .

C. Increasing the current through the potentiometer .

D. Increasing the sensitivity of the galvanometer.

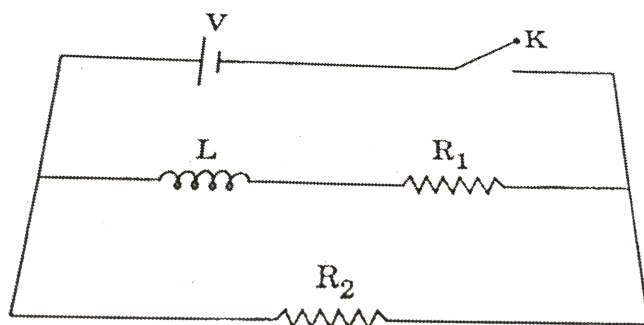
Answer: C



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11. In the circuit shown below, the key K is closed at $t = 0$. The current through the

battery is



A. 5 A at $t = 0$ and 7 A at $t \rightarrow \infty$

B. 3 A at $t = 0$ and 1 A at $t \rightarrow \infty$

C. 1 A at $t = 0$ and 3 A at $t \rightarrow \infty$

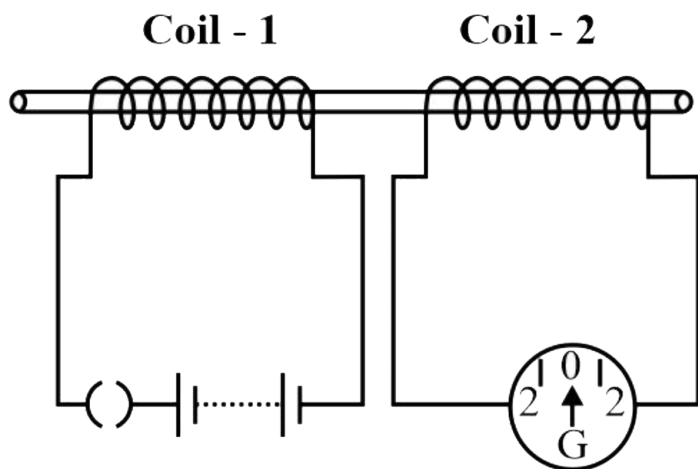
D. 2 A at $t = 0$ and 6 A at $t \rightarrow \infty$

Answer: C



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12. A non - conducting cylindrical rod is inserted within two coils of insulated wires, as shown in the given figure. A battery is connected to coil 1 , while a galvanometer is connected to coil 2



On switching on the current in coil 1,

A. coil 2 will move towards it

B. coil 2 will move away from it

C. the pointer of the galvanometer will remain at zero

D. the pointer of the galvanometer will show a deflection

Answer: D



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13. In a series LCR circuit, the voltages across an inductor, a capacitor and a resistor are 30 V, 30 V, 60 V respectively. What is the phase difference between the applied voltage and the current in the circuit ?

A. 60°

B. 30°

C. 90°

D. 0°

Answer: D



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14. At a point in space, the electric field points toward north. In the region surrounding this point, the rate of change of potential will be zero along.

A. north

B. south

C. north- south

D. east - west

Answer: D



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15. Two concentric spheres of radii R and r have similar charges with equal surface charge densities (σ). The electric potential at their common centre is

A. σ / ϵ_0

B. $\frac{\sigma}{\epsilon_0}(R - r)$

C. $\frac{\sigma}{\epsilon_0}(R + r)$

D. $\frac{\sigma}{4\pi\epsilon_0}(R - r)$

Answer: C



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16. If $20J$ of work has to be done to move an electric charge of $4C$ from a point, where potential is $10V$ to another point, where potential is V volt, find the value of V .

A. $2 V$

B. 70 V

C. 5 V

D. 15 V

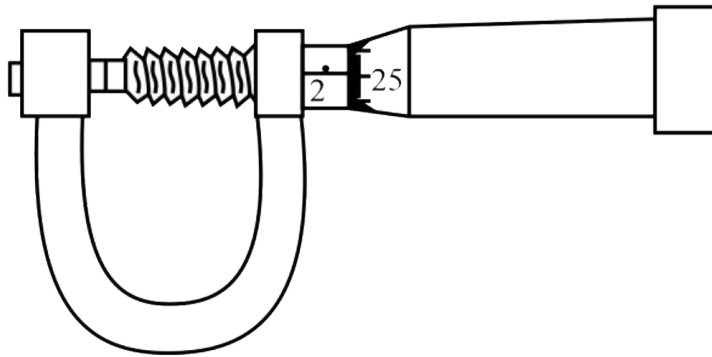
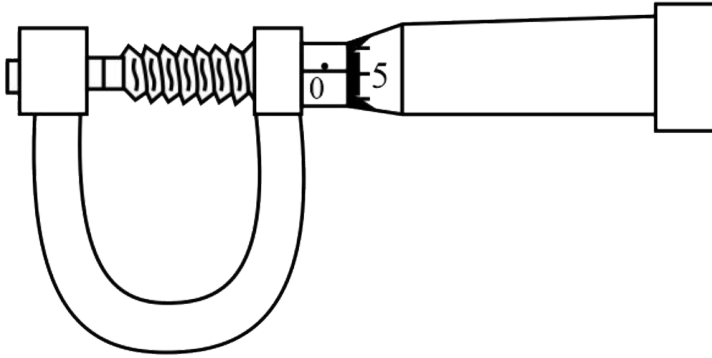
Answer: D



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17. The number of circular divisions of shown screw gauge are 50. It moves 0.5 mm on main scale in one rotation. The diameter of the ball

is:



A. 2. 25 mm

B. 2.20 mm

C. 1.20 mm

D. 1.25 mm

Answer: C



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18. If the first one - third of q journey is travelled at 20 km h^{-1} , Next one - third at 40 km h^{-1} And the last one third at 60 km h^{-1} then the average speed for the whole journey will be

A. 32.7 km h^{-1}

B. $35kmh^{-1}$

C. $40kmh^{-1}$

D. $45kmh^{-1}$

Answer: A



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19. A body is orbiting very close to the earth surface kinetic energy K.E. The energy required to completely escape from it is

A. K

B. $2K$

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

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

Answer: A



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20. A planet radiates heat at a rate proportional to the fourth power of its surface temperature T . If such a steady temperature of

the planet is due to an exactly equal amount of heat received from the sun then which of the following statements is true?

A. The planet's surface temperature varies inversely as the distance of the sun

B. The planet's surface temperature varies directly as the square of its distance from the sun

C. The planet's surface temperature varies inversely as the square root of its

distance from the sun

D. The planet's surface temperature is proportional to the fourth power of distance from the sun

Answer: C



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21. 2 kg of ice at $-20^{\circ}C$ is mixed with 5kg of water at $20^{\circ}C$. The water content of the final mixture is (Latent heat of ice $= 80 \text{ kcal kg}^{-1}$,

the specific heat of water

$= 1 \text{ kcal kg}^{-1} \cdot ^\circ \text{C}^{-1}$ and specific heat of ice

$= 0.5 \text{ kcal kg}^{-1} \cdot ^\circ \text{C}^{-1}$)

A. 7 kg

B. 6 kg

C. 4 kg

D. 3 kg

Answer: B



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22. In a flexible balloon 2, moles of SO_2 having an initial volume of 1 kL at a temperature of $27.^{\circ}C$ is filled . The gas is first expanded to thrice its initial volume isobarically and then further expanded adiabatically so as to attain its initial temperature . Assuming the gas to be ideal , the work done by the gas in the whole process is

$$\left[\gamma_{SO_2} = \frac{4}{3}, R = \frac{25}{3} Jmol^{-1}K^{-1} \right]$$

A. $10kJ$

B. $35kJ$

C. $45kJ$

D. $15kJ$

Answer: C



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23. A horizontal overhead powerline is at height of $4m$ from the ground and carries a current of $100A$ from east to west. The magnetic field directly below it on the ground

is

$$(\nu_0 = 4\pi \times 10^{-7} T m A^{-1})$$

A. 2.5×10^{-7} T northward

B. 5.0×10^{-7} T southward

C. 5.0×10^{-7} T northward

D. 2.5×10^{-7} T southward

Answer: D



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24. A straight wire of diameter 0.5 mm carrying a current of 1 A is replaced by another wire of 1mm diameter carrying same current. The strength of magnetic field far away is

- A. twice the earlier value
- B. same as the earlier value
- C. one - half of the earlier value
- D. one - quarter of the earlier value

Answer: B



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25. A charge q moves in a region where electric field as well as magnetic field exist, then force on it is

A. $q(\vec{v} \times \vec{B})$

B. $q\vec{E} + q(\vec{B} \times \vec{V})$

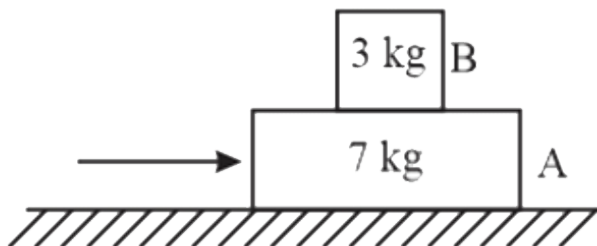
C. $q\vec{B} + q(\vec{E} + \vec{v})$

D. $q\vec{E} + q(\vec{v} + \vec{B})$

Answer: D



26. Two blocks A and B are placed one over the other on a smooth horizontal surface. The maximum horizontal force that can be applied on the lower block A, so that A and B move without separation is 49N. The coefficient of friction between A and B is (take $g = 9.8\text{ms}^{-2}$)



A. 0.2

B. 0.3

C. 0.5

D. 0.8

Answer: C



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27. A sample of ^{210}Po which is α -emitter with

$T_{\frac{1}{2}} = 138$ days is observed by a student to

have 200 disintegration (2000 Bq) . The activity in μCi for this source is

A. $0.050\mu Ci$

B. $0.051\mu Ci$

C. $0.055\mu Ci$

D. $0.054\mu Ci$

Answer: D



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28. During a nuclear fusion reaction,

A. a heavy nuclei breaks into two fragments
by itself

B. a light nuclei bombarded by thermal
neutrons break up

C. a heavy nuclei bombarded by thermal
neutrons break up

D. two light nuclei combine to give a
heavier nucleus and possibly other

products

Answer: D



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29. A photon and an electron have equal energy E . $\lambda_{\text{photon}} / \lambda_{\text{electron}}$ is proportional to

A. \sqrt{E}

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

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

D. does not depend upon E

Answer: B



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30. The average depth of indian ocean is about 3000 m. The fractional compression, $\frac{\Delta V}{V}$ of water at the bottom of the ocean is

(Given: Bulk modulus of the water $= 2.2 \times 10^9 Nm^{-2}$ and $g = 10ms^{-2}$)

A. 0.82 %

B. 0.91 %

C. 1.36 %

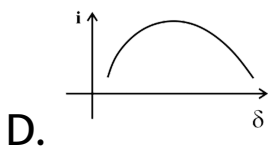
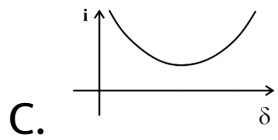
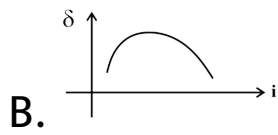
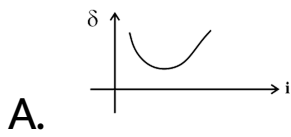
D. 1.52 %

Answer: C



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31. The graph between angle of deviation (δ) and angle of incidence (i) for a triangular prism is represented by:



Answer: A



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32. Magnification of a compound microscope is 30. Focal length of eye – piece is 5cm and the image is formed at a distance of distinct vision of 25cm . The magnification of the objective lens is

A. 6

B. 5

C. 7.5

D. 10

Answer: B



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33. A particle of mass is moving in a straight line with momentum p . Starting at time $t = 0$, a force $F = kt$ acts in the same direction on the moving particle during time interval T so that its momentum changes from p to $3p$. Here k is constant. The value of T is :

A. $\sqrt{\frac{2P}{K}}$

B. $2\sqrt{\frac{P}{K}}$

C. $\sqrt{\frac{2K}{P}}$

D. $2\sqrt{\frac{2K}{P}}$

Answer: B



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34. The ratio of the time taken by a solid sphere and that taken by a disc of the same mass and radius to roll down a rough inclined plane from rest, from the same height is

A. 15:14

B. $\sqrt{15} : \sqrt{14}$

C. $14 : 15$

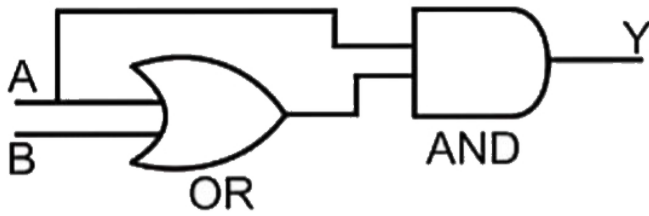
D. $\sqrt{14} : \sqrt{15}$

Answer: D



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35. The output Y of the combination of logic gates shown is equal to



A. A

B. \bar{A}

C. $A + B$

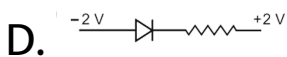
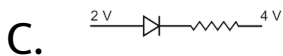
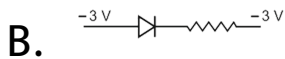
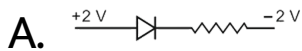
D. AB

Answer: A



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36. The forward biased diode connection among the following is



Answer: A



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37. Which one of the following would raise the temperature of 20 g of water at $30^{\circ}C$ most when mixed with?

(Specific heat of water is $1\text{ cal} / \text{g} - ^{\circ}C$)

A. 20 g of water at $40.^{\circ}C$

B. 40 g of water at $35.^{\circ}C$

C. 10 g of water at $50.^{\circ}C$

D. 40 g of water at $18.^{\circ}C$

Answer: C



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38. A parallel monochromatic beam of light is incident normally on a narrow slit. A diffraction pattern is formed on a screen placed perpendicular to the direction of incident beam. At the first maximum of the diffraction pattern the phase difference between the rays coming from the edges of the slit is:

A. 2π

B. π

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

D. 0

Answer: A



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39. The angular width of the central maximum in a single slit diffraction pattern is 60° . The width of the slit is $1\mu m$. The slit is illuminated by monochromatic plane waves. If another slit of same width is made near it, Young's fringes

can be observed on a screen placed at a distance 50 cm from the slits. If the observed fringe width is 1 cm, what is slit separation distance?

(i.e. distance between the centres of each slit.)

A. $100\mu m$

B. $25\mu m$

C. $50\mu m$

D. $75\mu m$

Answer: B



40. A submarine (A) travelling at 18km/hr is being chased along the line of its velocity by another submarine (B) travelling at 27km/hr . B sends a sonar signal of 500 Hz to detect A and receives a reflected sound of frequency ν . the value of ν is close to (speed of sound in water $= 1500\text{ms}^{-1}$)

A. 504 Hz

B. 499 Hz

C. 502 Hz

D. 507 Hz

Answer: C



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41. If the amplitude of sound is doubled and the frequency reduced to one-fourth the intensity of sound at the same point will

A. increasing by a factor of 2

B. decreasing by a factor of 2

C. decreasing by a factor of 4

D. remain unchanged

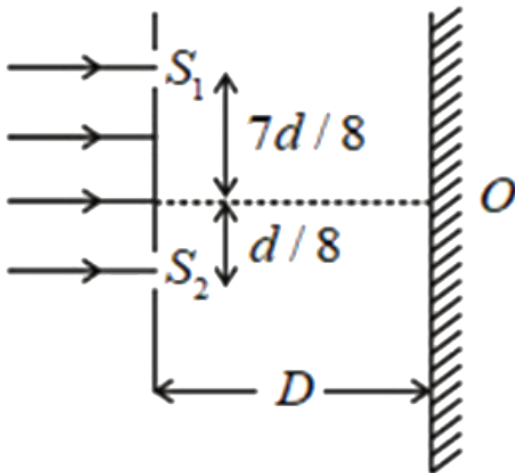
Answer: C



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42. In the figure , if a parallel beam of white light is incident on the plane of the slits S_1 and S_2 then the distance of the nearest white spot on the screen from O is [Assume

$$D \gg d, d \gg \lambda]$$



A. 0

B. $\frac{3d}{8}$

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

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

Answer: B



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43. A small sphere of mass m is suspended by a thread of length l . It is raised upto the height of suspension with thread fully stretched and released. Then, the maximum tension in thread will be

A. mg

B. $2mg$

C. 3mg

D. 6mg

Answer: C



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44. A long spring is stretched by 3 cm and its potential energy is V . If the spring is stretched by 6 cm ,its potential energy will be

A. V

B. 2V

C. 3V

D. 4V

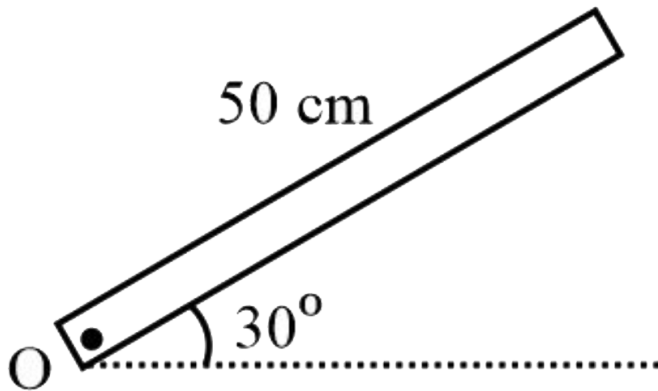
Answer: D



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45. A uniform rod of length 50 cm is released in the vertical plane from the position shown in the figure. The rod is hinged smoothly at O. The angular speed of rod when it becomes

horizontal is (take $g = 10ms^{-2}$)



A. $30\text{rad}s^{-1}$

B. $\sqrt{30}\text{rad}s^{-1}$

C. $40\text{rad}s^{-1}$

D. $\sqrt{32}\text{rad}s^{-1}$

Answer: B





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