PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 31

Physics

1. Assuming the mass of the earth as 6.64×10^{24}kg 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 $1kg$ moving with a speed of $4ms^{-1}$, collides with another block of mass $2kg$ which is at rest. The lighter block comes to rest after collision. The loss in KE of the system is

A. 8 J

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

C. 4 J

D. 0 J

Answer: C

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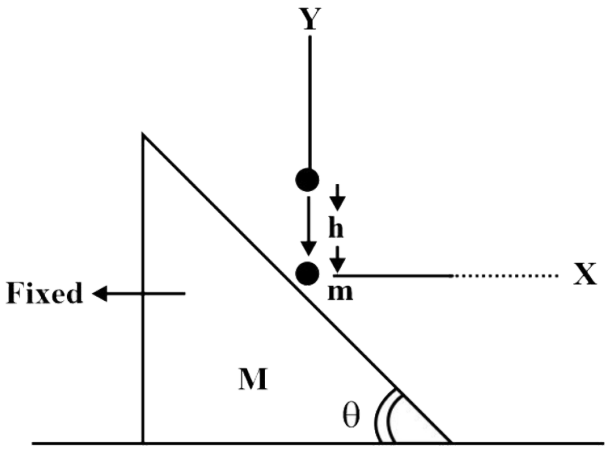
3. A ball of mass m is dropped onto a smooth fixed wedge of inclination θ The collision is perfectly elastic . If after the collision, the x component of the velocity of the block is component of the velocity of the block is

$\sqrt{2gh}$, then θ is



A. 30°

B. 45°

C. 60°

D. 15°

Answer: B

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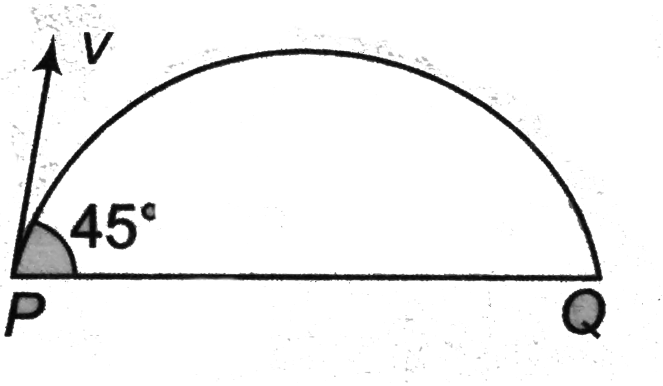
4. A projectile of mass m is fired with a velocity v from point P at an angle 45°. Neglecting air resistance, the magnitude of the change in momentum leaving the point P and arriving at Q is



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' s 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 a meter bridge the balancing length rom the left end (standard resistance of 1Ω is in the right gap) is found to be 20 cm . The value of the unkown resistance is

A. 0.4Ω

B. 0.5Ω

C. 4Ω

D. 0.25Ω

Answer: D

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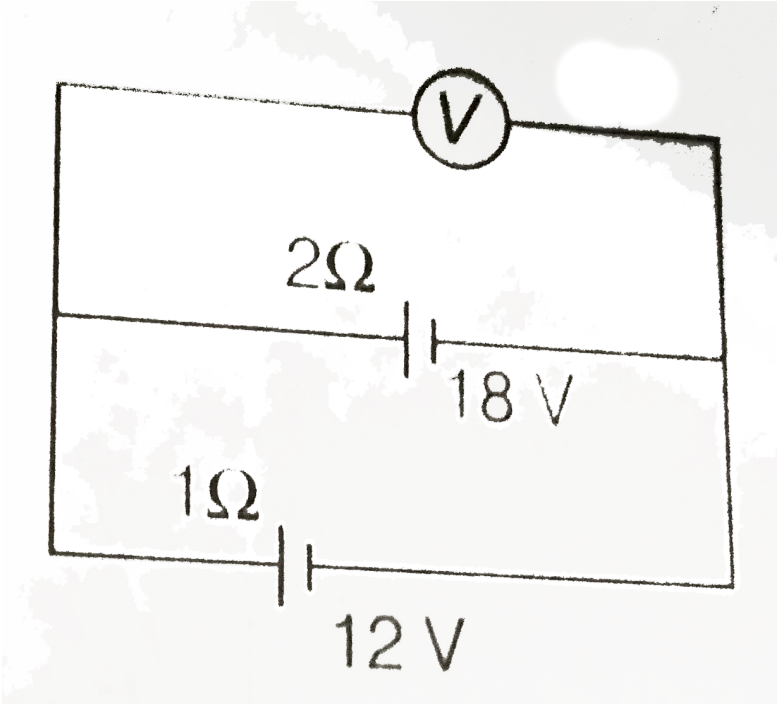
8. Two batteries, one of emf 18V and internal resistance 2Ω and the other of emf 12 and internal resistance 1Ω , are connected as shown. The voltmeter V will record a reading

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. 9 J

C. $6.8J$

D. $4.13J$

Answer: D

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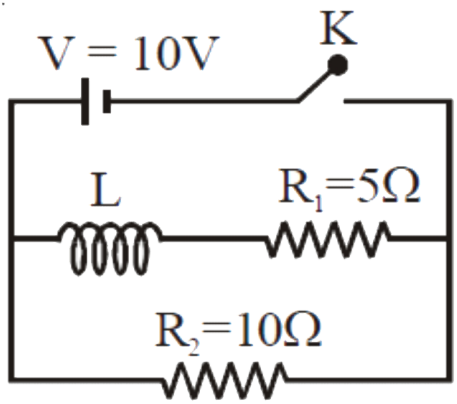
11. In the circuit shown below, the key K is closed at t = 0 . The current through the battery is



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 $t \to \infty$

Answer: C

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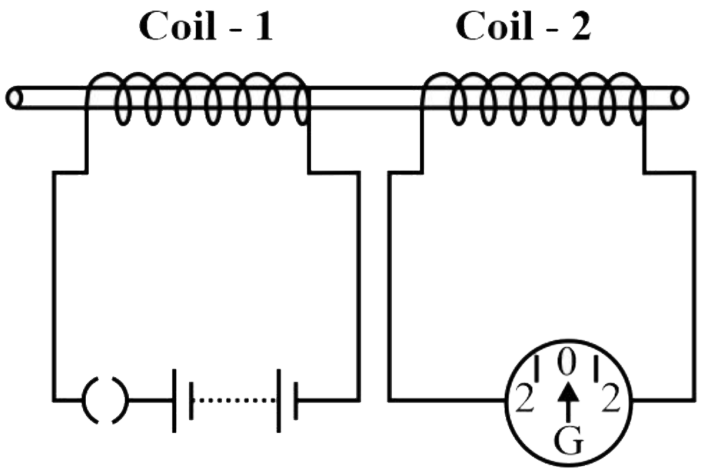
12. A non - conducting cylindrical rod is inserted within two coils of insulated wires, as shown in the given figure. A battery is connected to coil 1 , while a galvanometer is connected to coil 2



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 eletric 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 center is

A. σ / ε_0

B. $\frac{\sigma}{\varepsilon_0}(R - r)$

C. $\frac{\sigma}{\varepsilon_0}(R + r)$

D. $\frac{\sigma}{4\pi\varepsilon_0}(R - r)$

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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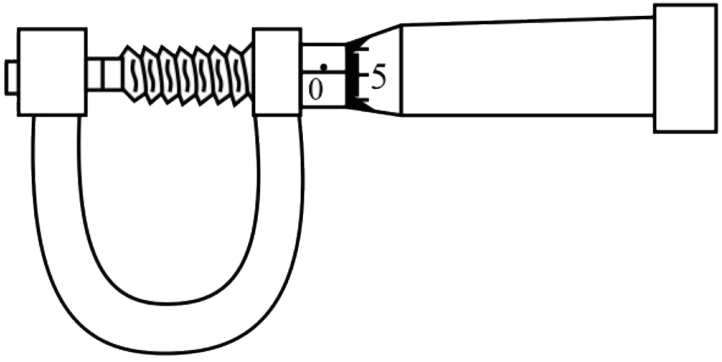
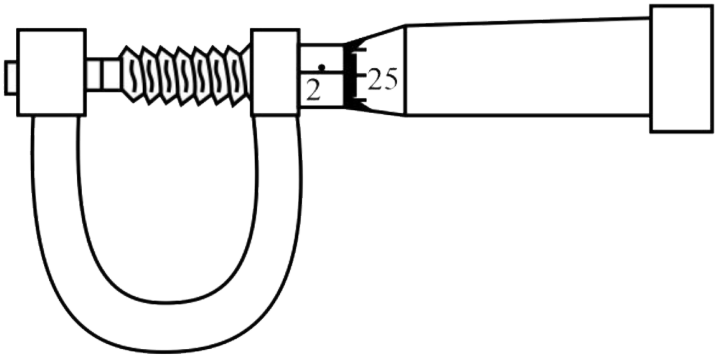
17. The figure shows two diagrams of the same screw gauge . In the first case, nothing is kept in its jaw and in the second case a small ball is kept between the jaws for which the diameter is required to be measured. The number of circular divisions on the shown screw gauge is 50. It moves 0.5mm on the main scale for one complete rotation and the main scale has $\frac{1}{2}$

Mm marks . 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 $40kmh^{-1}$ And the last one third at $60kmh^{-1}$ then the average speed for the whole journey will be

A. $32.7kmh^{-1}$

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 statement 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. $2kg$ ice at $-20^\circ C$ is mixed with $5kg$ water at $20^\circ C$. Then final amount of water in the mixture will be: [specific heat of ice

$= 0.5 cal / gm^{\circ} C$, Specific heat of water $= 1 cal / gm^{\circ} C$, Latent heat of fusion of ice $= 80 cal / gm]$

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 overheadpowerline 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

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

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 $0.5mm$ carrying a current of $1A$ is replaced by another wire of $1mm$ diameter carrying the 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 region in a electric field E and the magnetic field B both exist, then the force on its is

A. $q\left(\overrightarrow{v} \times \overrightarrow{B}\right)$

B. $q\overrightarrow{E} + q\left(\overrightarrow{B} \times \overrightarrow{V}\right)$

C. $q\overrightarrow{B} + q\left(\overrightarrow{E} + \overrightarrow{v}\right)$

D. $q\overrightarrow{E} + q\left(\overrightarrow{v} + \overrightarrow{B}\right)$

Answer: D

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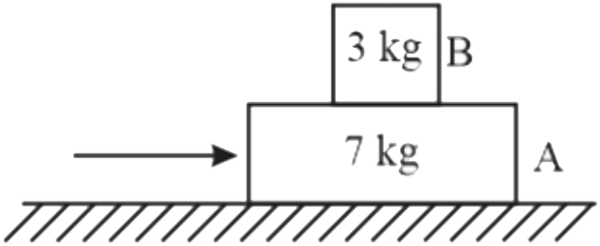
26. Two blocks A and B are placed one over the other on a smooth horizontal surface. The maximum horizontal force that can be applied on the lower block A, so that A and B move without separation is 49N. The coefficient of friction between A and B is (take g = $9.8ms^{-2}$

)



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, $\frac{\triangle V}{V}$ 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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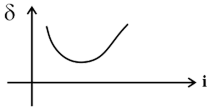
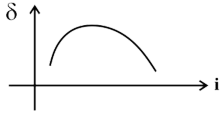
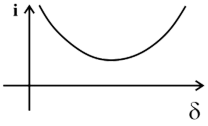
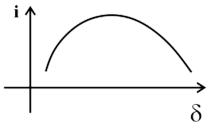
31. A graph is plotted between angle of deviation (δ) and angle of incidence (i) for a prism. The nearly correct graph is

A. 

B. 

C. 

D. 

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 magnificatio of the objective lens is

A. 6

B. 5

C. 7.5

D. 10

Answer: B

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33. A particle with linear momentum of magnitude P is subjected to a force $F = Kt(K > 0)$ which is directed along the direction of initial momentum. The time after which its linear momentum changes to 3P 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 smooth

inclined plane from rest from the same height

-

A. $15:14$

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

C. $14:15$

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

Answer: D

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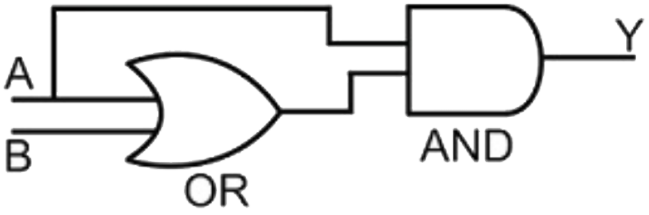
35. The output Y of the combination of logic gates shown is equal to



A. A

B. $\overline{A}$

C. $A + B$

D. AB

Answer: A

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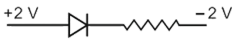
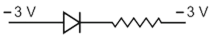
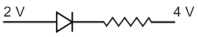
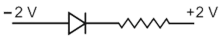
36. The forward biased diode connection among the following is

A. 

B. 

C. 

D. 

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 $1 cal / g - .^{\circ} C$)

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 patten 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

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40. Submarine A is going with speed of $18km/hr$. Submarine B is chasing A with speed of $27km/hr$. It sends frequency of $500Hz$ and hears after reflection from A. The perceived frequency is :

$(V_{\text{sound in water}} = 1500m/s)$

A. 504 Hz

B. 499 Hz

C. 502 Hz

D. 507 Hz

Answer: C

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

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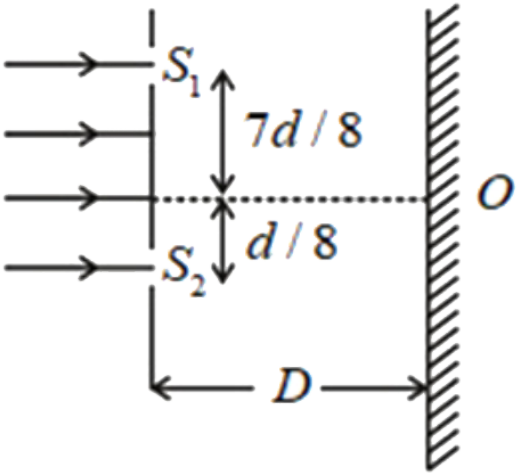
42. In the figure , if a parallel beam of white light is incident on the plane of the slits S_1 and S_2 then the distance of the nearest

white spot on the screen from O is [Assume $D > > d, d > > \lambda$]



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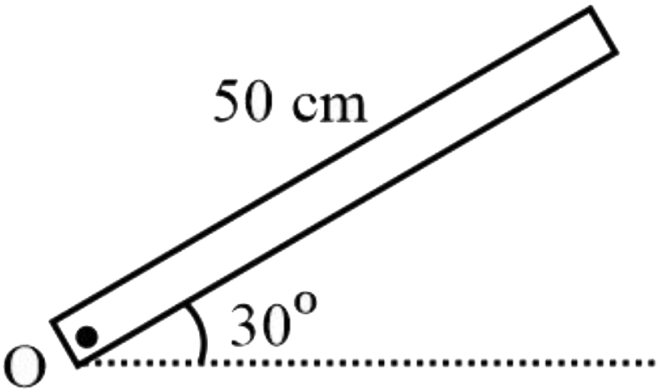
45. A uniform rod of length 50 cm is released in the vertical plane from the position shown in the figure. The rod is hinged smoothly at O. The angular speed of rod when it becomes

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



A. $30rads^{-1}$

B. $\sqrt{30}rads^{-1}$

C. $40rads^{-1}$

D. $\sqrt{32}rads^{-1}$

Answer: B

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