PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 92

Physics

1. When electron jumps from n=4 level to n=1 level,the angular momentum of electron changes by

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

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

C. $\frac{3h}{2\pi}$

D. $\frac{4h}{2\pi}$

Answer: C

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2. When a hydrogen atom is raised from the ground state to an excited state

A. Potential energy increases and kinetic energy decreases

B. Kinetic energy increases and potential energy decreases

C. Both KE and PE increases

D. Both KE and PE decreases

Answer: A

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3. A body of mass m_1 collides elastically with another body of mass m_2 at rest. If the velocity of m_1 after collision is $\frac{2}{3}$ times its initial velocity, the ratio of their masses is :

A. $1:5$

B. $5:1$

C. $5:2$

D. $2:5$

Answer: B

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4. A particle at rest suddenly disintegrates into two particles of equal masses which start moving. The two fragments will

A. Move in the same direction with equal speeds

B. Move in any directions with any speed

C. Move in opposite directions with equal speeds

D. Move in opposite directions with unequal speeds

Answer: C

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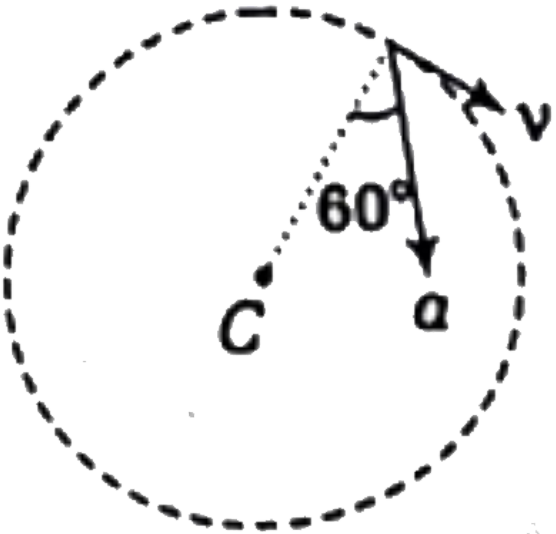
5. The figure shows the total acceleration $a = 32ms^{-2}$ of a moving particle moving clockwise in a circle of radius R = 1 m . What are the centripetal acceleration a and speed of

the particle at the given instant ?



A. $16\sqrt{3}ms^{-2}, 4\sqrt{3}ms^{-1}$

B. $16\sqrt{3}ms^{-2}, 4ms^{-1}$

C. $16ms^{-2}, 16ms^{-1}$

D. $16ms^{-2}, 4ms^{-1}$

Answer: D

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6. A short bar magnet has a magnetic moment of $0.48JT^{-1}$. Give the direction and magnitude of the magnetic field produced by the magnet at a distance of 10 cm from the centre of the magnet on (a) the axis, (b) the equitorial lines (normal bisector) of the magnet.

A. $0.96 \times 10^{-4} T$

B. $2.16 \times 10^{-4} T$

C. $0.96 \times 10^{-3} T$

D. $2.16 \times 10^{-3} T$

Answer: A

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7. Two unknown resistances are connected in two gaps of a meter-bridge. The null point is obtained at 40 cm from left end. A 30Ω

resistance is connected in series with the smaller of the two resistances, the null point shifts by 20 cm to the right end. The value of smaller resistance in Ω is

A. 12

B. 24

C. 36

D. 48

Answer: B

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8. A long resistance wire is divided into 2n parts. Then n parts are connected in series and the other n parts in parallel separately. Both combinations are connected to identical supplies. Then the ratio of heat produced in series to parallel combinations will be -

A. $1:1$

B. $1:n^2$

C. $1:n^4$

D. $n^2:1$

Answer: B

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9. A charge q is placed at the centre of the line joining two equal charges Q to establish equilibrium. The system of three charges will be in equilibrium if q is equal to

A. $+\frac{Q}{4}$

B. $-\frac{Q}{2}$

C. $+\frac{Q}{2}$

D. $-\frac{Q}{4}$

Answer: D

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10. Two point charges q and –q are at positions (0,0,d) and (0,0, –d) respectively . What is the electric field at (a,0,0) ?

A. $\frac{2qd}{4\pi\varepsilon_0(d^2+a^2)^{3/2}}\hat{k}$

B. $\frac{qd}{4\pi\varepsilon_0(d^2+a^2)^{3/2}}\hat{k}$

C. $\frac{-2qd}{4\pi\varepsilon_0(d^2+a^2)^{3/2}}\hat{k}$

D. $\frac{-qd}{4\pi\varepsilon_0(d^2+a^2)^{3/2}}\hat{k}$

Answer: C

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11. What is the value of inductance L for which the current is a maximum in series LCR circuit with $C = 10\mu F$ and $\omega = 1000\frac{rad}{s}$?

A. 1 mH

B. Cannot be calculated unless R is known

C. 10 mH

D. 100 mH

Answer: D

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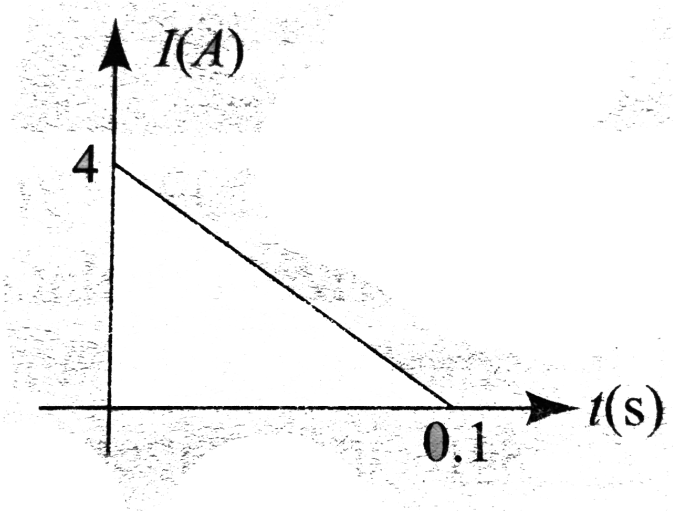
12. Some magnetic flux is changed from a coil of resitance 10Ω. As a result, an induced current is developed it, which varies with time as shown in Fig. 3.213. Find the magnitude of

the change in flux through ythe coil in weber.



A. 2 Wb

B. 4 Wb

C. 6 Wb

D. 8 Wb

Answer: A

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13. For a satellite escape velocity is 11 km/s . If the satellite is launched at an angle of 60° with the vertical , then escape velocity will be

A. $11kms^{-1}$

B. $11\sqrt{3}kms^{-1}$

C. $\frac{11}{\sqrt{3}}kms^{-1}$

D. $33kms^{-1}$

Answer: A

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14. For particles of equal masses M that move along a circle of radius R under the action of their mutual gravitational attraction. Find the speed of each particle.

A. $\frac{GM}{R}$

B. $\sqrt{\left[2\sqrt{2}\frac{GM}{R}\right]}$

C. $\sqrt{\left[\frac{GM}{R}\left(2\sqrt{2}+1\right)\right]}$

D. $\sqrt{\left[\frac{GM}{R}\left(\frac{2\sqrt{2}+1}{4}\right)\right]}$

Answer: D

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15. Four rods with different radii r and length l are used to connect two reservoirs of heat at different temperatures. Which one will conduct most heat ?

A. $r = 1cm, l = 1m$

B. $r = 1cm, l = \frac{1}{2}m$

C. $r = 2cm, l = 2m$

D. $r = 2cm, l = \frac{1}{2}m$

Answer: D

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16. The relation between efficiency $'\eta'$ of a heat engine and the co-efficient of performance $'\alpha$ of a refrigerator is

A. $\eta = \frac{1}{1-\alpha}$

B. $\eta = \frac{1}{1+\alpha}$

C. $\eta = 1+\alpha$

D. $\eta = 1-\alpha$

Answer: B

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17. In an adiabatic expansion of 2 moles of a gas, the change in its internal energy was

found to be –100J. The work done in this process is :

A. 0

B. 400 J

C. $-200J$

D. 200 J

Answer: D

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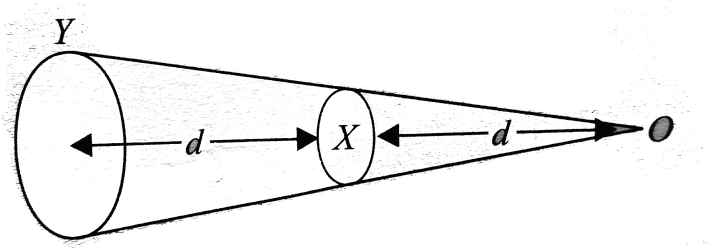
18. Two circular coils X and Y, having equal number of turns and carrying currents in the same sense, subtend same solid angle at point O. If the smaller coil X is midway between O and Y and if we represent the magnetic induction due to bigger coil Y at O as B_y and the due to smaller coil X at O as B_x,then find the ratio B_x / B_y.



A. $\frac{B_y}{B_x} = 1$

B. $\frac{B_y}{B_x} = 2$

C. $\frac{B_y}{B_x} = \frac{1}{2}$

D. $\frac{B_y}{B_x} = \frac{1}{4}$

Answer: C

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19. Two ions having masses in the ratio $1:1$ and charges $1:2$ are projected into uniform magnetic field perpendicular to the field with

speeds in th ratio $2:3$. The ratio of the radius of circular paths along which the two particles move is

A. $4:3$

B. $2:3$

C. $3:1$

D. $1:4$

Answer: A

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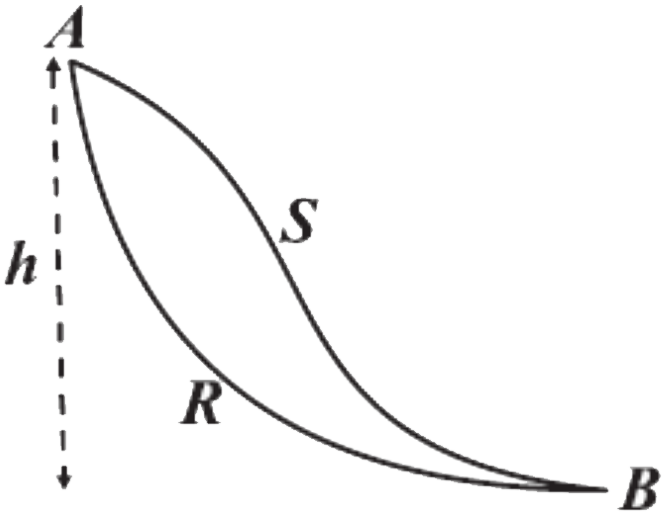
20. Two children Ramesh (on path ARB) and Sohan (on path ASB), travel down slides of identical height h but different shapes as shown in the figure. Assuming they start down the frictionless slides at the same time with zero initial velocity , which of the following statements is true?



A. Remesh reaches the bottom first with the same average velocity as Sohan.

B. Remesh reaches the bottom first with a larger average acceleration than Sohan.

C. Remesh reaches the bottom first with the same average acceleration as Sohan.

D. They reach the bottom at the same time with the same average acceleration.

Answer: B

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21. A boat crosses a river with a velocity of $8\frac{km}{h}$. If the resulting velocity of boat is $10\frac{km}{h}$ then the velocity of river water is

A. 12.8km h^{-1}

B. $6\ \text{km h}^{-1}$

C. $8\ \text{km h}^{-1}$

D. $10\ \text{km h}^{-1}$

Answer: B

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22. A 24 kg block resting on a floor has a rope tied to its top. The maximum tension , the rope can withstand without breaking is 310 N . The minimum time in which the block can be lifted a vertical distance of 4.6 m by pulling on the rope is

A. $1.2s$

B. $1.3s$

C. $1.7s$

D. $2.3s$

Answer: C

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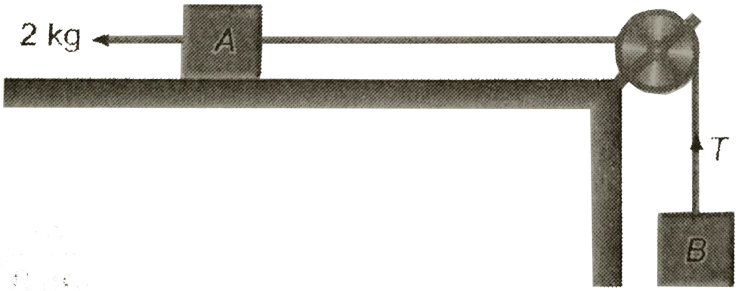
23. The coefficient of static friction, μ_s between block A mass 2kg and the table as shown in the figure, is 0.2. What would be the maximum mass value of block B, so that the two blocks do not move ? The string and the pulley are asseumed to be smooth and

massless ($g = 10m/s^2$)



A. 0.4 kg

B. 2.0 kg

C. 4.0 kg

D. 0.2 kg

Answer: A

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24. ${}_{92}^{238}U$ has 92 protons and 238 nucleons. It decays by emitting an alpha particle and becomes:

A. ${}_{92}^{234}U$

B. ${}_{90}^{234}U$

C. ${}_{92}^{235}Th$

D. ${}_{93}^{237}Th$

Answer: B

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25. The half-life of a radioactive substance is 20 min. The approximate time interval $(t_2 - t_1)$ between the time t_2 when $\frac{2}{3}$rd of its has decayed and time t_1 when $\frac{1}{3}$rd of it had decayed is -

(A) 14 min

(B) 20 min

(C) 28 min

(D) 7 min

A. 14 min

B. 20 min

C. 28 min

D. 7 min

Answer: B

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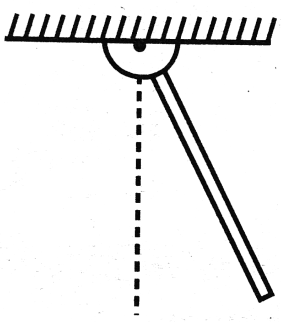

26.

A metre stick swinging in vertical plane about a fixed horizontal axis passing through its one end undergoes small oscillation of frequency f_0. If the bottom half of the stick were but off, then its new frequency of small oscillation woul become.

A. f_0

B. $\sqrt{2}f_0$

C. $2f_0$

D. $2\sqrt{2}f_0$

Answer: B

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27. The displacement of a particle performing simple harmonic motion is given by, $x = 8 \sin \omega t + 6 \cos \omega t$, where

distance is in cm and time is in second. What is the amplitude of motion?

A. 10 cm

B. 2 cm

C. 14 cm

D. 3.5 cm

Answer: A

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28. if λ_v ', λ_x and λ_m represent the wavelengths of visible light X-rays and microwaves respectively then:

A. $\lambda_m > \lambda_x > \lambda_v$

B. $\lambda_m > \lambda_v > \lambda_x$

C. $\lambda_v > \lambda_x > \lambda_m$

D. $\lambda_v > \lambda_m > \lambda_x$

Answer: B

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29. A photoelectric cell is illuminated by a point source of light $1m$ away . When the source is shifted to $2m$ then

A. Each emitted electron carries half the initial energy

B. Number of electrons emitted is a quarter of the initial number

C. Each emitted electron carries one quarter of the initial energy

D. Number of electrons emitted is half the initial number

Answer: B

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30. The lower end of a glass capillary tube is dipped in water. Water rises to a height of 9 cm. The tube is then broken at a height of 5 cm. The height of the water column and angle of contact will be

A. $5cm, \cos^{-1}\left(\frac{5}{9}\right)$

B. $4cm, \cos^{-1}\left(\frac{5}{4}\right)$

C. $5cm, \cos^{-1}\left(\frac{9}{5}\right)$

D. $5cm, \cos^{-1}\left(\frac{6}{7}\right)$

Answer: A

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31. The radii of two soap bubbles are r_i and r_2.

In isothermal conditions, two meet together in

vacuum. Then the radius kof the resultant bubble is given by

A. $R = (r_1 + r_2)/2$

B. $R = r_1(r_1 r_2 + r_2)$

C. $R^2 = r_1^2 + r_2^2$

D. $R = r_1 + r_2$

Answer: C

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32. The maximum value of refractive index of a prism which permits the transmission of light through it when the refracting angl e of the prism is 90°, is given by

A. $\sqrt{3}$

B. $\sqrt{2}$

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

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

Answer: B

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33. A light ray is incident on a planemirror at an angle of 30° with horizontal. At what angle with horizontal must a plane mirror be placed in its path so that it bacomes vertically upwards after reflection?

A. 40°

B. 20°

C. 30°

D. 60°

Answer: C

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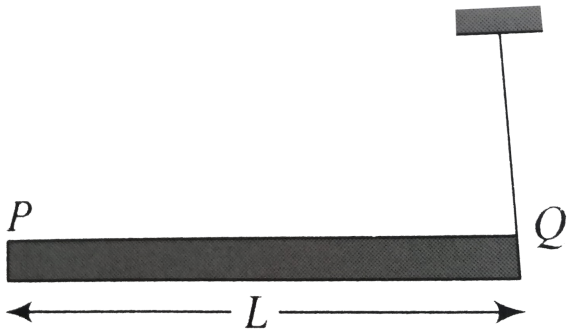
34. A rod PQ of mass M and length L is hinged at end P. The rod is kept horizontal by a massless string tied to point Q as shown in the figure. When string is cut, the initial

angular accleration of the rod is.



A. $\frac{3g}{2L}$

B. $\frac{g}{L}$

C. $\frac{2g}{L}$

D. $\frac{2g}{2L}$

Answer: A

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35. A flywheel of moment of inertia 0.4 kg m^2 and radius 0.2 m is free to rotate about a central axis. If a string is wrapped around it and it is pulled with a force of 10N. Then its angular velocity after 4s will be

A. $10 rads^{-1}$

B. $5 rads^{-1}$

C. $20 rads^{-1}$

D. None of these

Answer: C

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36. What is the conductivity of a semiconductor (in $\Omega^{-1}m^{-1}$) if electron density $= 5 \times 10^{12} cm^{-3}$ and hole density $= 8 \times 10^{13} cm^{-3}$?

$(\mu_e = 2.3V^{-1}s^{-1}m^2, \mu_h = 0.01m^2V^{-1}s^{-1})$

A. $5.634\Omega^{-1}m^{-1}$

B. $1.968\Omega^{-1}m^{-1}$

C. $3.421\Omega^{-1}m^{-1}$

D. $8.964\Omega^{-1}m^{-1}$

Answer: B

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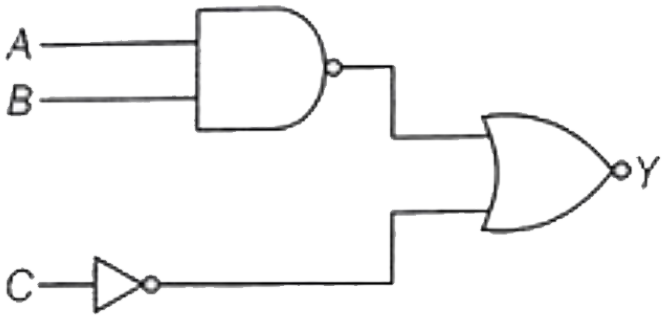
37. The current given the output as that of



A. AND gate

B. OR gate

C. NAND gate

D. NOR gate

Answer: A

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38. Air is pumped into an automobile tube upto a pressure of 200 kPa in the morning when the air temperture is $22^{\circ}C$ During the

day , temperature ries to $42^{\circ}C$ and the tube expands by 2% a The pressure of the air in the tube at this temperature, will be approximately

A. 212 kPa

B. 209 kPa

C. 206 kPa

D. 200 kPa

Answer: B

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39. In the releation $p = \frac{\alpha}{\beta} e^{-\frac{az}{k\theta}}$, where p is the pressure z is distance k is Boltzmann constant and θ is the temperature the dimensional formula β will be

A. $\left[M^0 L^2 T^0\right]$

B. $\left[ML^2 T\right]$

C. $\left[ML^0 T^{-1}\right]$

D. $\left[ML^2 T^{-}\right]$

Answer: A

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40. In the Young's double slit experiment , a mica slip of thickness t and refractive index μ is introduced in the ray from first source S_1 . By how much distance fringes pattern will be displaced ? (d = distance between the slits and D is the distance between slits and screen)

A. $\frac{d}{D}(\mu - 1)t$

B. $\frac{D}{d}(\mu - 1)t$

C. $\frac{1}{(\mu - 1)D}$

D. $\frac{D}{d}(\mu - 1)$

Answer: B

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41. In Young's double slit experiment, one of the slit is wider than other, so that amplitude of the light from one slit is double of that from other slit. If I_m be the maximum intensity, the resultant intensity I when they interfere at phase difference ϕ is given by:

A. $\frac{I_m}{9}(4+5\cos\phi)$

B. $\frac{I_m}{3}\left(1+2\cos^2.\frac{\phi}{2}\right)$

C. $\frac{I_m}{5}\left(1+4\cos^2.\frac{\phi}{2}\right)$

D. $\frac{I_m}{9}\left(1+8\cos^2.\frac{\phi}{2}\right)$

Answer: D

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42. A metal wire of linear mass density of $9.8g/m$ is stretched with a tension of $10kg-wt$ between two rigid support $1meter$

apart. The wire passes at its middle point between the poles of a permanent magnet, and it vibrates in resonance when carrying an alternating current of frequency n. the frequency n of the alternating source is

A. 50 Hz

B. 100 Hz

C. 200 Hz

D. 25 Hz

Answer: A

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43. Consider a wire with density (d) and stress (σ) . For the same density . if the stress increases 2 times , the speed of the transverse waves along the wire change by

A. $\sqrt{2}$

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

C. 2

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

Answer: A

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44. An installation consisting of an electric motor driving a water pump left 75 L of water per second to a height of 4.7 m . If the motor consumes a power of 5 k W , then efficiency of the installation is

A. $39\ \%$

B. $69\ \%$

C. $93\ \%$

D. $96\ \%$

Answer: B

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45. A particle is projected with a velocity u making an angle θ with the horizontal. The instantaneous power of the gravitational force

A. Varies linearly with time.

B. Is constant throughout

C. Is negative for complete path

D. None of these

Answer: A

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