PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 99

Physics

1. An electron is at ground state of the H atom. The minimum energy required to excite the H atom into the second excited state is

A. 13.6 eV

B. 12.1 eV

C. 10.2 eV

D. 3.4 eV

Answer: B

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2. A proton and an α particle accellerated throught the same potential differenc e enter a region of uniform magnetic field normally if

the radius of the proton orbit is 10 cm ten radius of α particle is

A. 10 cm

B. $10\sqrt{2}cm$

C. 20 cm

D. $5\sqrt{2}cm$

Answer: B

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3. Two identiacal masses are as shown in figure. One is thrown upwards with velocity 20 m/s and another is just dropped simultaneously.

If the collision between them is elastic, find the time interval between their striking with ground 

A. Zero

B. 2 s

C. 1 s

D. 3 s

Answer: B

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4. Two blocks of masses 10 kg and 4 kg are connected by a spring of negligible mass and placed on a frictionless horizontal surface. An impulse gives a velocity of $14m/s$ to the heavier block in the direction of the lighter block. The velocity of the centre of mass is

A. $30 \quad \mathrm{ms}^{-1}$

B. $20 \quad \mathrm{ms}^{-1}$

C. $10 \quad \mathrm{ms}^{-1}$

D. $5 \quad \mathrm{ms}^{-1}$

Answer: C

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5. When a ceiling fan is switched off, its angular velocity reduces to 50% while it makes 36 rotations. How many more rotations will it

make before coming to rest?(Assume uniform angular retardation)

A. 18

B. 12

C. 36

D. 48

Answer: B

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6. Force between two identical charges placed at a distance of r in vacuum is F.Now a slab of dielectric constant 4 is inserted between these two charges . If the thickness of the slab is $r/2$, then the force between the charges will becomes

A. $\frac{3}{5}F$

B. $\frac{4}{9}F$

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

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

Answer: B

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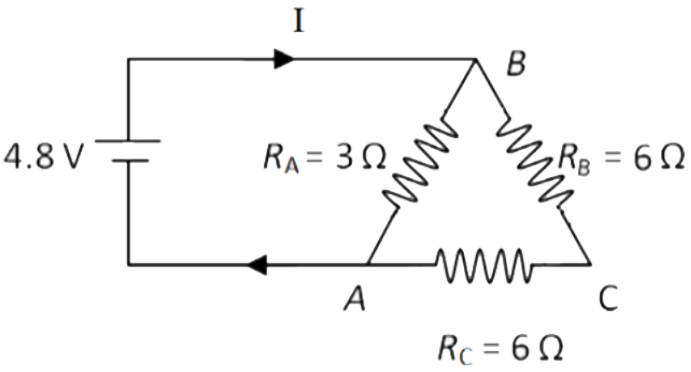
7. The current I in the given circuit is



A. 1.6 A

B. 2.0 A

C. 0.32 A

D. 3.2 A

Answer: B

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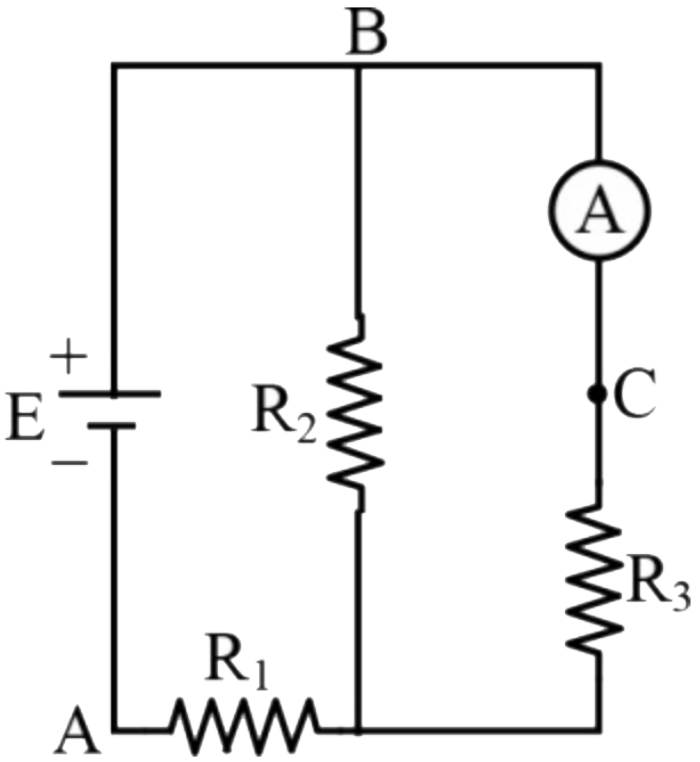
8. In the circuit shown the ideal ammeter A reads a current of I_1 , A . Now the source of e.m.f . and the ammeter are physically interchanged , i.e. . the source is out between B and C and the ammeter between A and B .

The ammeter now reads a current of I_2 A .

Then -



A. $I_1 > I_2$

B. $I_1 = I_2$

C. $I_1 < I_2$

D. The relation between I_1 and I_2 will depend upon the relative value of resistance R_1, R_2 and R_3

Answer: B

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9. The electric field strength in N C^{-1} that is required to just prevent a water drop carrying a change 1.6×10^{-19} C from falling under

gravity is (g = 9.8 m s^{-2} , the mass of water drop = 0.0016 g)

A. 9.8×10^{-16}

B. 9.8×10^{16}

C. 9.8×10^{-13}

D. 9.8×10^{13}

Answer: D

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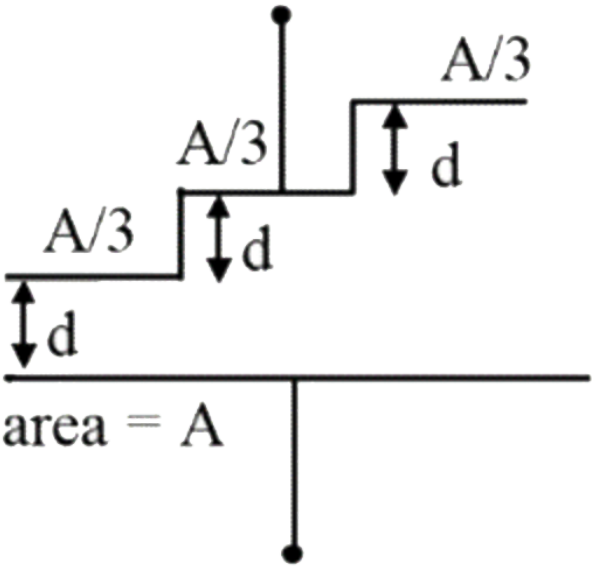
10. A capacitor is made of a flat plate of area A and a second plate having a stair-like structure as shown in the diagram . The capacitance of the arrangement is -



A. $\frac{\varepsilon_0 A}{d}$

B. $\frac{18}{11}\frac{\varepsilon_0 A}{d}$

C. $\frac{11}{18}\frac{\varepsilon_0 A}{d}$

D. $\frac{\varepsilon_0 A}{3d}$

Answer: C

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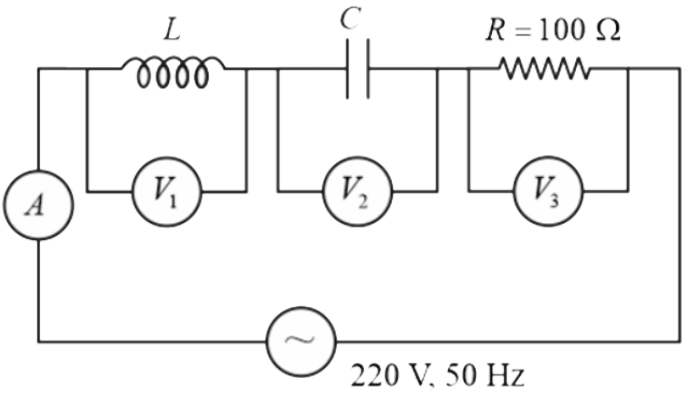
11. In the given circuit the reading of voltmeters V_1 and V_2 are 300 volt each . The reading of the voltmeter V_3 and ammeter A

are respectively



A. 150 V and 2.2 A

B. 220 V and 2.2 A

C. 220 V and 2.0 A

D. 100 V and 2.0 A

Answer: B

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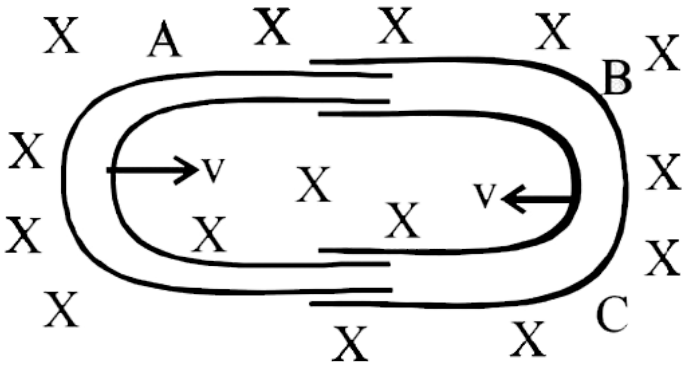
12. One conducting U tube can slide inside another as shown in figure, maintaining electrical contacts between the tubes. The magnetic field B is perpendicular to the plane of the figure. If each tube maoves towards the other at a constant speed v. Then the emf induced in the circuit in terms of B, l and v

where l is the width of each tube will be



A. zero

B. 2Blv

C. Blv

D. $-Blv$

Answer: B

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13. A satallite of mass m, initally at rest on the earth, is launched into a circular orbit at a height equal to the the radius of the earth. The minimum energy required is

A. $\frac{\sqrt{3}}{4}mgR$

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

C. $\frac{1}{4}mgR$

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

Answer: D

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14. Suppose the gravitational force varies inversely as the n^{th} power of distance. Then the time period of a planet in circular orbit of radius R around the sun will be proportional to-

A. $R^{\left(\frac{n+1}{2}\right)}$

B. $R^{\left(\frac{n-1}{2}\right)}$

C. R^n

D. $R^{\left(\frac{n-1}{2}\right)}$

Answer: A

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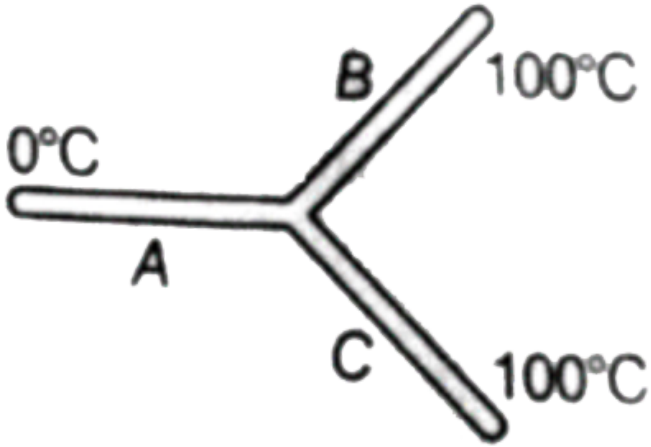
15. Three rods are made from the same material and having the same cross-sectional area and length have been joined as shown in the figure.



The left end and right end are kept $0^\circ C$ and $100^\circ C$, respectively . The temperature of the junction of three rods will be

A. $50^\circ C$

B. $60^\circ C$

C. $80^\circ C$

D. $66.66^\circ C$

Answer: D

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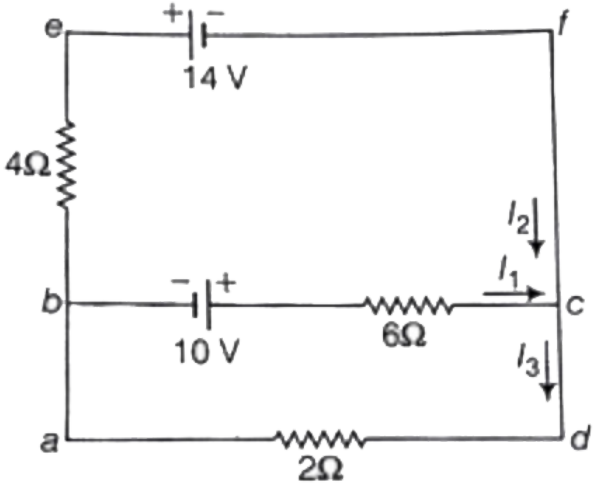
16. The value of the current I_1, I_2 and I_3 flowing through the circuit given below is



A. $I_1 = -3A, I_2 = 2, I_3 = -1A$

B. $I_1 = 2A, I_2 = -3, I_3 = -1A$

C. $I_1 = 3A, I_2 = -1, I_3 = -2A$

D. $I_1 = 1A, I_2 = -3, I_3 = -2A$

Answer: B

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17. Pressure P, Volume V and temperature T of a certain material are related by the $P = \frac{\alpha T^2}{V}$. Here α is constant. Work done by the material when temparature changes from T_0 to $2T_0$ while pressure remains constant is :

A. $3\alpha T_2^2$

B. $5\alpha T_2^2$

C. $\frac{3}{2}\alpha T_0^2$

D. $7\alpha T_2^2$

Answer: A

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18. If a distance of 40 cm at an axial position of a dipole, the "magnetic potential" (analogous to electric potential) is $2.4 \times 10^{-5} \mathrm{J\ A\ m^{-1}}$ then the magnetic moment of the dipole is

A. $28.6 \mathrm{A\ m^2}$

B. $32.2 \mathrm{A\ m^2}$

C. $38.4 \mathrm{A\ m^2}$

D. None of these

Answer: C

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19. An ionized gas contains both positive and negative ions . If it is subjected simultaneously to an electric field along the $+x$ - direction and a magnetic field along the $+y$ - direction and the negative ions towardws $-y$ - direction

A. Positive ions deflect towards +y direction and negative ions towards -y direction

B. All ions deflect towards +y direction

C. All ions deflect towards -y direction

D. Positive ions deflect towards -y direction and negative ions towards +y direction

Answer: C

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20. A particle moves along a straight line OX. At a time t (in seconds) the distance x (in metre) of the particle is given by $x = 40 + 12t - t^3$. How long would the particle travel before coming to rest ?

A. 16 m

B. 24 m

C. 40 m

D. 56 m

Answer: A

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21. A piece of marble is projected from the earth's surface with a velocity of $50ms^{-1}$. 2 s later , it just clears a wall 5 m high. What is the angle of projection ?

A. 45°

B. 30°

C. 60°

D. $\sin^{-1}\left(\frac{1}{4}\right)$

Answer: D

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22. A $0.2kg$ object at rest is subjected to a force $\left(0.3\hat{i} - 0.4\hat{j}\right)N$. What is its velocity vector after $6\,\sec$

A. $\left(9\hat{i} - 12\hat{j}\right)$

B. $\left(8\hat{i} - 16\hat{j}\right)$

C. $\left(12\hat{i} - 9\hat{j}\right)$

D. $\left(16\hat{i} - 8\hat{j}\right)$

Answer: A

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23. A cricket baal of mass 0.25 kg with speed 10 m/s collides with a bat and returns with same speed with in 0.01 s. The force acted on bat is

A. 25 N

B. 50 N

C. 250 N

D. 500 N

Answer: D

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24. This binding energy per nucleon for the parent nucleus is E_1 and that for the daughter nuclei is E_2. Then

A. $E_2 = 2E_1$

B. $E_1 > E_2$

C. $E_2 > E_1$

D. $E_1 = E_2$

Answer: C

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25. The binding energies per nucleon for deuteron $(._1 H^2)$ and helium $(._2 He^4)$ are $1.1MeV$ and $7.0MeV$ respectively. The energy released when two deutrons fuse to form a helium nucleus $(._2 He^4)$ is.....

A. 23.6 MeV

B. 20.3 MeV

C. 4.4 MeV

D. 28 MeV

Answer: A

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26. A stretched string of length $1m$ fixed at both ends , having a mass of $5 \times 10^{-4} kg$ is under a tension of $20N$. It is plucked at a point situated at $25cm$ from one end . The stretched string would vibrate with a frequency of

A. 100 Hz

B. 200 Hz

C. 400 Hz

D. 800 Hz

Answer: C

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27. A particle executing SHM has a maximum speed of $0.5ms^{-1}$ and maximum acceleration

of $1.0ms^{-2}$. The angular frequency of oscillation is

A. 2 rad s^{-1}

B. 0.5 rad s^{-1}

C. $2\pi \text{ rad s}^{-1}$

D. 0.5 rad s^{-1}

Answer: A

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28. If the work function for a certain metal is 3.2×10^{-19} joule and it is illuminated with light of frequency $8 \times 10^{14} Hz$. The maximum kinetic energy of the photo-electrons would be $\left(h = 6.63 \times 10^{-34} Js\right)$

A. $2.1 \times 10^{-19} J$

B. $3.2 \times 10^{-19} J$

C. $5.3 \times 10^{-19} J$

D. $8.5 \times 10^{-19} J$

Answer: A

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29. For a certain metal $v = 2v_0$ and the electrons come out with a maximum velocity of 4×10^6 m/s . If the value of $v = 5v_0$, then maximum velocity of the photoelectrons will be

A. $2 \times 10^7 \ \ \mathrm{ms}^{-1}$

B. $8 \times 10^7 \ \ \mathrm{ms}^{-1}$

C. $2 \times 10^6 \ \ \mathrm{ms}^{-1}$

D. $8 \times 10^5 \quad \mathrm{ms}^{-1}$

Answer: B

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30. A small ball of density ρ is immersed in a liquid of density $\sigma(>\rho)$ to a depth h and released. The height above the surface of water up to which the ball will jump is

A. $\left(\frac{\sigma}{\rho}-1\right)h$

B. $\left(\frac{\rho}{\sigma}-1\right)h$

C. $\left(\frac{\rho}{\sigma}+1\right)h$

D. $\left(\frac{\sigma}{\rho}+1\right)h$

Answer: A

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31. A body of density d is counterpoised by Mg of weights of density d_1 in air of density d. Then the true mass of the body is

A. M

B. $M = \left(1 - \frac{d}{d_2}\right)$

C. $M = \left(1 - \frac{d}{d_1}\right)$

D. $\frac{M(1 - d/d_2)}{(1 - d/d_1)}$

Answer: D

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32. Refractive index of glass with respect to medium is $\frac{4}{3}$. If $v_m - v_g = 6.25 \times 10^7$ m/s., then velocity of light in medium is

A. $2.5 \times 10^8 \mathrm{m\,s^{-1}}$

B. $0.125 \times 10^8 \mathrm{m\,s^{-1}}$

C. $1.5 \times 10^8 \mathrm{m\,s^{-1}}$

D. $3 \times 10^8 \mathrm{m\,s^{-1}}$

Answer: A

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33. The refractive index of a material of a plano-concave lens is $\frac{5}{3}$, the radius of

curvature is 0.3 m. The focal length of the lens in air is

A. $-0.45m$

B. $-0.6m$

C. $-0.75m$

D. $-1.0m$

Answer: A

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34. Two uniform thin rods each of mass M and length I are placed along X and Y-axis with one end of each at the origin. M.I. of the system about Z-axis is

A. $\frac{3}{2}Ml^2$

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

C. $2Ml^2$

D. None of these

Answer: B

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35. A soild cylinder of mass 2 kg and radius 0.2 m is rotating about its owm axis without friction with an angular velocity of 3 rad s^{-1}. Angular momentum of the cylinder is

A. 0.2 J s

B. 1.12 J s

C. 0.12 J s

D. 12 J s

Answer: C

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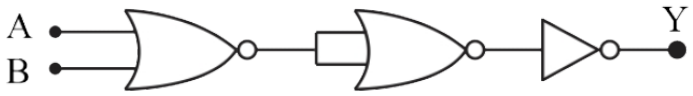
36. The given electrical network is equivalent to :



A. OR gate

B. NOR gate

C. NOT gate

D. AND gate

Answer: B

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37. In a reverse biased diode, when the applied voltage changes by $1V$, the current is found to change by $0.5\mu A$. The reversebiase resistance of the diode is

A. $2 \times 10^5 \Omega$

B. $2 \times 10^6 \Omega$

C. 200Ω

D. 2Ω

Answer: B

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38. A gas mixture consists of 2 moles of oxygen and 4 moles of argon at temperature T. Neglecting all vibrational modes , the total internal energy of the system is

A. 4 RT

B. 15 RT

C. 9 RT

D. 11 RT

Answer: D

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39. If the speed of light c, acceleration due to gravity (g) and pressure (p) are taken as the

fundamental quantities then the dimension of gravitational constant is

A. $c^2 g^0 p^{-2}$

B. $c^0 g^2 p^{-1}$

C. $c g^3 p^{-2}$

D. $c^{-1} g^0 p^{-1}$

Answer: B

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40. Light of wavelength 600 nm is incident normally on a slit of width 0.2 mm. The angular width of central maxima in the diffraction pattern is

A. $6 \times 10^{-3} rad$

B. $4 \times 10^{-3} rad$

C. $2.4 \times 10^{-3} rad$

D. $4.5 \times 10^{-3} rad$

Answer: A

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41. Two coherent beams of wavelength 5000Å reaching point would individually produce in intensities 1.44 and 4.00 units . If they reach there together, the intensity is 10.24 units . Calculate the lowest phase difference with which the beams reach that point.

A. zero

B. $\frac{\pi}{4}$

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

D. π

Answer: A

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42. In a resonance tube, using a tuning fork of frequency $325Hz$, the first two resonance lengths are observed at $25.4cm$ and $77.4cm$. The speed of sound in air is

A. $338ms^{-1}$

B. $328ms^{-1}$

C. $330ms^{-1}$

D. $320ms^{-1}$

Answer: A

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43. A sinusoidal wave with amplitude y_m is travellling with speed V on a stgring with linear density ρ. The angular frequency of the

wave is ω. The following conclusions are down. Mark the one which is correct.

A. Doubling the frequency doubles the rate at which energy is carried along the string.

B. If the amplitude were doubled, the rate at which energy is carried would be halved

C. If the amplitude were doubled, the rate at which energy is carried would be

doubled

D. The rate at which energy is carried is directly proportional to the velocity of the wave

Answer: D

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44. Displacement x (in meters) , of a body of mass 1 kg as a function of time t, on a horizontal smooth surface , is given as

$x = 2t^2$ Then work done in the first one second by the external force is

A. 2 J

B. 4 J

C. 8 J

D. 16 J

Answer: C

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45. A spring, which is initially in its unstretched condition, is first stretched by a length x and then again by a further length x. The work done in the first case is W_1 and in the second case is W_2.

A. $W_1 = 4W$

B. $W_1 = 3W$

C. $W_1 = W$

D. $W_1 = 2W$

Answer: B

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