PHYSICS

BOOKS - NTA MOCK TESTS

NEET MOCK TEST 4

Physics

1. If a ball is thrown vertically upwards with speed u, the distance covered during the last t second of its ascent is

A. ut

B. $\frac{1}{2}gt^2$

C. $ut - \frac{1}{2}gt^2$

D. $ut - \frac{1}{2}gt^2$

Answer: B

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2. An ideal gas at $27^\circ C$ is compressed adiabatically to $8/27$ of its original volume. If $\gamma = 5/3$, then the rise in temperature is

A. 450 K

B. 375 K

C. 675 K

D. 405 K

Answer: B

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3. An earthen pitcher loses 1 g of water per minute due to evaporation. If the water equivalent of pitcher is 0.5 kg and the pitcher contains 9.5 kg of water, calculate the time required for the water in the pitcher to cool to $28^{\circ}C$ from its original temperature of $30^{\circ}C$ Neglect radiation effect. Latent heat of vapourization of water in this range of temperature is 580 cal/g and specific heat of water is $1kcal/gC^{\circ}$

A. 30.5 min

B. 41.2 min

C. 38.6 min

D. 34.5 min

Answer: D

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4. The displacement x of a particle varies with time t as $x = ae^{-\alpha t} + be^{\beta t}$. Where a, b, α and β positive constant.

The velocity of the particle will.

A. be independent of β

B. drop to zero, when $\alpha = \beta$

C. decrease with time

D. increase with time

Answer: D

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5. A cylindrical capacitor has charge Q and length L. If both the charge and length of the capacitor are doubled by keeping other parameters fixed, the energy stored in the capacitor

A. remains same

B. increases two times

C. decreases two times

D. increases four times

Answer: B

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6. The reflectance and emittance of a perfectly black body are respectively

A. 0,1

B. 1,0

C. 0.5, 0.5

D. 0,0

Answer: A

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7. If a diamagnetic substance is brought near north or south pole of a bar magnet, it is

A. attracted by both poles

B. repelled by both poles

C. repelled by north poles but attracted towards south pole

D. attracted by north pole but repelled by south pole

Answer: B

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8. A ball is projected from the bottom of an inclined plane of inclination 30°, with a velocity of $30ms^{-1}$, at an angle of 30° with the inclined plane. If $g = 10ms^{-2}$, then the range of the ball on given inclined plane is

A. 12 m

B. 60 m

C. 120 m

D. 600 m

Answer: B

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9. The ratio of the radii of the planets P_1 and P_2 is K. the ratio of the acceleration due to gravity is r. the ratio of the escape

velocities from them will be

A. $\sqrt{K_1 K_2}$

B. $\sqrt{2K_1 K_2}$

C. $\sqrt{\frac{K_1}{K_2}}$

D. $\sqrt{\frac{K_2}{K_1}}$

Answer: A

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10. If a body is rolling on a surface without slipping such that its kinetic energy of translation is equal to kinetic energy of rotation then it is a

A. disc

B. sphere

C. ring

D. cylinder

Answer: C

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11. Path difference between two wavefronts emitted from coherent sources is $2.1\mu m$. Phase difference between the wavefronts at that point is 7.692 $\pi$the wavelength of light emitted by source will be

A. 5385 Å

B. 5600 Å

C. 5460Å

D. 5892 Å

Answer: C

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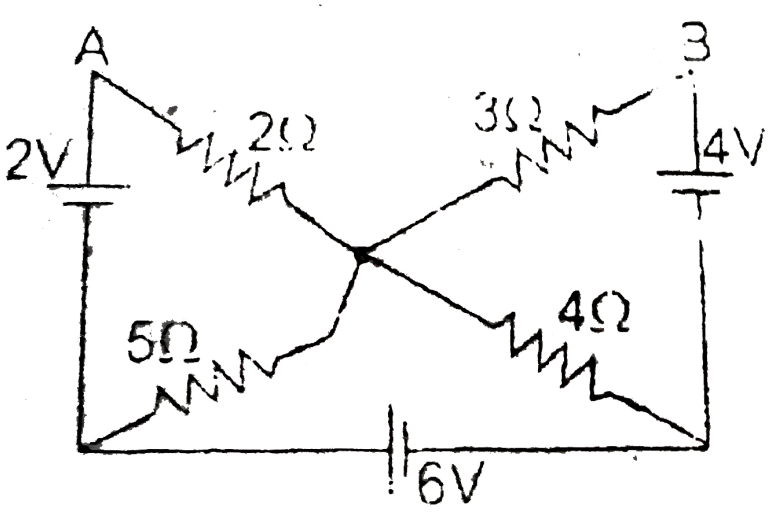
12. Potential difference between points A and B (i.e. $V_A - V_B$) is ----

-



A. 2 V

B. 4V

C. 6V

D. 8V

Answer: B

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13. given that $\vec{A} + \vec{B} + \vec{C} = 0$ out of three vectors two are equal in magnitude and the magnitude of third vector is $\sqrt{2}$ times that of either of the two having equal magnitude. Then the angles between vectors are given by

A. $45^\circ, 45^\circ, 90^\circ$

B. $90^\circ, 135^\circ, 135^\circ$

C. $30^\circ, 60^\circ, 90^\circ$

D. $45^\circ, 60^\circ, 90^\circ$

Answer: B

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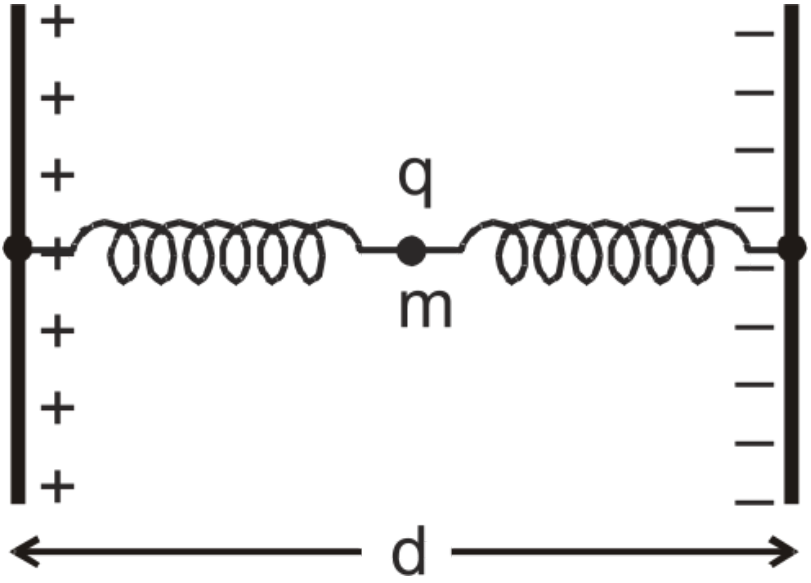
14. Two large non conducting plates having surface charge densities $+\sigma$ and $-\sigma$ respectively, are fixed d distnce apart. A small test charge q of mass m is attached to two non conducting springs each of spring constant k as shown in the figure. The sum of lengths of both springs in underformed state is d. The charge q is released from rest with both the springs nondeformed. then charge q will (neglect gravity)



A. perform SHM with angular frequecy $\sqrt{\frac{k}{m}}$

B. perform SHM with amplitude $\frac{\sigma q}{2k\varepsilon_0}$

C. not perform SHM but will have a periodic motion

D. remain stationary

Answer: B

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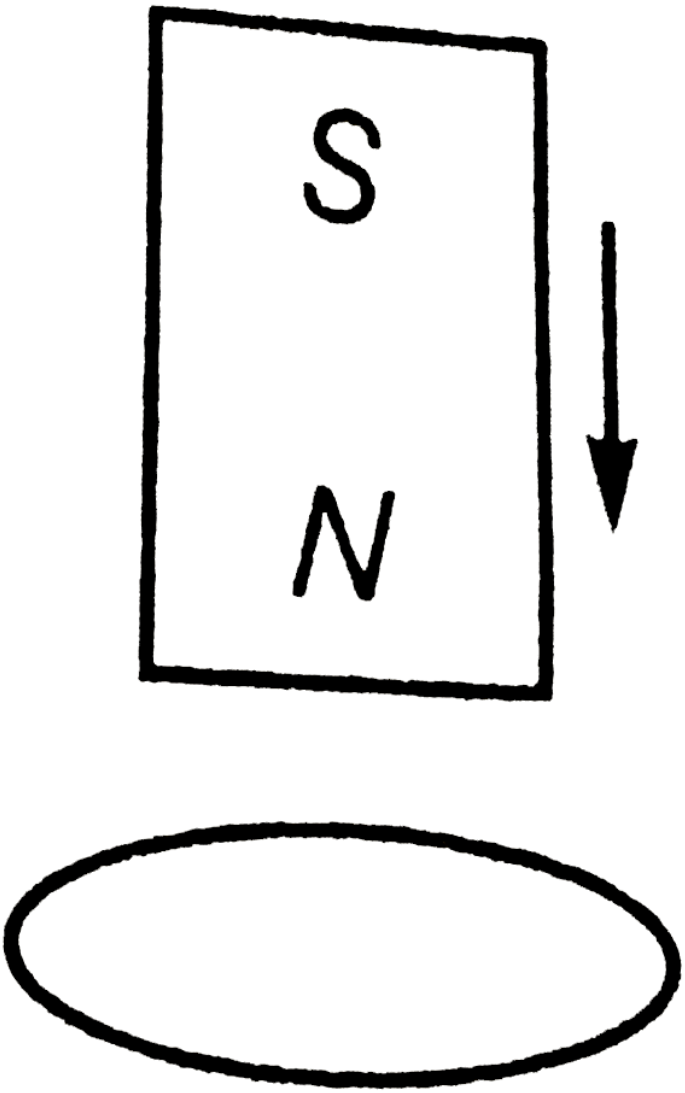
15. The North pole of a magnet is falling on a metallic ring as shown in the figure. The direction of induced current, if looked

from upside in the ring will be



A. anti-clockwise

B. clockwise

C. clockwise or anti-clockwise depending on radius of the ring

D. no induced current

Answer: A

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16. there are two force each having same magnitude 10 N .one is incilined at an angle of 30° and other at an angle of 135° to the positive direction of x-axis .The x and y componenents of the resultant are

A. $1.59N\hat{i}$ and $12.07N\hat{j}$

B. $10N\hat{i}$ and $10N\hat{j}$

C. $1.59N\hat{i}$ and $10N\hat{j}$

D. $1.59N\hat{i}$ and $2N\hat{j}$

Answer: A

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17. Argon gas is adiabatically compressed to half its volume. If P, V and T represent the pressure, volume and temperature of the gasous, respectively, at any stage, then the correct equation representing the process is

A. $TV^{2/5}$ = constant

B. $VP^{5/3}$ = constant

C. $TP^{-2/5}$ = constant

D. $PT^{2/5}$ = constant

Answer: C

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18. A circular coil of radius $20cm$ and 20 turns of wire is mounted vertically with its plane in magnetic meridian.A small magnetic needle (free to rotate about vertical axis) is placed at the center of the coil.It is deflected through 45° when a current is passed through the coil and in equilbrium (Horizontal component of earth's field is $0.34 \times 10^{-4}T$).The current in coil is:

A. $\frac{17}{10\pi}A$

B. $6A$

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

D. $\frac{3}{50}A$

Answer: A

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19. One litre of oxygen at a pressure of 1 atm and two litres of nitrogen at a pressure of 0.5 atm are introduced into a vessel of volume 1 litre. If there is no change in temperature, the final pressure of the mixture of gas (in atm) is

A. 1.5

B. 1

C. 2

D. 4

Answer: C

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20. Why the coil of a dead beat galvanometer is wound on a metal frame?

A. reduce hysteresis

B. provide electromagnetic damping

C. increase the moment of inertia

D. increase the sensitivity

Answer: B

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21. According to Newton's law of cooling, the rate of cooling of a body is proportional to $(\Delta\theta)^n$, where $\Delta\theta$ is the difference of the temperature of the body and the surroundings, and n is equal to

A. two

B. three

C. four

D. one

Answer: D

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22. In the Young's double slit experiment, the intensities at two points P_1 and P_2 on the screen are respectively I_1 and I_2 If P_1 is located at the centre of a bright fringe and P_2 is located at a distance equal to a quarter of fringe width from P_1 then $\frac{I_1}{I_2}$ is

A. 2

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

C. 4

D. 16

Answer: A

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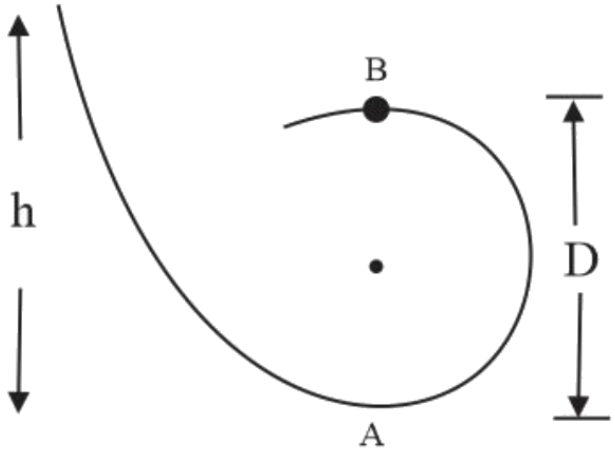
23. A body slides down on a frictionless track which ends in a circular loop of diameter D. The minimum height h in terms of D so that the body may just complete the circular loop, is



A. $h = \frac{5}{2}D$

B. $h = \frac{3}{2}D$

C. $h = \frac{5}{4}D$

D. $h = 2D$

Answer: C

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24. Let N_β be the number of β particles emitted by 1 gram of Na^{24} radioactive nuclei (half life $= 15$ hrs) in 7.5 hours, N_β is close to (Avogadro number $= 6.023 \times 10^{23} / \text{g. mole}$) :-

A. 1.75×10^{22}

B. 6.2×10^{21}

C. 7.5×10^{21}

D. 1.25×10^{22}

Answer: C

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25. The binding energy of deuteron is 2.2 MeV and that of $._2^4He$ is 28 MeV. If two deuterons are fused to form one $._2^4He$, then the energy released is

A. 30.2 MeV

B. 25.8 MeV

C. 23.6 MeV

D. 19.2 MeV

Answer: C

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26. A long copper tube of inner radius R carriers a current i. The magnetic field B inside the tube is

A. $\left(\frac{\mu_0 i}{\pi R^2}\right) \cdot r$

B. $\left(\frac{2\mu_0 i}{\pi R^2}\right) \cdot r$

C. $\left(\frac{\mu_0 i}{2\pi R^2}\right) \cdot r$

D. $\left(\frac{\mu_0 i}{2\pi R}\right) \cdot r$

Answer: C

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27. Water rises up to a height h in a capillary tube of certain diameter. This capillary tube is replaced by a similar tube of half the diameter. Now the water will rise to the height of

A. 4 h

B. 3 h

C. 2 h

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

Answer: C

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28. The tolerance level of a resistor with the colour code red, blue, orange, gold is

A. $\pm 5\ \%$

B. $\pm 10\ \%$

C. $\pm 20\ \%$

D. $\pm 40\ \%$

Answer: A

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29. An athlletic coach told his team that muscle times speed equals power. What dimesions does he view for muscle?

A. MLT^{-2}

B. ML^2T^{-2}

C. MLT^{-2}

D. L

Answer: A

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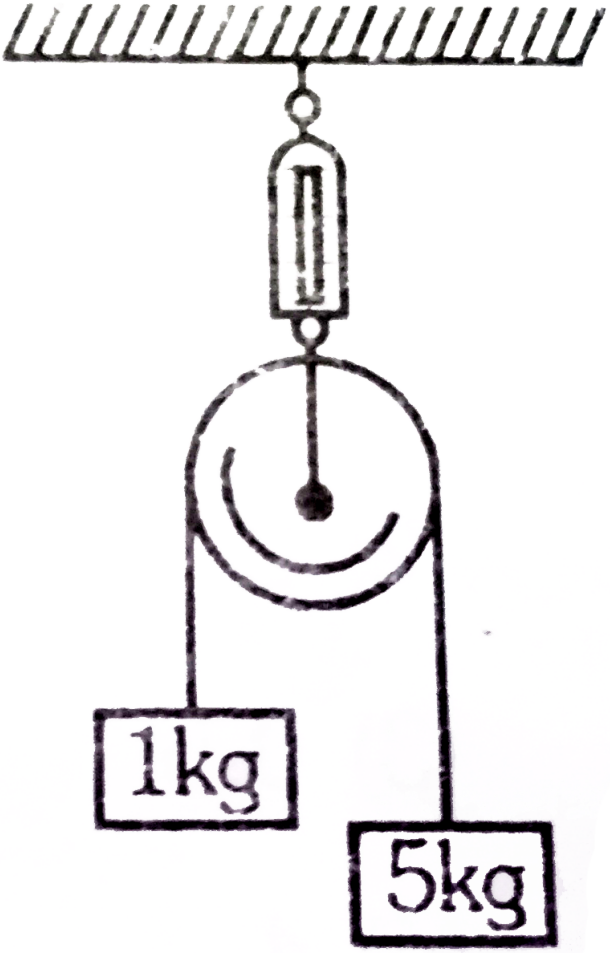
30. Two masses of 1 kg and 5 kg are attached to the ends of a massless string passing over a pulley of negligible weight. The pulley itselt is attached to a light spring balance as shown in figure. The masses start moving during this interval, the readcing of spring balance will be-



A. 6 kg

B. Less than 6 kg

C. More than 6 kg

D. May be more or less than 6 kg

Answer: B

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31. Assuming that potential energy of spring is zero when it is stretched by $\frac{x_0}{2}$, its potential energy when it is compressed by x_0 is

A. $\frac{3}{8}kx_0^2$

B. $-\frac{3}{4}kx_0^2$

C. $-\frac{3}{8}kx_0^2$

D. $\frac{1}{8}kx_0^2$

Answer: C

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32. The engine of a car produces acceleration $4m/s^2$ in the car. If this car pulls another car of same mass, what will be the acceleration produced

A. $6ms^{-2}$

B. $12ms^{-2}$

C. $3ms^{-2}$

D. $1.5ms^{-2}$

Answer: C

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33. A body of mass $m = 10^{-2}kg$ is moving in a medium and experiences a frictional force $F = -kv^2$. Its initial speed is $v_0 = 10ms^{-2}$. If , after $10s$, its energy is $\frac{1}{8}mv_0^2$, the value of k will be

A. $10^{-1}kgm^{-1}s^{-1}$

B. $10^{-3}kgm^{-1}$

C. $10^{-3}kgs^{-1}$

D. $10^{-4}kgm^{-1}$

Answer: D

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34. An electron is accelerated under a potential difference of 64 V, the de-Brogile wavelength associated with electron is $[e = -1.6 \times 10^{-19} C, m_e = 9.1 \times 10^{-31} kg, h = 6.623 \times 10^{-34} Js]$

A. $1.53 Å$

B. $2.53 Å$

C. $3.35 Å$

D. $4.54 Å$

Answer: A

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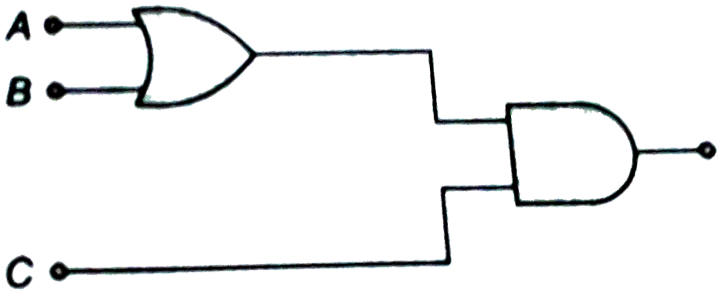
35. To get an output 1 from the circuit shown in the figure, the input must be



A. $A = 0, B = 1, C = 0$

B. $A = 1, B = 0, C = 0$

C. $A = 1, B = 0, C = 1$

D. $A = 1, B = 1, C = 0$

Answer: C

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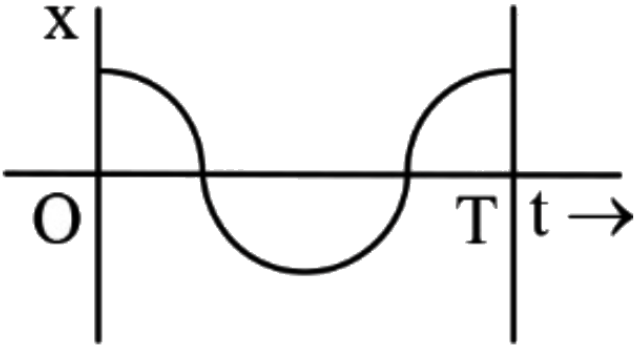
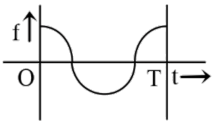
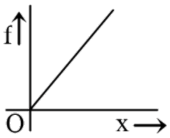
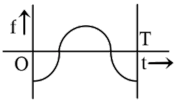
36. A body is performing simple harmonic motion of amplitude A and time period T. The figure shown position-time graph of the body . At any time t, acceleration of the body is f, then which of

the following graphs is/are appropriate?



A. 

B. 

C. 

D. 

Answer: C

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37. It is desired to make an achromatic combination of two lenses, $(L_1 \& L_2)$ made of materials having dispersive power ω_1 and $\omega_2 (< \omega_1)$. If the combination of lenses is converging then:

A. 25 cm and 50 cm

B. 50 cm and 25 cm

C. 50 cm and 100 cm

D. 100 cm and 50 cm

Answer: A

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38. Two factories are sounding their sirens at 800 Hz. A man goes from one factory to the other at a speed of 2 m/s. The velocity of

sound is 320 m/s. The number of beats heard by the person in 1 s will be

A. 10

B. 4

C. 2

D. 8

Answer: A

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39. Photons of energy $6eV$ are incident on a metal surface whose work function is $4eV$. The minimum kinetic energy of the emitted photo - electrons will be

A. zero

B. 1 eV

C. 2 eV

D. 10 eV

Answer: A

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40. In an electromagnetic wave, the amplitude of electric field is $1V/m$. The frequency of wave is $5 \times 10^{14} Hz$. The wave is propagating along z-axis. The average energy density of electric field, in joule/m^3,will be

A. $35.2 \times 10^{-12} J/m^3$

B. $35.2 \times 10^{-10} J/m^3$

C. $35.2 \times 10^{-11} J/m^3$

D. $35.2 \times 10^{-13} J/m^3$

Answer: A

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41. A ball is dropped from height 'H' onto a horizontal surface. If the coefficient of restitution is 'e' then the total time after which it comes to rest is

A. $\sqrt{\frac{2H}{g}}\left(\frac{1-e}{1+e}\right)$

B. $\sqrt{\frac{2H}{g}}\left(\frac{1+e}{1-e}\right)$

C. $\sqrt{\frac{2H}{g}}\left(\frac{1-e^2}{1+e^2}\right)$

D. $\sqrt{\frac{2H}{g}}\left(\frac{1+e^2}{1-e^2}\right)$

Answer: B

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42. The resistance of a straight conductor does not depend on its

A. length

B. temperature

C. material

D. shape of cross - section

Answer: D

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43. A projectile is thrown with velocity $u = 20m/s \pm 5\%$ at an angle 60°. If the projectile comes back on the ground at the same level then which of following cannot be a possible answer for

range.

Consider $g = 10m/s^2$

A. $34.6m$

B. $37.5m$

C. $32.0m$

D. $39.0m$

Answer: D

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44. A convex lens of focal length f_1 is kept in contact with a concave lens of focal length f_2. Find the focal length of the combination.

A. $\frac{f_1 f_2}{f_1 - f_2}$

B. $\frac{f_1 + f_2}{f_1 f_2}$

C. $\frac{f_1 - f_2}{f_1 f_2}$

D. $\frac{f_1 f_2}{f_1 + f_2}$

Answer: A

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45. Which of the following pair have same dimensional formula?

A. Angular momentum, Torque

B. Torque, Work

C. plank constant, Boltzmann constant

D. Gas constant, Pressure

Answer: B

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