



PHYSICS

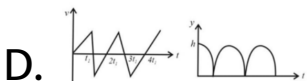
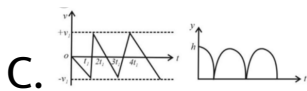
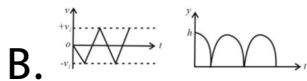
BOOKS - NTA MOCK TESTS

NTA NEET SET 35

Physics

1. Consider a rubber ball freely falling from a height $h = 4.9$ m on a horizontal elastic plate. Assume that the duration of collision is

negligible and the collision with the plate is totally elastic. Then the velocity as a function of time and the height as a function of time will be:



Answer: C



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2. A coin placed on a rotating table just slip when it is placed at a distance $4r$ from the centre, on doubling the angular velocity of the table, the coin will just slip now the coin is at a distance from centre is

A. $4r$

B. $2r$

C. r

D. $r/4$

Answer: C



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3. A square coil of side 25cm having 1000 turns is rotated with a uniform speed in a magnetic field about axis perpendicular to the direction of the field. At an instant t , the e.m.f. induced in the coil is $e = 200 \sin 100\pi t$. The magnetic induction is

A. 0.02 T

B. 10^{-3} T

C. 0.1 T

D. 0.01 T

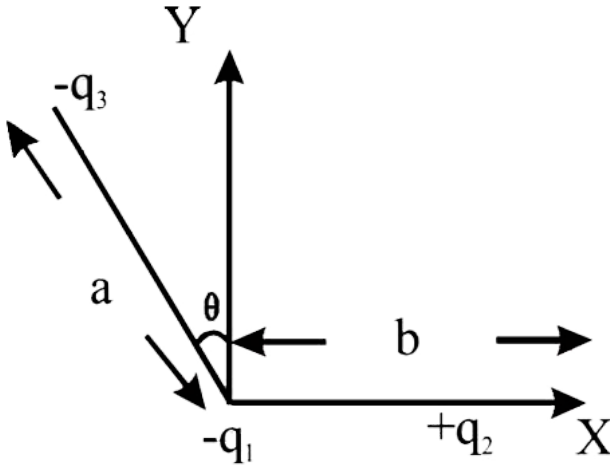
Answer: D



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4. Three charges $-q_1$, $+q_2$ and $-q_3$ are placed as shown in the figure. The x-component of

the force on $-q_1$ is proportional to



A. $\frac{q_2}{b^2} - \frac{q_3}{a^2} \sin \theta$

B. $\frac{q_2}{b^2} - \frac{q_3}{a^2} \cos \theta$

C. $\frac{q_2}{b^2} + \frac{q_3}{a^2} \sin \theta$

D. $\frac{q_2}{b^2} + \frac{q_3}{a^2} \cos \theta$

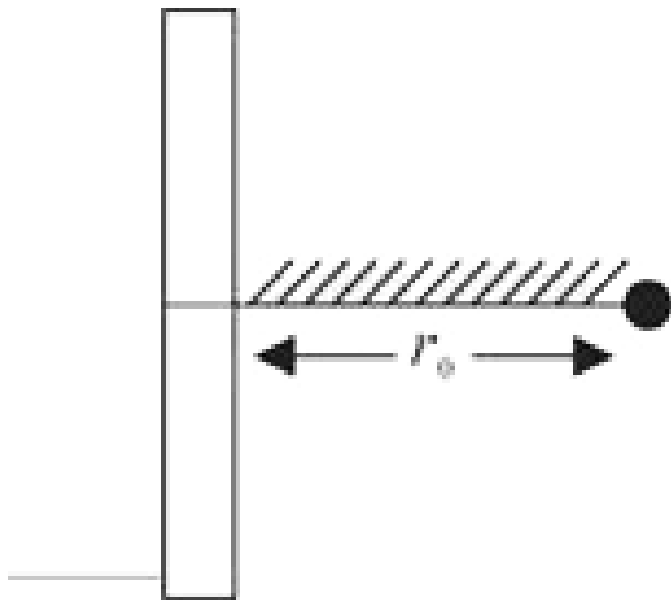
Answer: C



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5. A positive point charge is released from rest at a distance r_0 from a positive line charge with uniform density. The speed (v) of the point charge, as a function of instantaneous

distance r from line charge, is proportional to:



A. $v \propto \left(\frac{r}{r_0} \right)$

B. $v \propto \sqrt{\ln \left(\frac{r}{r_0} \right)}$

C. $v \propto \ln \left(\frac{r}{r_0} \right)$

D. $v \propto e^{+r/r_0}$

Answer: B



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6. A copper rod of length 75 cm and an iron rod of length 125cm are joined together end to end . Both are of circular cross section with diameter 2 cm . The free ends of the copper and iron are maintained at $100^{\circ}C$ and $0^{\circ}C$ respectively . The surface of the bars are insulated thermally . The temperature of the copper -iron junction is [Thermal conductivity

of the copper is $386.4W / m - K$ and that of iron is $48.46W / m - K$].

A. $100^{\circ} C$

B. $0^{\circ} C$

C. $93^{\circ} C$

D. $50^{\circ} C$

Answer: C



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7. n mole of He and $2n$ mole of O_2 is mixed in a container. Then $\left(\frac{C_p}{C_v}\right)_{mix}$ will be

A. $\frac{19}{13}$

B. $\frac{13}{19}$

C. $\frac{13}{6}$

D. $\frac{6}{13}$

Answer: A



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8. Four charged particles are projected perpendicularly into the magnetic field with equal velocity. Which will have minimum frequency of rotation?

A. Proton

B. Electron

C. Li^+

D. He^+

Answer: C



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9. A ball of mass 0.2 kg moves with a velocity of 20 m/sec and it stops in 0.1 sec , then the force on the ball is

A. 40 N

B. 20 N

C. 4 N

D. 2 N

Answer: A



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10. An open capillary tube is lowered in vessel with mercury. The difference between the levels of the mercury in the vessel and in the capillary tube $\Delta h = 4.6\text{mm}$. What is the radius of curvature of the mercury meniscus in the capillary tube? Surface tension of mercury is 0.46N/m , density of mercury is 13.6gm/cc .

A. $\frac{1}{340}m$

B. $\frac{1}{680}m$

C. $\frac{1}{1020}m$

D. information is insufficient

Answer: B



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11. The radii and Young's moduli of two uniform wires A and B are in the ratio 2:1 and 1:2 respectively. Both wires are subjected to the same longitudinal force. If the increase in length of the wire A is one percent, the percentage increase in length of the wire B is

A. 1.0

B. 1.5

C. 2.0

D. 3.0

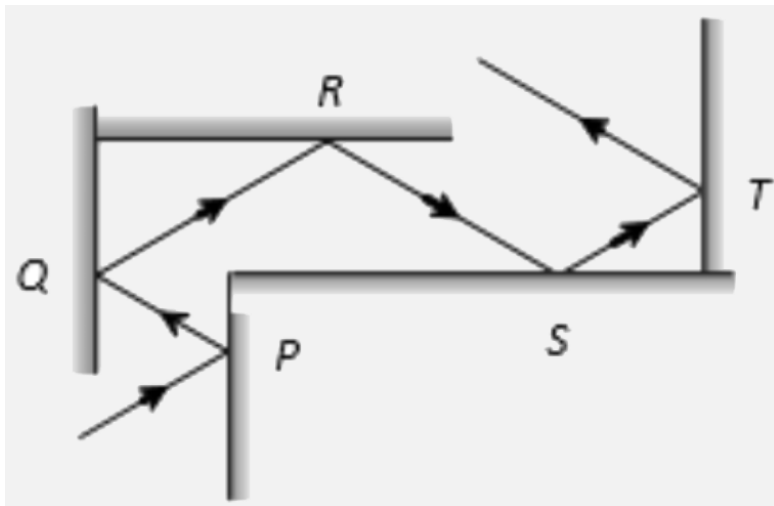
Answer: C



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12. The following figure shows the multiple reflections of a light ray along a glass corridor where the walls are either parallel or

perpendicular to one another . If the angle of incidence at point P is 30° , then the angles of reflection of the light ray at points Q,R,S and T respectively are



A. 30° , 30° , 30° , 30°

B. 30° , 60° , 30° , 60°

C. 30° , 60° , 60° , 30°

D. 60° , 60° , 60° , 60°

Answer: C



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13. There are two identical spherical balls of same material one being solid and the other being hollow. Then they can be distinguished by

A. By spinning them using equal torques

B. By determining their moment of inertia

C. By rolling them down an inclined plane

D. By any one of these methods

Answer: D



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14. A fluid having a thermal coefficient of volume expansion γ is filled in a cylindrical vessel up to a height h_0 . The coefficient of linear thermal expansion of the material of the

vessel is α . If the fluid is heated with the vessel , then find the level of liquid when temperature increases by $\Delta\theta$.

A. $\frac{h_0(1 + \gamma\Delta\theta)}{(1 + 2\alpha\Delta\theta)}$

B. $\frac{h_0(1 + \gamma\Delta\theta)}{(1 + 3\alpha\Delta\theta)}$

C. $\frac{h_0(1 + \gamma\Delta\theta)}{(1 + \alpha\Delta\theta)}$

D. $h_0(1 + \gamma\Delta\theta)$

Answer: A



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15. In a hall, a person receives direct sound waves from a source $120m$ away. He also receives waves from the same source which reach him after being reflected from the $25m$ high ceiling at a point halfway between them. The two waves interfere constructively for wavelengths (in metres)

A. $20, \frac{20}{3}, \frac{20}{3}, \text{ etc.}$

B. $10, 5, 2.5 \text{ etc}$

C. $10, 20, 30, \text{ etc}$

D. $15, 25, 35 \text{ etc}$

Answer: A



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16. A 20 cm long string, having a mass of 1.0 g, is fixed at both the ends. The tension in the string is 0.5 N. The string is set into vibrations using an external vibrator of frequency 100 Hz. Find the separation (in cm) between the successive nodes on the string.

A. 5

B. 3

C. 2

D. 1

Answer: A



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17. A particle moves in a straight line with retardation proportional to its displacement. Its loss in kinetic energy for any displacement x is proportional to

A. x^2

B. e^x

C. x

D. $\log e^x$

Answer: A



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18. In an electron gun, the electrons are accelerated by the potential V . If the e is the charge and m is the mass of the electron, then

the maximum velocity of these electrons will be

A. $\frac{2eV}{m}$

B. $\sqrt{\frac{2eV}{m}}$

C. $\sqrt{\frac{2m}{eV}}$

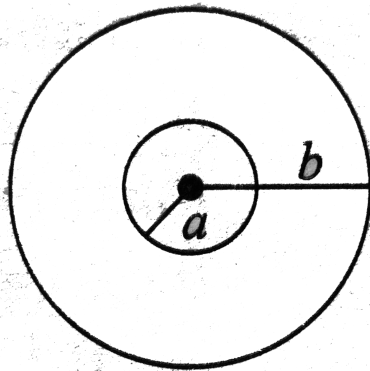
D. $\frac{V^2}{2em}$

Answer: B



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19. Two concentric and coplanar coils have radii a and b ($b > a$) as shows in Fig. Resistance of the inner coil is R . Current in the outer coil is increased from 0 to i , then the total charge circulating the inner coil is



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

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

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

D. $\left(\frac{\mu_0 i}{2b}\right) \frac{\pi a^2}{R}$

Answer: D



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20. In an circuit, V and I are given by

$V = 150 \sin(150t) V$ and

$I = 150 \sin\left(150t + \frac{\pi}{3}\right) A.$ The power

dissipated in the circuit is

A. zero

B. 5625 W

C. 150 W

D. 106 W

Answer: B



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21. The electric field in a certain region is acting radially outwards and is given by $E = Ar$. A charge contained in a sphere of

radius ' a ' centered at the origin of the field,
will given by

A. $4\pi \epsilon_0 Aa^2$

B. $A\pi \epsilon_0 a^2$

C. $4\pi \epsilon_0 Aa^3$

D. $\epsilon_0 Aa^3$

Answer: C



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22. An artificial satellite of mass 'm' is moving in a circular orbit around the earth. The height of the satellite above the surface of the earth is R. Suppose that it stops suddenly in its orbit and falls freely under gravity. With what speed it will strike the surface of the earth?

A. \sqrt{gR}

B. $2\sqrt{gR}$

C. $3\sqrt{gR}$

D. $5\sqrt{gR}$

Answer: A



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23. A solid cube and a solid sphere of the same material have equal surface area. Both are at the same temperature $120^{\circ} C$, then

A. both of them will cool down at the same rate

B. the cube will cool down slower than the sphere

C. the sphere will cool down slower than
the cube

D. the information is insufficient

Answer: C



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24. The angle of a prism is 60° and its refractive index is $\sqrt{2}$. The angle of minimum deviation suffered by a ray of light in passing through it is

A. About 20°

B. 30°

C. 60°

D. 45°

Answer: B



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25. A wheel rotating at an angular speed of 20 rad/s is brought to rest by a constant torque in 4.0 seconds. If the moment of inertia of the

wheel about the axis of rotation is $0.20 \text{ kg} - \text{m}^2$ find the work done by the torque in the first two seconds.

A. 10 J

B. 20 J

C. 30 J

D. 40 J

Answer: C



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26. A mixture of two gases is contained in a vessel. The Gas 1 is monoatomic and gas 2 is diatomic and the ratio of root mean square speeds of the molecules of two gases is

A. 2

B. 4

C. 8

D. 16

Answer: A



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27. Yellow light emitted by sodium lamp in Young's double slit experiment is replaced by monochromatic blue light of the same intensity:

- A. fringe width will decrease
- B. fringe width will increase
- C. fringe width will remain unchanged
- D. fringe width will become less intense

Answer: A



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28. A train moves towards a stationary observer with speed $34m/s$. The train sounds a whistle and its frequency registered by the observer is f_1 . If the train's speed is reduced to $17m/s$, the frequency registered is f_2 . If the speed of sound of $340m/s$, then the ratio f_1 / f_2 is

A. $\frac{18}{19}$

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

C. 2

D. $\frac{19}{18}$

Answer: D



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29. The length of a stretched wire is 1 m and its fundamental frequency is 300 Hz. What is the speed of the transverse wave in the wire ?

A. 330ms^{-1}

B. 660ms^{-1}

C. 990ms^{-1}

D. 550ms^{-1}

Answer: B



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30. A shell in flight explodes into n equal fragments k of the fragments reach the ground earlier than the other fragments. The

acceleration of their centre of mass
subsequently will be

A. G

B. $(n - k)g$

C. $\frac{(n - k)g}{k}$

D. $\frac{(n - k)g}{k}g$

Answer: D



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31. In a circular motion of a particle , the tangential acceleration of the particle is given by $a_t = 9ms^{-2}$. The radius of the circle is 4m . The particle was initially at rest. Time after which total acceleration of the particle makes an angle of 45° with the radial acceleration is

A. $\frac{1}{3}s$

B. $\frac{2}{3}s$

C. $\frac{5}{3}s$

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

Answer: B



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32. The area enclosed by a hysteresis loop is a measure of

- A. Retentivity
- B. Susceptibility
- C. Permeability

D. Heat energy lost per unit volume in the sample

Answer: D



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33. A 6 V battery is connected to the terminals of a 3 m long wire of uniform thickness and resistance of 100Ω . The difference of potential between two points on the wire separated by a distance of 50 cm will be

A. 1.5 V

B. 3.0 V

C. 1.0 V

D. 2.0 V

Answer: C



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34. the least count of the main scale of a screw gauge is 1 m. the minimum number of

divisions on its circular scale required to measure $5\mu\text{m}$ diameter of a wire is :

A. 500

B. 100

C. 50

D. 200

Answer: D



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35. A particle is projected in the $X - Y$ plane. 2 sec after projection the velocity of the particle makes an angle 45° with the $X -$ axis. 4 sec after projection, it moves horizontally. Find the velocity of projection (use $g = 10ms^{-2}$).

A. $20\sqrt{5}ms^{-1}$

B. $10\sqrt{5}ms^{-1}$

C. $5\sqrt{5}ms^{-1}$

D. $2\sqrt{5}ms^{-1}$

Answer: A



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36. ${}_{90}\text{Th}^{232} \rightarrow {}_{82}\text{Pb}^{208}$. The number of α and β – particles emitted during the above reaction is

A. 6,4

B. 3 ,3

C. 4, 6

D. 6, 6

Answer: A



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37. The half-life of ${}^{215}\text{At}$ is $100\mu\text{s}$. The time taken for the radioactivity of a sample of ${}^{215}\text{At}$ to decay to $1/16^{\text{th}}$ of its initial value is

A. $400\mu\text{s}$

B. $6.3\mu\text{s}$

C. $40\mu\text{s}$

D. $300\mu\text{s}$

Answer: A



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38. Water rises to a height of 2cm in a capillary tube. If the tube is tilted 60° from the vertical, water will rise in the tube to a length of

A. 4 cm

B. 2 cm

C. 1 cm

D. 8 cm

Answer: A



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39. If the error in the measurement of momentum is 20 % , then the error in the calculation of kinetic energy is (assume the error in measurement of m as zero)

A. 20 %

B. 44 %

C. 40 %

D. 200 %

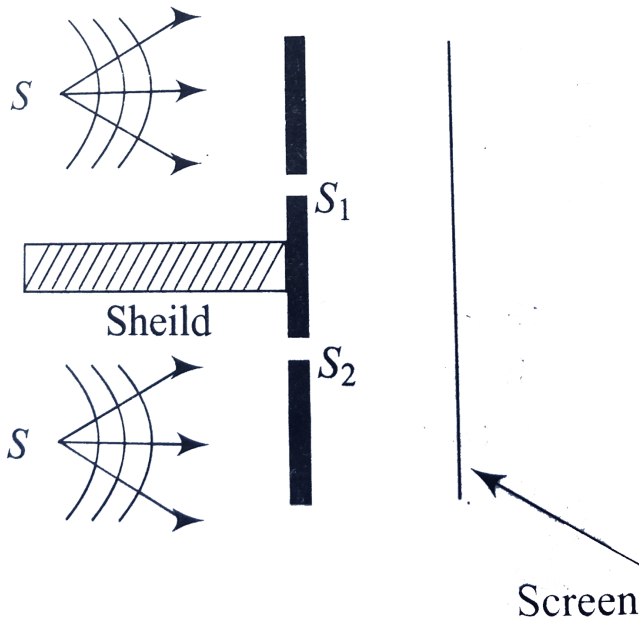
Answer: C



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40. What happens to the interference pattern if the two slits in Young's experiment are illuminated by two independent sources such as two sodium lamps S and S' as shown in

figure



- A. The intensity of the bright fringes is doubled
- B. The intensity of the bright fringes becomes four times

C. Two sets of interference fringes overlap

D. No interference pattern is observed

Answer: D



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41. A block of mass m is placed over rough inclined plane having inclination 30° . The coefficient of friction between the block and inclined plane is 0.75. The contact force on the block is $\frac{x}{4}mg$. Find the value of x

A. $\frac{3}{4}mg$

B. 2 mg

C. $\frac{5}{4}mg$

D. mg

Answer: D



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42. In photoelectric effect , photocurrent

A. increases with increase of frequency of
incident photon

B. decreases with increase of frequency of
incident photon

C. does not depend on the frequency of
photon but depends only on intensity of
incident light

D. depends both on intensity and
frequency of incident beam

Answer: C



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43. A vessel of depth $2h$ is half filled with a liquid of refractive index $2\sqrt{2}$ and the upper half with another liquid of refractive index $\sqrt{2}$. The liquids are immiscible. The apparent depth of the inner surface of the bottom of vessel will be:

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

B. $\frac{1}{2(\sqrt{2} + 1)}$

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

D. $\frac{3\sqrt{2}h}{4}$

Answer: D



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44. An open organ pipe is closed suddenly with the result that the second overtone of the closed pipe is found to be higher in frequency by 100 than the first overtone of the original pipe. Then, the

fundamental

frequency of the open pipe is

A. $200s^{-1}$

B. $100s^{-1}$

C. $250s^{-1}$

D. $150s^{-1}$

Answer: A



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45. The correct measure of magnetic hardness of a material is

A. remanant magnetism

B. hysteresis loss

C. coercivity

D. curie temperature

Answer: C



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