PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET TEST 81

Physics

1. If elements with principal quantum number $n > 4$ were not allowed in nature, the number of possible elements would be:

A. 60

B. 32

C. 4

D. 64

Answer: A

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2. If $13.6eV$ energy is required to ionized the hydrogen atom then the energy required to ionize the hydrogen atom , then the energy required to remove an electron from $n = 2$ is

A. 10.2 eV

B. 0 eV

C. 3.4 eV

D. 6.8 eV

Answer: C

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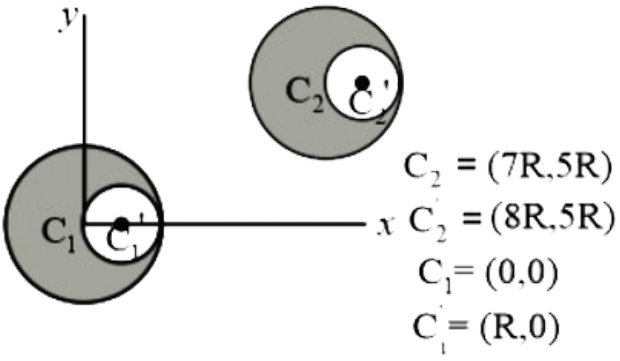
3. A system of two identical, uniform discs with identical circular cavities, is shown in the figure. Different relevant coordinates are given in the figure. The coordinates of the centre of mass of the system

are



A. $\left(\frac{3R}{2}, \frac{5R}{4}\right)$

B. $\left(\frac{19R}{2}, \frac{5R}{4}\right)$

C. $\left(\frac{R}{2}, \frac{R}{4}\right)$

D. $\left(\frac{20R}{6}, \frac{5R}{2}\right)$

Answer: B

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4. A ball strickes a horizontal floor at an angle $\theta = 45^\circ$ with the normal to floor. The coefficient of restitution between the ball and the floor is $e = 1/2$. The fraction of its kinetic energy lost in the collision is.

A. $\frac{5}{8}$

B. $\frac{3}{8}$

C. $\frac{3}{4}$

D. $\frac{1}{4}$

Answer: B

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5. A circular tube of radius R and across- sectional radius $r(r << R)$ is filled completely with iron balls of th radius ρ. Iron balls just fitting into the tube . The tension in the tube when it is rotated about its axis perpendicular to its plane with angular velocity ω

A. $\frac{4}{3}\pi\rho\omega^2 r^3 R$

B. $\frac{4}{3}\pi\rho\omega^2 r^2 R^2$

C. $\frac{2}{3}\pi\rho\omega^2 r^3 R$

D. $\frac{2}{3}\pi\rho\omega^2 r^2 R^2$

Answer: D

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6. Position vectors of a particle moving in xy plane at time t is $\vec{r} = a(1 - \cos \omega t)\hat{i} + a \sin \omega t \hat{j}$. The path of the particle is

A. a circle of radius a and centre at (a,0)

B. a circle of radius a and centre at (0,0)

C. an ellipse

D. neither a circle nor an ellipse

Answer: A

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7. The density of copper is $9 \times 10^3 kgm^{-3}$ and its atomic mass is 63.5 u. Each copper atom provides one free electron. Estimate the number of free electrons per cubic metre in copper.

A. 10^{19}

B. 10^{23}

C. 10^{25}

D. 10^{28}

Answer: D

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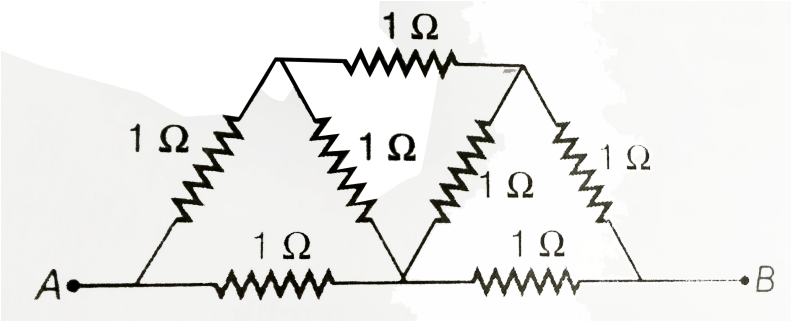
8. In the network shown in figure each resistance is 1Ω .

The effective resistance between A and B is



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

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

C. 7Ω

D. $\frac{8}{7}\Omega$

Answer: D

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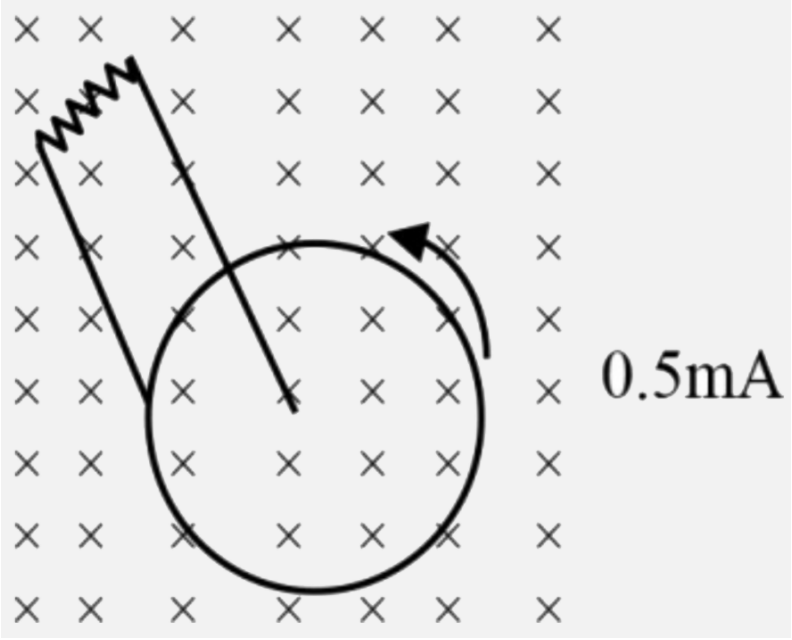
9. The following figure a conducting disc rotating about its axis in a perpendicular magnetic field B. The resistor of resistance R is connected between the centre and the rim. The current in the resistor is (The radius of the disc is 5.0 cn=m, angular speed $\omega = 10 rads^{-1}, B = 0.40T$ and $R = 10\Omega$)



A. 0.5 A

B. 0.2 A

C. 0.3 A

D. 0.9 A

Answer: A

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10. In a step up transformer, if ratio of turns of primary to secondary is $1:10$ and primary voltage si $230V$. If the load current is $2A$. Then the current in primary is

A. 20 A

B. $10A$

C. $2A$

D. $1A$

Answer: A

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11. Two concentric spherical conducting shells of radii R and $2R$ carry charges Q and $2Q$respectively.Change in electric potential on the outer shell when both are connected by a conducting wire is $\left(k = \frac{1}{4\pi\varepsilon_0}\right)$

A. zero

B. $\frac{3kQ}{2R}$

C. $\frac{kQ}{R}$

D. $\frac{2kQ}{R}$

Answer: A

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12. Sixty four identical sphere of change q and capacitance C each are combined to form a large sphere . The charge and capacitance of the large sphere is

A. 64 q, C

B. 16 q, 4 C

C. 64 q, 4 C

D. 16 q , 64 C

Answer: C

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13. A non -uniform rod of length l having mass density $\lambda(x) = \left(A + Bx^2\right)$ is placed - x - axis with its ends at , $(a, 0)$ and $(a + l, 0)$. The force it would exert on a point mass m kept at the origin is

A. $Gm\left[A\left(\frac{l}{a(a+2)}\right) + Bl\right]$

B. $Gm\left[A\left(\frac{l}{a(a-l)}\right) - Bl\right]$

C. $Gm\left[A\left(\frac{l}{a(a+l)}\right)+Bl\right]$

D. $Gm\left[A\left(\frac{l}{a(a+l)}\right)-Bl\right]$

Answer: C

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14. The weight of a body on the surface of the earth is 12.6 N. When it is raised to height half the radius of earth its weight will be

A. 2.8 N

B. 5.6 N

C. 12.5 N

D. 25.2 N

Answer: B

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15. Solar radiation emitted by sun resembles that emitted by a body at a temperature of $6000K$ Maximum intensity is emitted at a wavelength of about $4800A^{\circ}$ If the sun was cooled down from $6000K$ to $3000K$ then the peak intensity would occure at a wavelenght of .

A. $4800Å$

B. $9600Å$

C. 2400Å

D. 19200Å

Answer: B

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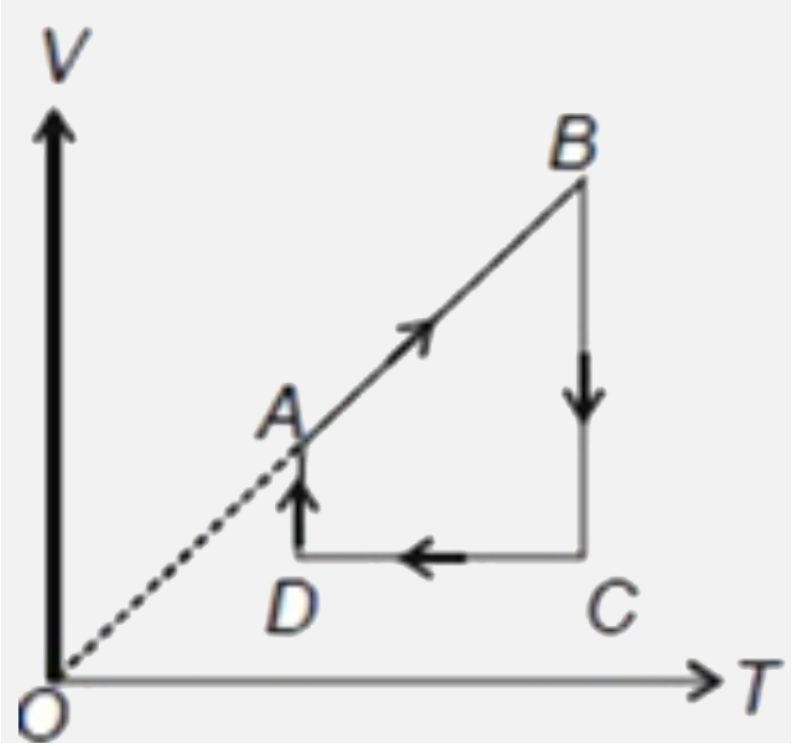
16. V - T graph for a given mass of an ideal gas is shown in the figure. Then the corresponding P - V graph would be



(BC and DA are vertical lines , CD is horizontal line)

A.

B.

C.

D.

Answer: A

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17. The gas inside a spherical bubble expands uniformly and slowly so that its radius increases from R to $2R$. Let the atmospheric pressure be p_0 and surface tension be S. The work done by the gas in the process is

A. $\frac{28\pi R^3 P_0}{3} + 24\pi s R^2$

B. $\frac{25\pi R^3 P_0}{3} + 24\pi s R^2$

C. $\frac{25\pi R^3 P_0}{3} + \frac{23\pi s R^2}{2}$

D. $23\pi R^2$

Answer: A

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18. The cyclotron frequency of an electron gyrating in a magnetic field of $1T$ is approximately:

A. 28 MHz

B. 280 MHz

C. 2.8 GHz

D. 28 GHz

Answer: D

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19. Two identical conducting wires AOB and COD are placed at right angles to each other. The wire AOB carries an electric current I_1 and COD carries a current I_2. The magnetic field on a point lying at a distance d from O, in a direction perpendicular to the plane of the wires AOB and COD, will be given by

A. $\frac{\mu_0}{2\pi}\left(\frac{I_1 I_2}{d}\right)^{\frac{1}{2}}$

B. $\frac{\mu_0}{2\pi d}\left(I_1^2 + I_2^2\right)^{\frac{1}{2}}$

C. $\frac{\mu_0}{2\pi d}\left(I_1 + I_2\right)$

D. $\frac{\mu_0}{2\pi d}\left(I_1^2 + I_2^2\right)$

Answer: B

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20. A "bar" magnet of moment $\vec{M} = \hat{i} + \hat{j}$ is placed in a magnetic field induction $\vec{B} = 3\hat{i} + 4\hat{j} + 4\hat{k}$.

The torque acting on the magnet is

A. $4\hat{i} - \hat{j} + \hat{k}$

B. $\hat{i} + \hat{k}$

C. $\hat{i} - \hat{j}$

D. $\hat{i} + \hat{j} + \hat{k}$

Answer: A

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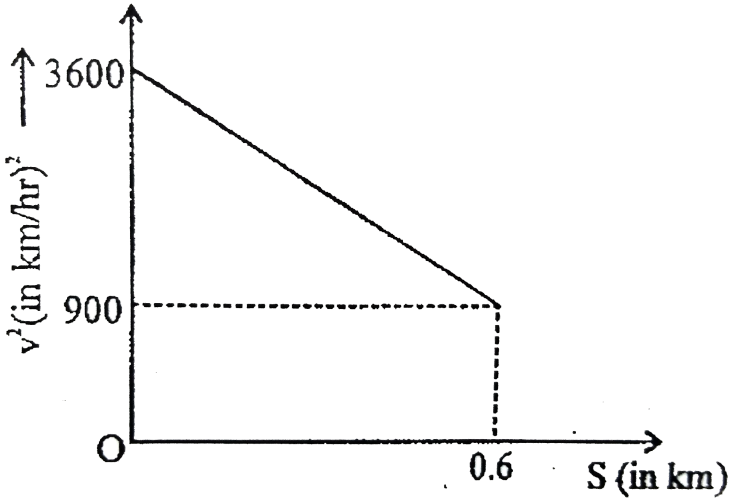
21. A graph between the square of the velocity of a particle and the distance 'S' moved by the particle is shown in the figure. The acceleration of the particle in kilometer per hour square is



A. 2250

B. 225

C. -2250

D. -225

Answer: C

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22. The kinetic energy of a projectile at the highest point is half of the initial kinetic energy. The angle of projection with the horizontal is

A. 30°

B. 45°

C. 60°

D. 90°

Answer: B

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23. A body starts from rest and moves with constant acceleration for t s. It travels a distance x_1 in first half of time and x_2 in next half of time, then

A. $x_2 = x_1$

B. $x_2 = 2x_1$

C. $x_2 = 3x_1$

D. $x_2 = 4x_1$

Answer: C

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24. Two particles of masses m and $M(M > m)$ are connected by a cord that passes over a massless, frictionless pulley. The tension T in the string and the acceleration a of the particles is

A. $\frac{\sqrt{2}Mmg}{M+m}$

B. $\frac{Mmg}{M+m}$

C. $\frac{2Mmg}{M+m}$

D. $\frac{\sqrt{3}Mmg}{M+m}$

Answer: A

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25. What is the disintegration constant of radon if the number of its atoms diminishes by 18% in 24 h? $[\text{Take ln } (0.82) \approx -0.2]$

A. $2.1 \times 10^{-3} s^{-1}$

B. $2.1 \times 10^{5} s^{-1}$

C. $22 \times 10^{6} s^{-1}$

D. $22 \times 10^{-6} s^{-1}$

Answer: D

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26. If a star can convert all the He nuclei completely into oxygen nuclei. The energy released per oxygen nuclei is (Mass of the helium nucleus is 4.0026 amu and mass of oxygen nucleus is 15.9994 amu)

A. 7.6 MeV

B. 56.12 MeV

C. 10.24 MeV

D. 23.4 MeV

Answer: C

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27. A point mass m is suspended at the end of a massless wire of length l and cross section A. If Y is the Young's modulus for the wire, obtain the frequency of oscillation for the simple harmonic motion along the vertical line.

A. $\frac{1}{2\pi}\sqrt{\frac{YA}{mL}}$

B. $2\pi\sqrt{\frac{mL}{YA}}$

C. $\frac{1}{\pi}\sqrt{\frac{YA}{mL}}$

D. $\pi\sqrt{\frac{mL}{YA}}$

Answer: A

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28. A hole is drilled along the diameter of the earth and pen is dropped into it. The time taken by it is reach other end of the earth is

A. 162.2 min

B. 84.6 min

C. 21.2 min

D. 42.3 min

Answer: D

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29. Ultraviolet light by wavelength 200 nm is incident on the polished surface of Fe(Iron). The work function of the surface is 4.71 eV. What will be its stopping potential ?

$\left(h = 6.626 \times 10^{-34} Js, 1eV = 1.6 \times 10^{-19} J, \right)$

A. 1.5 V

B. 2.5 V

C. 0.5 V

D. none of these

Answer: A

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30. The work function of a metal is in the range of 2 eV to 5 eV. Find which of the following wavelength of light cannot be used for photoelectric effect. (Consider, Planck's constant $= 4 \times 10^{-15}$ eV - s, velocity of light $= 3 \times 10^{8} ms^{-1}$)

A. 510 nm

B. 650 nm

C. 400 nm

D. 570 nm

Answer: B

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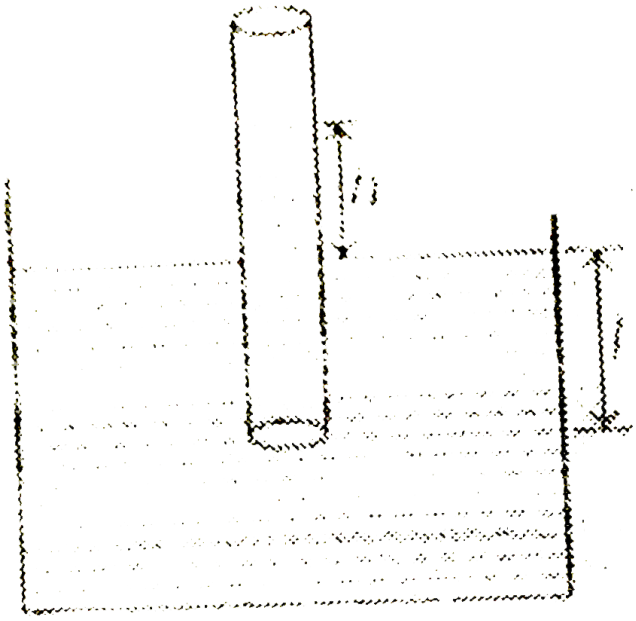
31. A capillary tube is dipped in water to a depth and the water rises to a height $h(<l)$ in the capillary tube. The lower end of the tube is closed in water by putting a lower over it. The tube is now taken out and the thumb is removed from the lower end and it kept open. The length of liquid column in the tube will be



A. l

B. $l + h$

C. h

D. 2h

Answer: D

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32. The bulk modulus of water is $2.0 \times 10^9 N/m^2$. The pressure required to increase the density of water by 0.1% is

A. $2 \times 10^9 Nm^{-2}$

B. $2 \times 10^8 Nm^{-2}$

C. $2 \times 10^6 Nm^{-2}$

D. $2 \times 10^4 Nm^{-2}$

Answer: C

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33. The distance between the object and its real image from the convex lens is 60 cm and the height of image is two times the height of object . The focal length of the lens is

A. $\frac{20}{3}$ cm

B. 20 cm

C. $\frac{40}{3}cm$

D. 40 cm

Answer: C

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34. A beam of light is travelling from region II to region III (see the figure) . The refractive index in the region I,II and III are n_0, $\frac{n_0}{\sqrt{2}}$, and $\frac{n_0}{2}$ respectively . The angle of incidence θ for which the beam just misses entering region III is

A. 30°

B. 45°

C. 60°

D. $\sin^{-1}\sqrt{2}$

Answer: A

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35. Two spheres of equal masses, one of which is a thin spheical shelll and the other a solid, have the same moment of inertia about their respective diameters. The ratio of their radii well be

A. $5:7$

B. $3:5$

C. $\sqrt{3}:\sqrt{5}$

D. $\sqrt{3}:\sqrt{7}$

Answer: C

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36. A uniform rod is held at an angle of 45° to the horizontal and released from rest as shown. The minimum coefficient of friction between plane and rod required so that the rod does not slip on the plane upon releases, will be

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

B. $\frac{2}{5}$

C. $\frac{3}{7}$

D. $\frac{4}{7}$

Answer: A

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37. The electrical conductivity of a semiconductor increases when electromagnetic radiation of wavelength shorter than $2480nm$ is incident on it. The band gap in (eV) for the semiconductor is.

A. 0.9

B. 0.7

C. 0.5

D. 0.1

Answer: C

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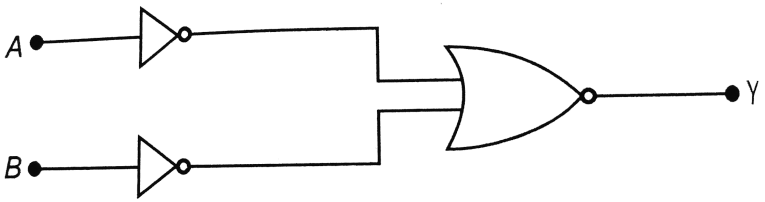
38. Which logic gate is represented by the following combination of logic gates ?



A. OR

B. NAND

C. AND

D. NOR

Answer: C

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39. A monoatomic gas $(\gamma = 5/3)$ is suddenly compressed to $(1/8)$ of its volume adiabatically then the pressure of the gas will change to

A. $\frac{24}{5}$

B. 8

C. $\frac{40}{3}$

D. 32

Answer: D

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40. If pressure P, velocity V and time T are taken as fundamental physical quantities, the dimensional formula of force if

A. PV^2T^2

B. $P^{-1}V^2T^{-2}$

C. PVT^2

D. $P^{-1}VT^2$

Answer: A

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41. The interference pattern is observed at P due to superimposition of two rays coming out from a source S as shown in the figure . The value of l for which maxima is obtained at P is (R is a perfect reflecting surface) : -

A. $l = \frac{(2n-1)\lambda}{2\sqrt{3}-1}$

B. $l = \frac{(2n-1)\lambda}{\sqrt{3}-1}$

C. $l = \frac{(2n-1)\lambda\sqrt{3}}{4\left(2-\sqrt{3}\right)}$

D. $l = \frac{2n\lambda}{\sqrt{3}-1}$

Answer: C

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42. In Young's double slit experiment, the intensity of light coming from the first slit is double the intensity from the second slit. The ratio of the maximum intensity to the minimum intensity on the interference fringe pattern observed is

A. 32

B. 36

C. 38

D. 42

Answer: D

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43. A cylindrical tube open at both the ends has a fundamental frequency of 390 Hz in air. If $\frac{1}{4}$ th of the tube is immesed vertically in water the fundamental frequency of air column is

A. 260 Hz

B. 130 Hz

C. 390 Hz

D. 520 Hz

Answer: A

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44. Find beat frequency if the motion of two particles is given by

$y_1 = 0.25 \sin(310t)$

$y_2 = 0.25 \sin(316t)$

A. 3

B. $\frac{3}{\pi}$

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

D. 6

Answer: B

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45. A block of mass m is kept on a platform Platform starts moving upwards with an acceleration of $\frac{g}{2}$. Find the work done by the normal force on the block in the first one second.

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

B. zero

C. $\frac{3mg^2}{8}$

D. $\frac{3mg^2}{4}$

Answer: C

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