PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 36

Physics

1. A nuclear reactor delivers a power of 10^9 W. What is the amount of fuel consumed by the reactor in one hour?

A. $6.610^{-5}g$

B. $0.96g$

C. $4 \times 10^{-2}g$

D. $0.8g$

Answer: C

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2. A photelectric material having work-function ϕ_0 is illuminated with light of wavelength

$\lambda\left(\lambda < \frac{hc}{\lambda_0}\right)$. The fastest photoelectron has a de Broglie wevelength λ_d. A change in wavelength of the incident light by $\Delta\lambda$ results in a change $\Delta\lambda_d$ in λ_d. Then the ratio $\Delta\lambda_d / \Delta\lambda$ is proportional to

A. $\frac{\lambda_d^3}{\lambda^2}$

B. $\frac{\lambda_d^3}{\lambda}$

C. $\frac{\lambda_d^2}{\lambda^2}$

D. $\frac{\lambda_d}{\lambda}$

Answer: A

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3. Resistance of a conductor increases with the rise of temperature, because

A. the collisions of the conducting electrons with the electrons increases

B. the collisions of the conducting electrons with the lattice consisting of the ions of the metal increase

C. the number of conduction electrons decrease

D. the number of conduction electrons increases

Answer: B

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4. A solid sphere of mass M and radius R has a spherical cavity of radius R/2 such that the centre of cavity is at a distance R/2 from the

centre of the sphere. A point mass m is placed inside the cavity at a distance R/4 from the centre of sphere. The gravitational force on mass m is

A. $\frac{11GMm}{R^2}$

B. $\frac{14Gmm}{R^2}$

C. $\frac{Gmm}{2R^2}$

D. $\frac{GMm}{R^2}$

Answer: C

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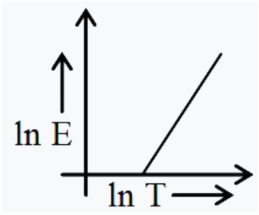
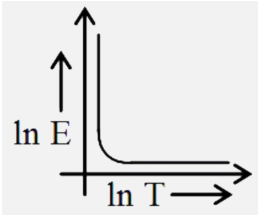
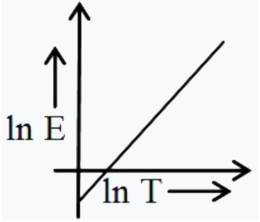
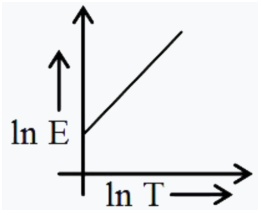
5. Which of the following graphs correctly represents the relation between In (E) and In (T), where E is the amount of radiation emitted per unit time from a unit area of the body and T is the absolute temperature ?

A. 

B. 

C. 

D. 

Answer: C

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6. What is de Broglie wavelength of a bullet of mass 0.040 kg travelling at a speed of 1.0 km/sec ?

A. $1.66 \times 10^{-34} m$

B. $1.66 \times 10^{-35} m$

C. $1.66 \times 10^{-32} m$

D. $1.66 \times 10^{-33} m$

Answer: B

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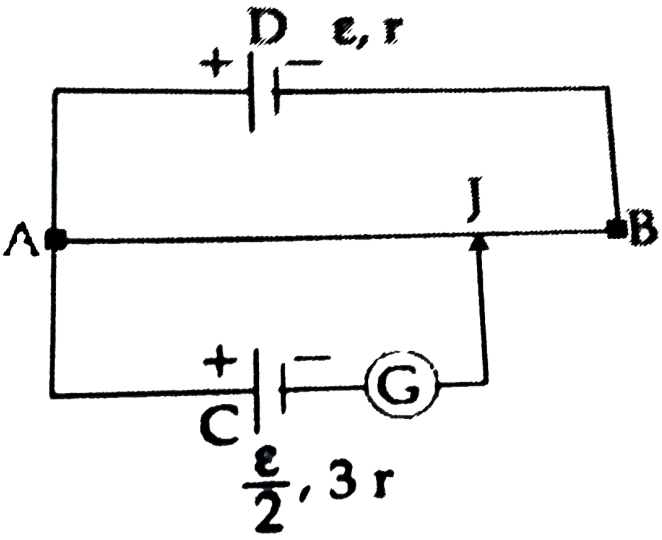
7. A potentiometer wire AB having length L and resistance 12 r is joined to a cell D of emf $\varepsilon/2$ and internal resistance 3r is connected.

The length AJ at which the galvanometer as shown in fig. Shows no deflection is :



A. $\frac{5}{12}L$

B. $\frac{11}{24}L$

C. $\frac{11}{12}L$

D. $\frac{13}{24}L$

Answer: D

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8. The molar specific heat of oxygen at constant pressure $C_P = 7.03 cal / mol.^\circ C$ and $R = 8.31 J / mol.^\circ C$. The amount of heat taken by 5 mol of oxygen when heated at constant volume from $10^\circ C$ to $20^\circ C$ will be approximately.

A. 25 cal

B. 50 cal

C. 253 cal

D. 500 cal

Answer: C

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9. A sample of radioactive material has mass m , decay constant λ, and molecular weight M. Avogadro constant $= N_A$. The initial activity of the sample is:

A. λm

B. $\frac{\lambda m}{M}$

C. $\frac{\lambda m N_A}{M}$

D. $mN_A e^{\lambda}$

Answer: C

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10. If the distance between the sun and the earth is increased by four times then the attraction between the two will

A. 4 times

B. 8 times

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

D. $\frac{1}{8}$ times

Answer: B

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11. Oxygen boils at $-183^{\circ}C$. This temperature is approximately

A. $-297.4^\circ F$

B. $-253.6^\circ F$

C. $-342.6^\circ F$

D. $-225.3^\circ F$

Answer: A

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12. In a potentiometer arrangement , a cell of EMF 2 V gives a balance point at 40 cm length of the wire . If this cell is replaced by another

cell and the balance point shifts to 60 cm , then the EMF of the second cell is

A. 1 V

B. 2 V

C. 3 V

D. 4 V

Answer: C

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13. A point on the periphery of a rotating disc has its acceleration vector making angle of 30° with the velocity . The ratio $(a_c/a_t(a_c$ is centripetal acceleration and a_1 is tangential acceleration) equals

A. $\sin 30^\circ$

B. $\cos 30^\circ$

C. $\tan 30^\circ$

D. none of these

Answer: C

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14. A tuning fork of frequency n is held near the open end of tube, the tube is adjusted until resonance occurs. If the two shortest lengths to produce resonance are L_1 and L_2, then the speed of the sound is

A. $n(L_2 - L_1)$

B. $\frac{n(L_2 - L_1)}{2}$

C. $4n(L_2 - L_1)$

D. $2n(L_2 - L_1)$

Answer: D

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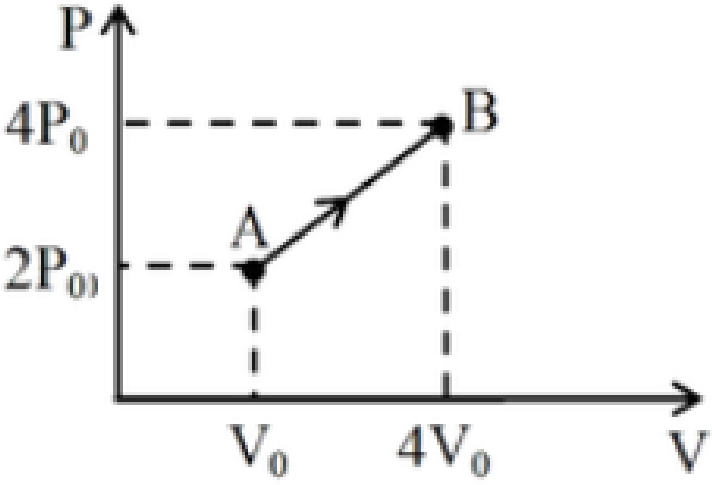
15. One mole of monatomic ideal gas undergoes the process $A \to B$, as in the given $P - V$ diagram . The specific heat for

this process is



A. $\frac{3R}{2}$

B. $\frac{15R}{7}$

C. $\frac{30R}{7}$

D. $\frac{20R}{7}$

Answer: B

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16. A hospital uses an ultrasonic scanner to locate tumours in a tissue.What is the wavelength of sound in the tissue in which the speed of sound is $1.7kms^{-1}$? The operating frequency of the scanner is 4.2 MHz.

A. $4.1 \times 10^{-4}m$

B. $1.1 \times 10^{-4}m$

C. $3.1 \times 10^{-4} m$

D. $4.1 \times 10^{-3} m$

Answer: A

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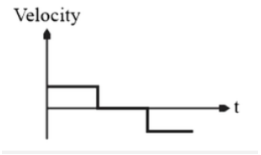
17. A boy is pushing a box on horizontal floor from a position of rest to rest , while moving along a straight line. Consider the three phases of motion. The floor is rough with a small friction coefficient .

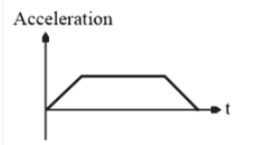
(i) Initially a constant hard push on the box to get it moving and attain a maximum velocity .

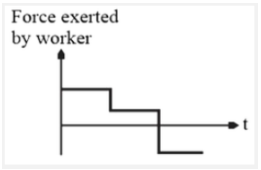
(ii) Mild push to keep the box moving with constant velocity

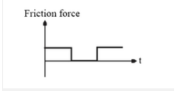
(iii) To pull back the box the to bring it to stop with the same retardation.

Which of the following graph is CORRECT ?

A. 

B. 

C. 

D. 

Answer: C

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18. The stream of a river is flowing with a speed of 2 km/h. A swimmer can swim at a speed of 4 km/h. What should be the direction of the swimmer with respect to the flow of the river to cross the river straight?

A. 150°

B. 90°

C. 120°

D. 60°

Answer: C

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19. A coil in the shape of an equilateral triangle of side l is suspended between the pole pieces of a permanent magnet such that $\vec{B}$ is in the plane of the coil. If due to a current i in the

triangle a torque τ acts on it, the side l of the triangle is

A. $2\left(\frac{\tau}{\sqrt{3}BI}\right)^{\frac{1}{2}}$

B. $\frac{2}{\sqrt{3}}\left(\frac{\tau}{BI}\right)$

C. $2\left(\frac{\tau}{BI}\right)^{\frac{1}{2}}$

D. $\frac{1}{\sqrt{3}}\frac{\tau}{BI}$

Answer: A

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20. A vessel contains a mixture of one mole of oxygen and two moles of nitrogen at 300K. The ratio of the average rotational kinetic energy per O_2 molecules to that per N_2 molecules is

A. $1:1$

B. $1:2$

C. $1:2$

D. depends on the moment of inertia of the two molecules

Answer: A

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21. Certain amount of an ideal gas is contained in a closed vessel. The vessel is moving with a constant velcity v. The molecular mass of gas is M. The rise in temperature of the gas when the vessel is suddenly stopped is $(\gamma C_P / C_V)$

A. $\frac{Mv^2(\gamma - 1)}{2R}$

B. $\frac{Mv^2(\gamma + 1)}{2R}$

C. $\frac{Mv^2}{2R\gamma}$

D. $\frac{Mv^2}{2R(\gamma+1)}$

Answer: A

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22. Average power in the L-C-R circuit depends upon

A. current

B. phase difference only

C. EMF

D. current, EMF and phase difference

Answer: D

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23. A bar magnet is dropped along the axis of copper ring held horizontally. The acceleration of fall is

A. equal to the acceleration due to gravity at that place

B. less than the acceleration due to gravity at that place

C. greater than the acceleration due to gravity at that place

D. twice the acceleration due to gravity at that place

Answer: B

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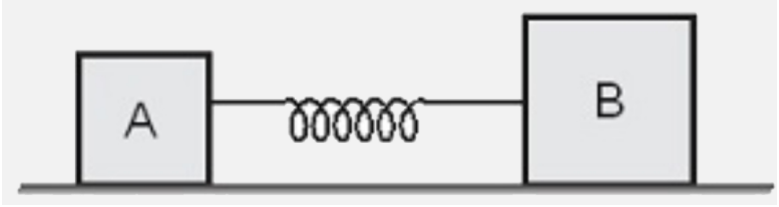
24. Two blocks A and B of masses m and 2m, respectively , are connected by a massless spring of force constant k and are placed on a smooth horizontal plane. The spring is stretched by an amount x and then released . The relative velocity of the blocks when the spring comes to its natural length is



A. $\left(\sqrt{\frac{3k}{2m}}\right)x$

B. $\left(\sqrt{\frac{2k}{3m}}\right)x$

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

D. $\sqrt{\frac{3km}{2x}}$

Answer: A

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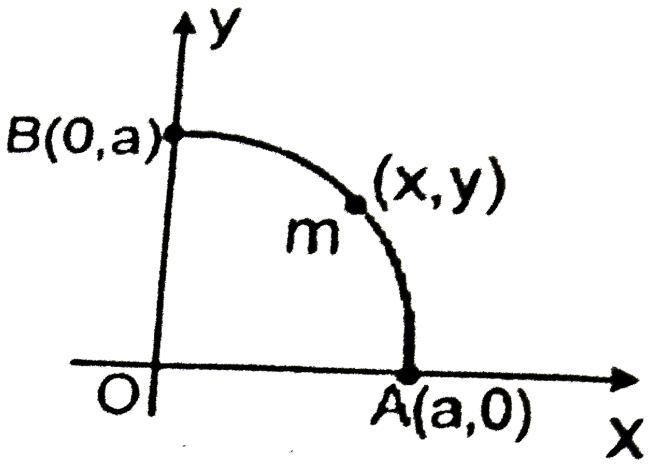
25. A particle of mass $'m'$ moves along the quarter section of the circular path whose centre is at the origin . The radius of the circular path is $'a'$. A force $\vec{F} = y\hat{i} - x\hat{j}$

newton acts on the particle, where x, y denote the coordinates of position of the particle. Calculate the work done by this force in taking, the particle from point, $A(a, 0)$ to point $B(0, a)$ along the circular path.



A. $-\sqrt{2}a^2 J$

B. $-\frac{\pi a^2}{4}J$

C. $-a^2J$

D. $-\frac{\pi a^2}{2}J$

Answer: D

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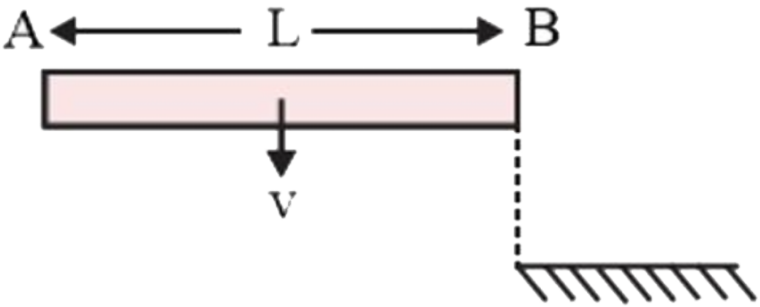
26. A rod AB of length L and mass M is free to move on a frictionless horizontal surface . It is moving with a velocity v , as shown in figure. End B of rod AB strikes the end of the wall.

Assuming elastic impact , the angular velocity of the rod AB , just after



A. $\frac{v}{2L}$

B. $\frac{3v}{L}$

C. $\frac{3v}{2L}$

D. $\frac{v}{L}$

Answer: B

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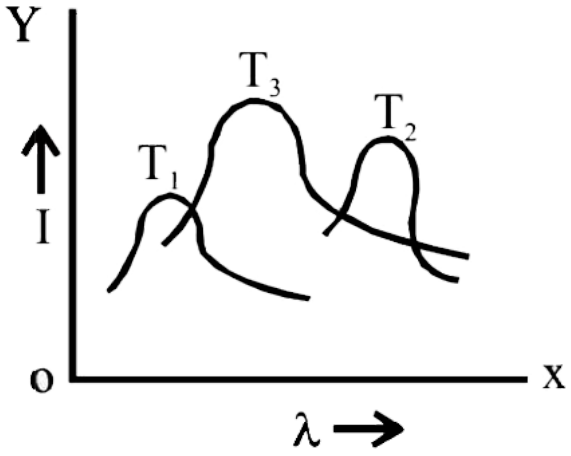
27. The plots of intensity versus wavelength for three black bodies at temperature T_1, T_2 and T_3 respectively are as shown. Their temperatures are such that



A. $T_1 > T_2 > T_3$

B. $T_1 > T_3 > T_2$

C. $T_2 > T_3 > T_1$

D. $T_3 > T_2 > T_1$

Answer: B

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28. Imagine that an electron revolves around a circle of the radius $5.3 \times 10^{-11} m$ with a linear speed of $7.5 \times 10^4 ms^{-1}$ in a hydrogen atom.

The magnetic field produced at the centre of the circle, due to the electron, is

A. $43Wbm^{-2}$

B. $4300Wbm^{-2}$

C. $0.43Wbm^{-2}$

D. $43 \times 10^{-4}Wbm^{-2}$

Answer: C

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29. The displacement of a particle from its mean position (in metre) is given by

$y = 0.2\sin(10\pi t + 1.5\pi)\cos(10\pi t + 1.5\pi)$

The motion of the particle is

A. periodic but not S.H.M

B. non - periodic

C. simple harmonic motion with a period 0.1 s

D. simple harmonic motion with a period 0.2 s

Answer: C

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30. The maximum kinetic energy of a photoelectron is 3 eV. What is its stopping potential ?

A. 3 V

B. 1 V

C. 6 V

D. 2 V

Answer: A

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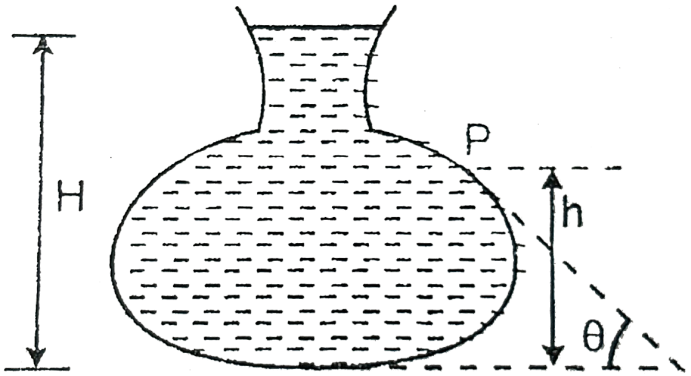
31. Figure here shows the vertical cross-section of a vessel filled with a liquid of density ρ. The normal thrust per unit area on the walls vessel at point. P, as shown, will be



A. $h\rho g$

B. $H\rho g$

C. $(H-h)\rho g$

D. $(H-h)\rho g\cos\theta$

Answer: C

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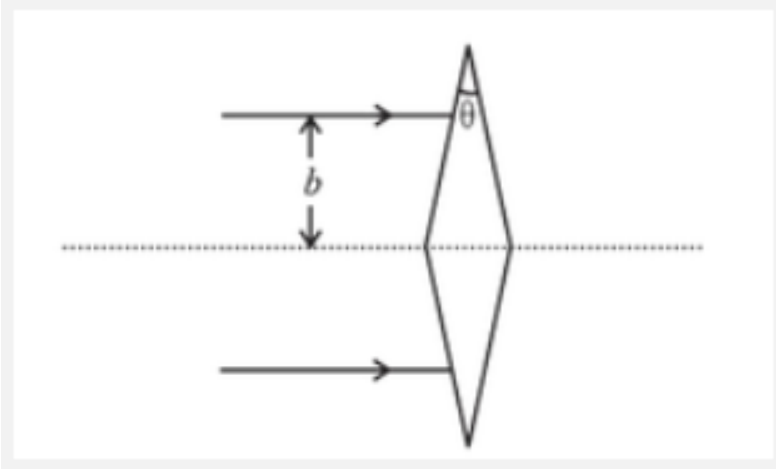
32. Two identical thin isosceles prims of refracting angle θ and refractive index μ are placed with their bases touching each other. A

parallel beam , of width 2b, is incident on this system , as shown. The distance of the point of convergence from the prism is



A. $\frac{b}{(\mu-1)\theta}$

B. $\frac{b}{2(\mu-1)\theta}$

C. $\frac{2b}{(\mu-1)\theta}$

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

Answer: A

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33. A uniform straight rod is placed in vertical position on a smooth horizontal surface and released. As the rod is in motion, the centre of mass moves

A. the centre of rod follows straight line path

B. the centre mass follows circular path

C. the instantaneous axis is passing through the contact point

D. all of above

Answer: A

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34. Zener diodes have higher dopant densities as compared to ordinary p - n junction diodes. This

A. decrease the width of depletion layer as well as electric field

B. increase the width of depletion layer as well as electric field

C. decrease the width of depletion layer but increase the electric field

D. increases the width of depletion layer but decrease the electric field

Answer: C

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35. A metal sphere of radius r and specific heat s is rotated about an axis passing through its centre at a speed of n rotation/s. It is suddenly stopped and $50\,\%$ of its energy is used in increasing its temperature. Then, the rise in temperature of the sphere is

A. $\frac{2\pi^2 n^2 r^2}{5S}$

B. $\frac{\pi^2 n^2}{10 r^2 S}$

C. $\frac{7}{8}\pi r^2 n^2 S$

D. $\frac{5(\pi rn)^2}{14S}$

Answer: A

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36. The voltage and current in a conductor are measured as $(50 \pm 2)V$ and $(5 \pm 0.2)A$ The percentage error in the calculation of resistance is

A. 4%

B. 5%

C. 7%

D. 8%

Answer: D

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37. Light of wavelength 6328Å is incident normally on a slit of width 0.2 mm. Angular width of the central maximum on the screen will be :

A. 0.9°

B. 0.18°

C. 0.54°

D. 0.36°

Answer: D

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38. Tube A has both ends open while tube B has one closed, otherwise they are identical.

The ratio of fundamental frequency of tube A and B is

A. $1:2$

B. $1:4$

C. $4:1$

D. $2:1$

Answer: D

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39. Two identical coaxial circular loops carry a current i each circulating in the same direction. If the loops approach each other the current in

A. the current in each loop will decrease

B. the current in each loop will increase

C. the current in each loop will remain the same

D. the current in each loop will increase and in the other loop will decrease

Answer: A

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40. An object is projectile with velocity kv_e in vertically upward direction from the ground into the space (v_e is escape velocity and $k < 1$). If air resistance is considered to be negligible then the maximum height from the centre of earth to which it can go, will be : (R =radius of earth)

A. $\frac{R}{k^2+1}$

B. $\frac{R}{k^2-1}$

C. $\frac{R}{1-k^2}$

D. $\frac{R}{k+1}$

Answer: C

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41. Speeds of two identical cars are u and 4u at at specific instant. The ratio of the

respective distances in which the two cars are stopped from that instant is

A. $1:1$

B. $1:4$

C. $1:8$

D. $1:16$

Answer: D

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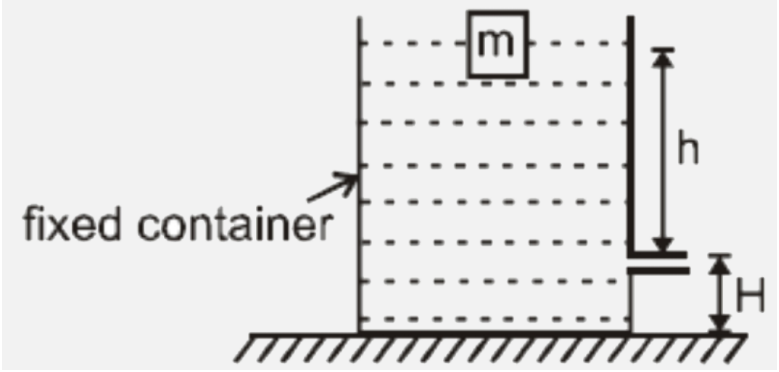
42. If the pin hole in the container is very small compared to the area of the base of container and a block floats in the ideal liquid then, the speed of efflux is



A. less than $\sqrt{2gh}$

B. greater than $\sqrt{2gh}$

C. equal to $\sqrt{2gh}$

D. equal to $\sqrt{2gH}$

Answer: C

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43. When $p-n$ junction diode is forward biased then

A. the depletion region is reduced and barrier height is increased

B. the depletion region is widened and barrier height is reduced

C. both the depletion region and barrier height are reduced

D. both the depletion region and barrier height are increased

Answer: C

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44. In Young's interference experiment, if the slit are of unequal width, then

A. fringes will not be formed

B. the positions of minimum intensity will not be completely dark

C. bright fringe will not be formed at the centre of the screen

D. distance between two consecutive bright fringes will not be equal to the

distance between two consecutive dark fringes.

Answer: B

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45. The operating point of transistor amplifier should be in

A. middle of its active region

B. middle of its saturation region

C. middle of its cut - off region

D. between the cut - off and active region

Answer: A

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