PHYSICS

AAKASH INSTITUTE ENGLISH

MOCK TEST 9

Example

1. When two bodies collide elastically, then

A. Kinetic energy of the system alone is conserved throughout the collision

B. Only momentum is conserved throughout the collision

C. Both kinetic energy and momentum are conserved throughout the collision

D. Neither kinetic energy nor momentum is conserved throughout the collision

Answer: C

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2. A body falls on a surface of coefficient of restitution 0.6 from a height of 1 m . Then the body rebounds to a height of

A. 0.6 m

B. 0.4 m

C. 1m

D. 0.36 m

Answer: D

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3. In an inelastic collision

A. only momentum is conserved

B. only kinetic energy is conserved

C. neither momentum nor kinetic energy is conserved

D. both momentum and kinetic energy are conserved

Answer: A

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4. Two masses m_A and m_B moving with velocities v_A and v_B in opposite direction collide elastically after that the masses m_A and m_B move with velocity v_B and v_A respectively. The ratio (m_A/m_B) is

A. 1

B. $\frac{V_A - V_B}{V_A + V_B}$

C. $\frac{3V_A}{2V_B}$

D. $\frac{V_A}{V_B}$

Answer: A

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5. Two masses of 0.25 kg each moves toward each other with speed 3 ms^{-1} collide and stick together. Find the final velocity

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6. Two equal masses m_1 and m_2 moving along the same straight line with velocites $+3m/s$ and $-5m/s$ respectively collide elastically. Their velocities after the collision will be respectively.

A. $+4\frac{m}{s}$ for both

B. $-3\frac{m}{s}$ and$+5\frac{m}{s}$

C. $-4\frac{m}{s}$and$+4\frac{m}{s}$

D. $-5\frac{m}{s}$ and$+3\frac{m}{s}$

Answer: D

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7. A body of mass $4kg$ moving with velocity $12m/s$ collides with another body of mass $6kg$ at rest. If two bodies stick together after collision , then the loss of kinetic energy of system is

A. Zero

B. 288J

C. 172.8J

D. 144J

Answer: C

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8. A shell of mass $20kg$ at rest explodes into two fragments whose masses are in the ratio $2:3$. The smaller fragment moves with a velocity of $6m/s$. The kinetic energy of the larger fragment is

A. 96 J

B. 216 J

C. 144 J

D. 360 J

Answer: A

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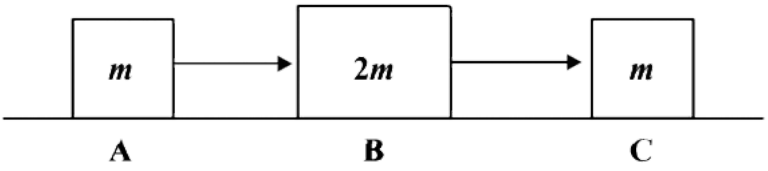
9. There object A, B and C are kept is a straing line a frictionless horizontal surface . These have masses have increase on $2m$ and m respectively . The object A move toward B

with a speed 9 m//s and makes as elastic collision with a there after B makes completely inclesis with C . All motion over on the same straight line . Find the first speed of the object C



A. 3 m/s

B. 4m/s

C. 5m/s

D. 1m/s

Answer: B

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10. A particle falls from a height h upon a fixed horizontal plane and rebounds. If e is the coefficient of restitution the total distance travelled before rebounding has stopped is

A. $h\frac{1+e_2}{1-e^2}$

B. $h\frac{1-e^2}{1+e^2}$

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

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

Answer: A

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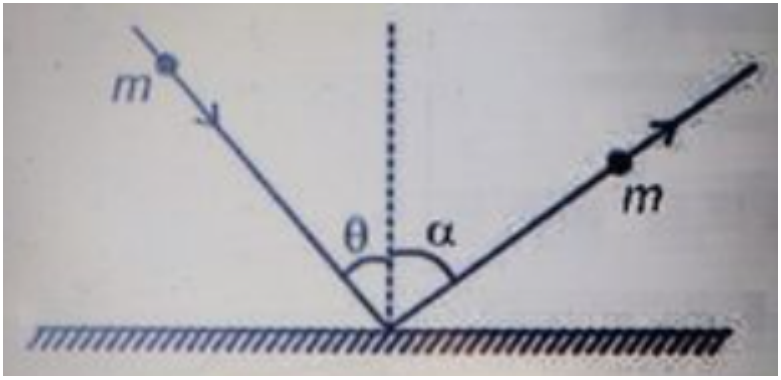
11. If the collision of a ball of mass m is inelastic, then the relation between theta and alpha is (where theta is the coefficient of

restitution)



A. tan α = (tan θ)/ 'alpha'

B. 2tan α = etan θ

C. tan α = (cot θ) /θ

D. $\alpha = \theta$

Answer: A

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12. Two balls each of mass 2kg (one at rest) undergo oblique collision is perfectly elastic, then the angle between their velocities after collision is

A. 30^{o}

B. 60^{o}

C. 45^{o}

D. 90^{o}

Answer: D

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13. Two balls of equal masses moving with equal speed in mutually perpendicular directions, stick together after collision. If the balls were initially moving with a speed of $\frac{30}{\sqrt{}}2$ ms^(-1) each, the speed of their combined mass after collision is

A. 30 ms^{-1}

B. $15ms^{-1}$

C. $\frac{30}{\sqrt{}} 2ms^{-1}$

D. $30\sqrt{2}ms^{-1}$

Answer: B

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14. The practicals having position vectors $\overrightarrow{r}_1 = \left(6\hat{i} + 10\hat{j}\right)$ metre and $\overrightarrow{r}_2 = \left(-10\hat{i} - 6\hat{j}\right)$ metre are moving with velocities $\overrightarrow{V}_1 = \left(8\hat{i} + 6\hat{j}\right)\frac{m}{s}$ and

$\vec{V}_2 = \left(2\alpha\hat{j} + 14\hat{j}\right)$ m/s. If they collide after 2 second, then value of α is

A. 2

B. 4

C. 6

D. 8

Answer: D

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15. A particle of mass m moving in the x direction with speed 2v is hit by another particle of mass 2m moving in the y direction with speed v. If the collision is perfectly inelastic, the percentage loss in the energy during the collision is close to

A. 0.56

B. 0.8

C. 0.35

D. 0.44

Answer: D

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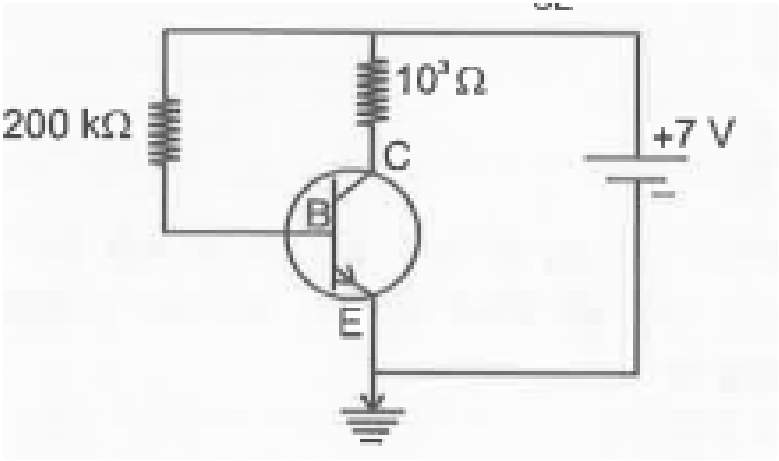
16. A transistor is connected in common emitter configuration as shown in the figure.If $V_{BE} = 1V$ and current gain β = 100,then the voltage across collector emitter terminals VCE is



A. 5 V

B. 1 V

C. 4 V

D. 2 V

Answer:

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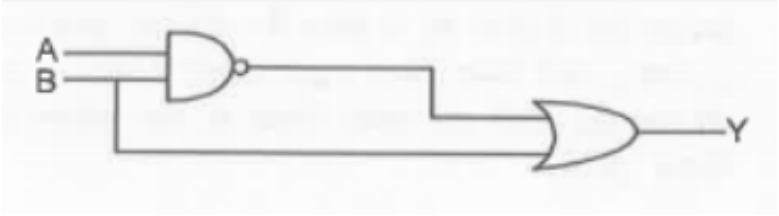
17. The output of the given logic gate is



A. $Y = \overline{A}B + \overline{B}$

B. Y=AB

C. $Y = (A + B).\overline{B}$

D. Y=1

Answer: D

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18. The count rate of a radioactive sample was 1600 count/s at t=0 and 100 count/s at t=8s.Select the correct option.

A. Its count rate was 400 count/s at t = 2s

B. Half life of the sample is 2.88 s

C. Mean life of the sample is 4 s

D. Its count rate was 200 count/s at t = 6 s

Answer: A

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19. In Young`s double slit experiment, the phase different between two coherent sources of equal intensity is π/3.The intensity at a point which is at equal distance from the two slits is (I0 is maximum intensity)

A. $(l_\circ \frac{)}{2}$

B. $(3l_\circ \frac{)}{4}$

C. $(l_\circ \frac{)}{4}$

D. $\frac{l_\circ}{\sqrt{2}}$

Answer: B

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20. A person cannot see beyond a distance of 50 cm.The power of corrective lens required to see distant object is

A. −1.5 D

B. −1.0D

C. −3 D

D. −2.0 D

Answer: A

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21. A plano convex lens fits exactly into a plano concave lens. Their plane surface are parallel to each other. If lenses are made at different materials of refractive indicies μ_1 and μ_2 and R is the radius of curvature of length of the combination is

A. $\frac{R}{\mu_1 + \mu_2}$

B. $\frac{R}{\mu_1 - \mu_2}$

C. $\frac{R}{2(\mu_1 - \mu_2)}$

D. $\frac{R}{2\mu_1 - \mu_2}$

Answer: C

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22. If charge q1 and q2 lies inside and outside respectively of a closed surface S. Let E be the electric field at any point on S and ϕ be the electric flux over S. Select the incorrect option.

A. If q_1 = 0 and $q_2 \neq 0$,then E=0 but $\phi \neq 0$

B. If q_1 changes,both E and ϕwill change

C. If q_2 changes, E will changes but ϕ will not change

D. If $q_1 \neq 0$ and $q_2 \neq 0$,then $\phi \neq 0$

Answer: A

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23. At a place horizontal and vertical components of earth $smag \neq ticfieldareasfollows$BH=1G 5^.` East of north

BV=1G vertically upward

Then inclination and declination are respectively

A. $45^\circ, 5^\circ W$

B. $5^\circ, 45^\circ E$

C. $45^\circ, 5^\circ E$

D. $5^\circ, 45^\circ W$

Answer: A

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24. The product of angular speed and tangential speed of electron in n^{th} orbit of hydrogen atom is

A. Inversly proportional to n^2

B. Directly proportional to n^2

C. inversly proportional to n^4

D. Independent of n

Answer: A

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25. When light of wavelength λ is incident on a metal surface ,stopping potential is found to be $V_\circ$. When light of wavelength nλ is in incident on the same metal surface ,stopping

potential is found to be $\frac{V_\circ}{n+1}$. The threshold wavelength of the metal is

A. $n^3\lambda$

B. $\frac{\lambda}{n^2}$

C. n^2λ`

D. (n+2)λ`

Answer: D

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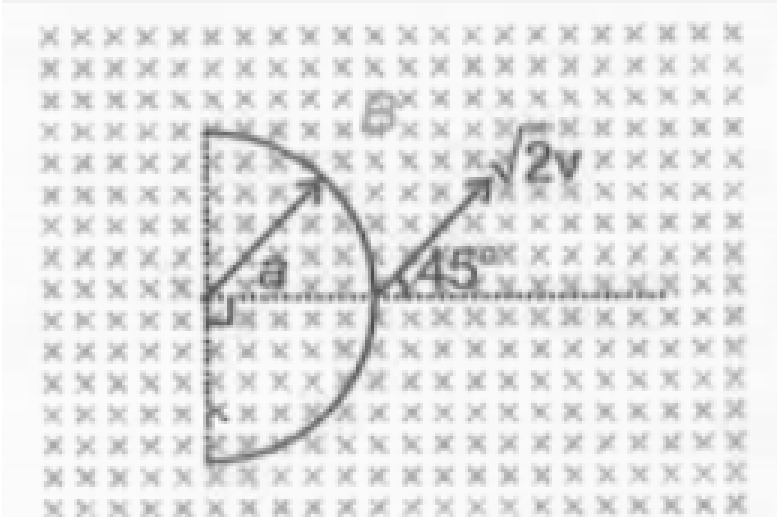
26. A semicircular conducting wire of radius a is moving perpendicular to a uniform magnetic field B with speed $\sqrt{2}v$as shown in the figure.The emf induced across the wire Is



A. Bva

B. 2Bva

C. 3Bva

D. $\sqrt{2}$ Bva`

Answer: C

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27. The instantaneous value of current at a given instant is 1 A and peak value of current is $\frac{5}{3}A$ .The potential difference between A and B at the same instant is

A. 4 V

B. $\frac{5}{3\sqrt{2}}V$

C. 23/3 V`

D. 3 V

Answer:

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28. A wire of certain length carries a current I.It is bent to form a circle of one turn and the magnetic field at the centre is B1. If it is bent

to form a coil of four turns, then magnetic field at centre is B_2.The ratio of B_1 and $B_2$is

A. 1 : 16 `

B. 1 : 4`

C. 64 : 1 `

D. 2 : 1 `

Answer: C

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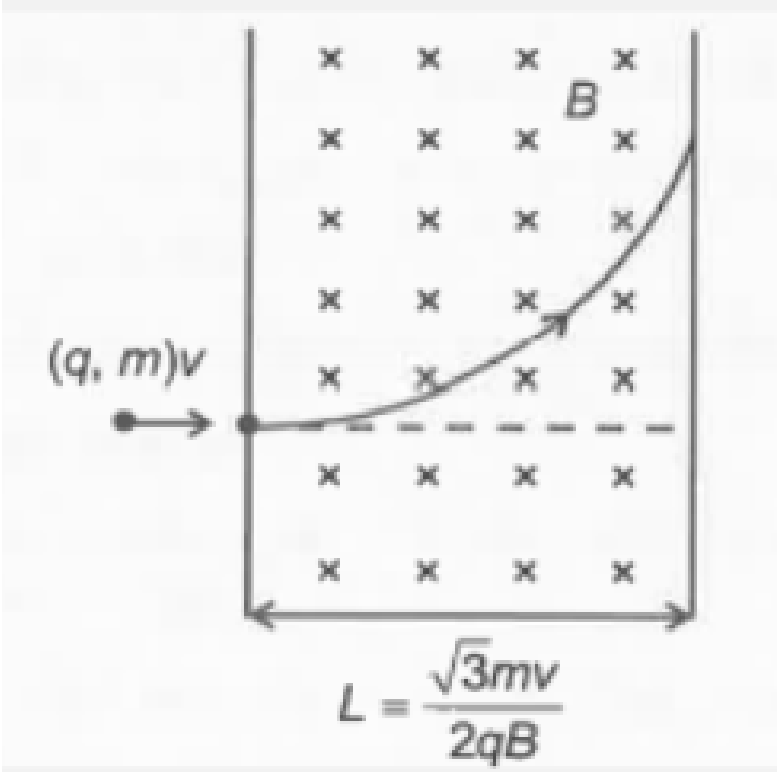
29. A charge particle of mass m and charge q enters in a region of uniform magnetic field as shown in figure.The magnitude of change in linear momentum due to magnetic field will be



A. mv

B. 2mv

C. √3mv`

D. zero

Answer: D

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30. The dimensional formula of $\frac{1}{\mu_\circ^{c^2}} \frac{d\phi_E}{dt}$ is same as that of[where Φe is same as that of

[where ϕ_E is electric flux and c is speed od light,t is time and μ_0 is permeability of free space)

A. Current

B. electric potential

C. capacitance

D. charge

Answer: D

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31. The wavelength of de-Broglie wave associated with a thermal neutron of mass m kg at 27^·C is (KB is the Boltzmann constant and all quantities are in SI units)

A. $\frac{h}{\sqrt{100}mK_B}metre$

B. $\frac{h}{\sqrt{900}mK_B}metre$

C. $\frac{h}{\sqrt{400}mK_B}metre$

D. $\frac{h}{\sqrt{300}mK_B}metre$

Answer: A

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32. Match the column in radioactive decay process of nucleus with atomic number Z and mass number A.

	Column I		Column II
a.	If the process is γ-decay	(i)	Both Z and A will decrease
b.	If the process is β^+ decay	(ii)	Z will increase but A will not decrease
c.	If the process is β^- decay	(iii)	Z will decrease but A will not change
d.	If the process is α-decay	(iv)	Z and A will remain unchanged

A. a(iv), b(iii), c(ii), d(i)

B. a(iii), b(iv), c(ii), d(i)

C. a(iv), b(iii), c(i), d(ii)

D. a(ii), b(i), c(iv), d(iii)

Answer: A

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33. Unpolarised light of intensity I_0 passes through five successive polaroid sheets,each of whose transmission axes makes an angle 45°. With the previous one.The intensity of the finally transmitted light is

A. $\frac{I_\circ}{64}$

B. $\frac{I_\circ}{16}$

C. $\frac{I_\circ}{8}$

D. $(I_\circ \frac{)}{32}$

Answer: B

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34. The circuit shown in figure contains two diodes each with a forward resistance of 50Ω and infinite reverse resistance.If the battery

voltage is 6 v ,then the current through the 100Ω resistance is

A. 0.04A

B. 0.02A

C. 0.2A

D. 0.15A

Answer: B

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35. A fruit which is at 20 m above a lake suddenly detaches from the tree.A fish inside the lake , in the line of fall of fruit,is looking at fruit when fruit is at 12.8 m above the water surface.Speed of fruit as observed by fish $\left(\mu_{water} = \frac{4}{3} \text{ and } g = 10\frac{m}{s^2}\right)$

A. 6 m/s

B. 12 m/s

C. 15 m/s

D. 16 m/s

Answer: D

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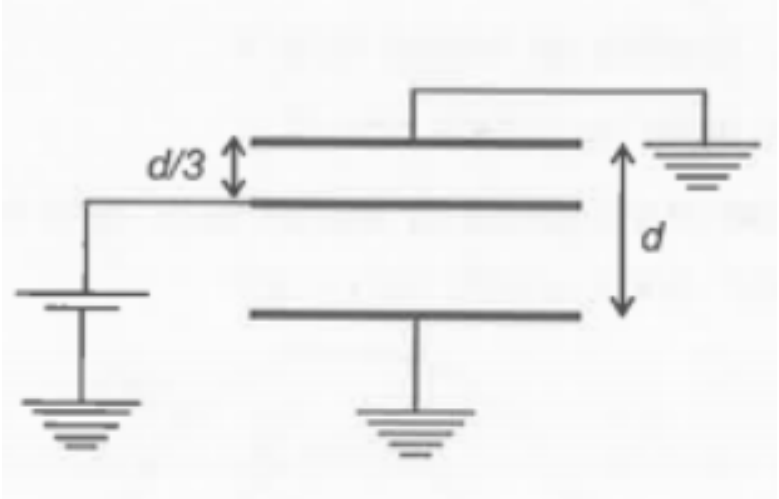
36. Two parallel conducting plates of area A each,are placed at distance d.A third plate ,identical with the first two placed at a distance d/3 from one of the plate as shown in

figure.The capacitance of given arrangement is



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

B. $\frac{3}{2}\frac{\varepsilon_0 A}{d}$

C. $\frac{\varepsilon_0 A}{2d}$

D. $\frac{9\varepsilon_0 A}{2d}$

Answer:

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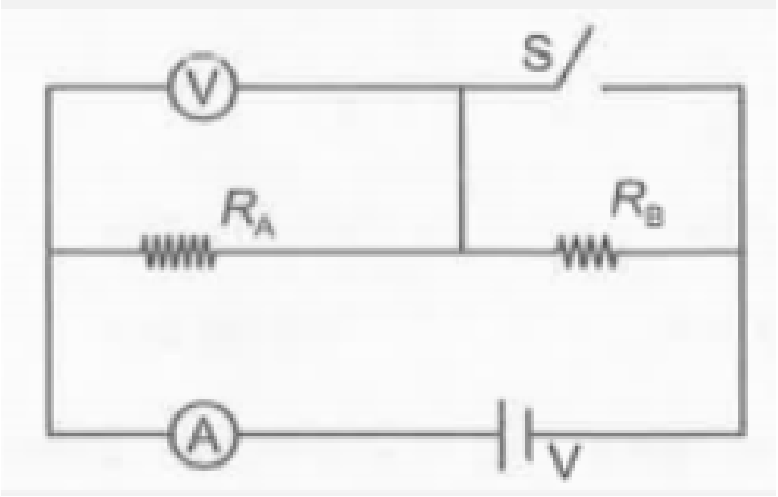
37. The diagram shows a circuit with two identical resistance.The battery has a neglible resistance .If switch S is closed,then which of the following statement in incorrect ?[Assume volmeter and ammeter are ideal & $R_A = R_B$



A. Power dissipated in R_A increases

B. Power dissipated in $R_B$becomes zero

C. voltmeter reading decreases

D. Ammeter reading increases

Answer: A

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38. Two concentric conducting shells of radii R and 2R are having charges Q and -2Q respectively.In a region r

A. Electric field is zero but electric potential is non zero

B. electric field is non-zero,electric potential is zero

C. Both electric field and electric potential are zero

D. Both electric field and electric potential are non-zero

Answer: C

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39. A uniform rod of mass m is hinged at one end and other end is connected to a light extensible string having length L.If the Young`s

modulus and crosssectional area of the wire is Y and A respectively then the elongation in the string is

A. $\frac{mgL}{AY}$

B. $2\frac{mgL}{AY}$

C. $\frac{mgL}{2AY}$

D. $\frac{mgL}{4AY}$

Answer:

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40. A ring, a solid cylinder, a hollow sphere and a solid sphere are released from rest on an inclined plane from same level. If there is no slipping then which one of these will reach the ground at last?

A. Ring

B. Solid cylinder

C. Hollow sphere

D. Solid sphere

Answer: A

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41. In the figure shown , the tension is strings are T_1 and T_2 for figure (1) and (2) respectively and acceleration of mass m are a_1 and a_2 for figure (1) and (2) respectively.Select the correct option

A. $T_1 > T_2$ and $a_2 > a_1$

B. T_2gtT_1 and a_1gta_2`

C. $T_1 > T_2$ and $a_1 > a_2$

D. $T_2 > T_1$ and $a_2 > a_1$

Answer: C

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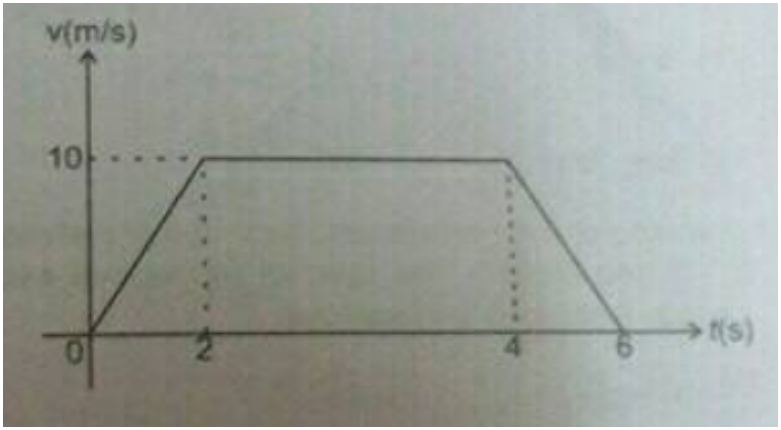
42. A particle of mass 1 kg is moved under the action of a force and velocity time graph of the particle is shown in figure.Work done by the force from t=0 to t=6 s Is



A. 40 J

B. 80 J

C. 20 J

D. Zero

Answer: C

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43. The temperature in kelvin at which the average speed of H_2 molecues will be same as that of N_2 molecules at 35 C will be ?

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44. A system consists of two concentric spherical shells of radii a and $b(b > a)$ maintained at tempareture T_1 and T_2 respectively.The radial rate of flow of heat through subtance between the two concentric spherical shells is proportional to

A. b - a

B. $\frac{ab}{b-a}$

C. $\log_e\left(\frac{b}{a}\right)$

D. $\frac{b-a}{ab}$

Answer: B

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45. The ratio of the masses and radii of two planets are 2:3 and 8:27.The ratio of respective escape speeds from their surfaces are

A. $\sqrt{3}:\sqrt{2}$

B. 9 : 4`

C. 3 : 2`

D. 3 : 4`

Answer: C

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46. A metal rod has length L, radius of its cross-section r. Youngs modulus Y and thermal coefficient of linear expansion is α.It is clamped between two rigid supports with negligible tension. If its temperature is

increased by $T^{\circ}C$, then force exerted by the rod on any of the supports is

A. $2\pi^2 YT$

B. $2\pi r^2 Y\alpha T$

C. $\pi r^2 YLT$

D. $\pi r^2 Y\alpha T$

Answer: A

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47. A person P is standing at perpendicular distance of 100 m from point Q on a highway.A bus B is moving with a speed of $30\sqrt{2}$ m/s toward point Q on the highway.The driver of the bus blows a horn of frequency 1200 Hz . The frequency of the sound received by the person P, when the bus emits sound when it is at distant 100 m from Q is [speed of sound in air is 330 m/s]

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48. Third overtone of a closed organ pipe is in unison with fourth harmonic of an open organ pipe . Find the ratio of the lengths of the pipes.

A. 7 : 8`

B. 2 : 5`

C. 7 : 4`

D. 2 : 1`

Answer: B

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49. A particle is executing S.H.M. If u_1 and u_2 are the velocitiesof the particle at distances x_1 and x_2 from the mean position respectively, then

A. $2\pi\sqrt{\frac{(x_2^2+X_1^2)}{(V_1^2+V_2^2)}}$

B. $2\pi\sqrt{\frac{(x_2^2-X_1^2)}{(V_1^2-V_2^2)}}$

C. $2\pi\sqrt{\frac{(x_2^2-X_1^2)}{(V_2^2-V_1^2)}}$

D. $2\pi\sqrt{\frac{(x_1^2-X_2^2)}{(V_1^2+V_2^2)}}$

Answer: B

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50. A faulty thermometer has ice point at $-5^{\circ}C$ and steam point at $105^{\circ}C$ What would be the tempareture shown by this thermometer of a person?(Assume correct tempareture of person is $37^{\circ}C$)

A. $42^{\circ}C$

B. $32^{\circ}C$

C. $35.7^\circ C$

D. $47^\circ C$

Answer: C

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51. Tempareture and volume of one mole of an ideal momatomic gas in a process are related as $TV^{\frac{2}{3}} = K$,where k is constant.The molar specific heat capacity for the process is

A. 2R

B. (5R)/2`

C. 3R

D. Zero

Answer: A

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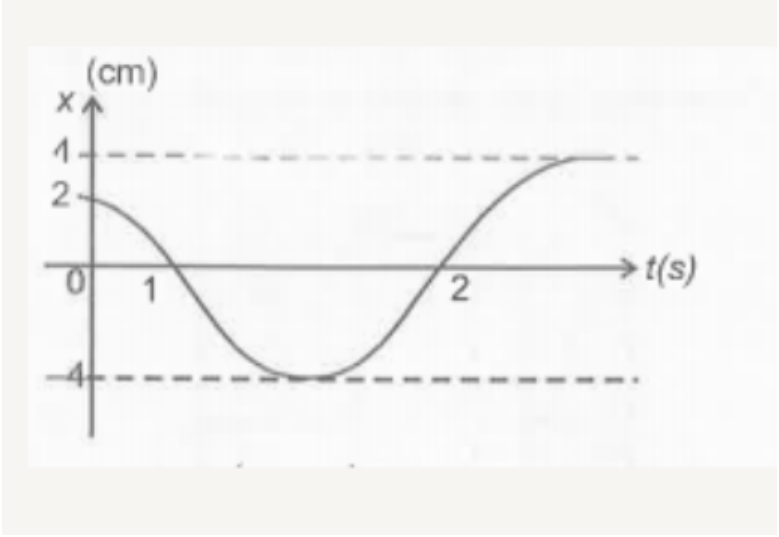
52. Displacement time(x-t) graph of a particle executing S.H.M is shown In the figure.The

equation of S.H.M is given by



A. $x = 4\sin\left(\frac{\pi}{2}t + \frac{\pi}{6}\right)cm$

B. $x = 4\sin\left(\pi t + \frac{\pi}{6}\right)cm$

C. $x = 4\sin\left(\frac{\pi}{4}t + \frac{5\pi}{6}\right)cm$

D. $x = 4\sin\left(\pi t + \frac{5\pi}{6}\right)cm$

Answer: B

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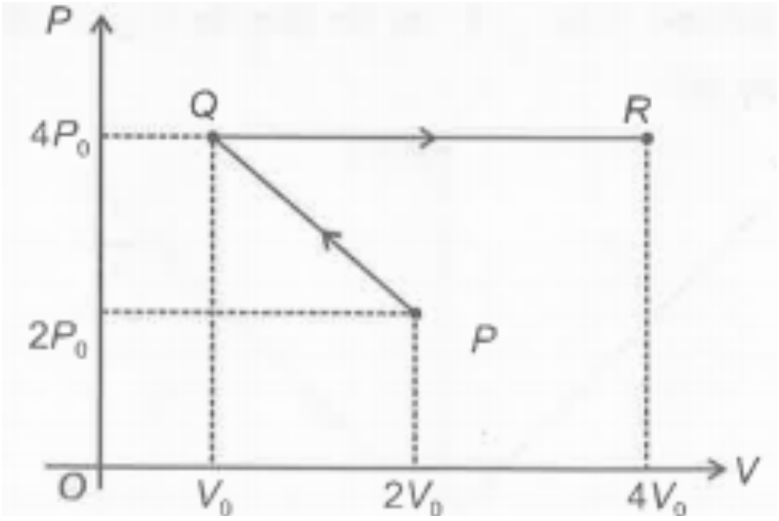
53. An ideal gas undergoes a process P → Q → R as shown in pressure (p) - volume (v) diagram.The work done by the gas is



A. $\frac{7}{4}P_0V_0$

B. $15P_0V_0$

C. $9P_0V_0$

D. $12P_0V_0$

Answer: C

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54. A solid cylinder of length L is in equilibrium in two different liquid A and B as shown in the figure.The density of liquid A $\frac{3\rho}{2}$ and liquid B is 3ρ.The density of cylinder is

A. 7/5ρ

B. 13/5ρ

C. 5/2ρ

D. 2ρ

Answer: B

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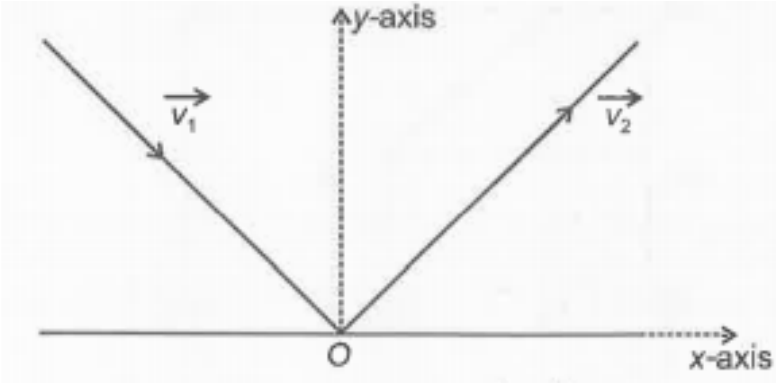
55. A ball is thrown onto a floor as shown in figure.If its velocity vector $\left(\overline{V}1\right)$ is $\left(3\hat{i}-4\hat{j}\right)\frac{m}{s}$ and coefficient ofrestitution is

$\frac{1}{2}$ then,the velocity $(\overrightarrow{V2})$ by which it rebounds is



A. $\left(3\hat{i}+4\hat{j}\right)\frac{m}{s}$

B. $\left(3\hat{i}+2\hat{j}\right)\frac{m}{s}$

C. $\left(-3\hat{i}+2\hat{j}\right)\frac{m}{s}$

D. $\left(-3\hat{i}-2\hat{j}\right)\frac{m}{s}$

Answer: A

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56. A verical thin rod is hinged at point P, due to slight push rod starts to rotate.The velocity of centre of mass of rod just after turning angle 0 is [L is length of rod] (## AAK_TST_09_NEET_19_PHY_E09_041_Q001 ##)

A. $\sqrt{\frac{6g}{L}}\sin 0/2`$

B. $\sqrt{\frac{3gL}{2}}\sin 0/2`$

C. $\sqrt{\frac{6gL}{5}(1+\cos\theta)}$

D. $\sqrt{\frac{3gL}{2}}$. costheta/2`

Answer: B

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57. Three identical cubes each of mass m are place on a smooth horizontal surface.A constant force F is applied on A as shown in the figure.The force on B applied by C is

A. F/2`

B. F/3`

C. F

D. (2F)/3`

Answer: B

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58. A physical quantity of the dimension of length that can be formed out of c, G and $\frac{e^2}{4\pi\varepsilon_0}$ is [c is velocity of light G is universal constant of gravitation, e is charge

A. $C^2\left[G\frac{e^2}{4\pi\varepsilon_0}\right]^{\frac{1}{2}}$

B. $C^3\left[G\frac{e^2}{4\pi\varepsilon_0}\right]^{\frac{1}{2}}$

C. $\frac{1}{C^3}\left[\frac{Ge^2}{4\pi\varepsilon_0}\right]^{\frac{1}{2}}$

D. $\frac{1}{C^3}\left[\frac{Ge^2}{4\pi\varepsilon_0}\right]^{-\left(\frac{3}{2}\right)}$

Answer: A

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59. A particle is projected from origin x-axis with velocity V_0 such that it suffers

retardation of magnitude given by Kx^3 (where k is a positive constant).The stopping distance of particle is

A. $\left(\frac{3V_0^2}{4k}\right)^{\frac{1}{3}}$

B. $\left(\frac{2V_0^2}{k}\right)^{\frac{1}{4}}$

C. $\left(\frac{V_0^2}{2k}\right)^{\frac{1}{4}}$

D. $\left(\frac{2V_0^2}{3k}\right)^{\frac{1}{3}}$

Answer: B

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60. A particle is moving on a circle of radius A .At an instant its speed and tangential acceleration are B and C respectively.Total acceleration of the particle at that instant is

A. $\sqrt{\frac{A^2}{B^2}+C^2}$

B. $\sqrt{\frac{A^4}{B^2}+C^2}$

C. $\sqrt{\frac{B^4}{A^2}+C^2}$

D. $\frac{B^2}{A}+C$

Answer: A

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61. In an n-p-n transistor 10^{10} electron enter the emitter in 10^{-6} s. If 2% of the electrons are lost in the base, the current amplification factor is

A. 49

B. 27

C. 39

D. 38

Answer:

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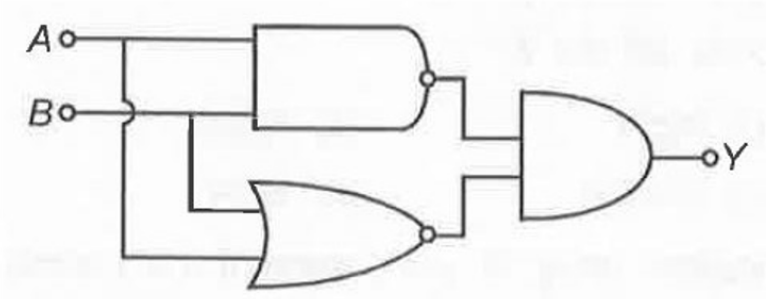
62. For the given logic gate network, the output at Y when A = 1 , B = 1 and A = 0 , B = 0 are



A. 1 , 0

B. 0 , 1

C. 1 , 1

D. 0 ,0

Answer:

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63. The electrical conductivity of a semiconductor increases when electromagnetic radiation of wavelength

shorter than 2480 nm is incident on it. Find the band gap of the semiconductor.

A. 0.75 eV

B. 0.05 eV

C. 1.5 eV

D. 0.5 eV

Answer:

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64. A freshly prepared radioactive source of half-life 2 h emits radiation of intensity which is 64 times the permissible safe level. The minimum time after which it would be possible to work safely with this source is

A. 42 hr

B. 128 hr

C. 6 hr

D. 12 hr

Answer:

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65. The graph showing the energy spectrum of β particle is

A. 

B. 

C. 

D. 

Answer:

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66. For the given reaction, the particle X is :

$$_{\cdot 6}C^{11} \rightarrow {}_{\cdot 5}B^{11} + \beta^{+} + X$$

A. Neutron

B. Neutrino

C. Electron

D. Proton

Answer:

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67. The recoil energy of a hydrogen atom after it emits a photon in going from n = 5 state to n = 1 state is (M = Mass of H atom, R = Rydberg's constant, h = Planck's constant)

A. $\left(\frac{21}{25}Rh\right)^2 \frac{1}{2M}$

B. $\left(\frac{18}{25}Rh\right)^2 \frac{1}{2M}$

C. $\left(\frac{24Rh}{25}\right)^2 \frac{1}{2M}$

D. $\frac{(Rh)^2}{2M}$

Answer:

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68. Two identical metal plates show photoelectric effect by a light of wavelength λ_A falling on plate A and λ_B on plate B $(\lambda_A = 2\lambda_B)$. The maximum kinetic energy is

A. $K_A = 2K_B$

B. $K_A > \frac{K_B}{2}$

C. $2K_A = K_B$

D. $K_A < \frac{K_B}{2}$

Answer:

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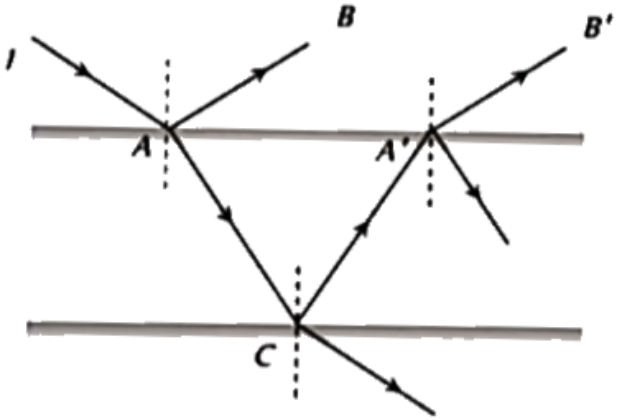
69. A ray of light of intensity I is incident on a parallel glass-slab at the point A and it undergoes partial reflection and refraction as shown in the figure. At each reflection 25% of the incident energy is reflected and the rest is transmitted. If the rays AB and A'B' undergo

interference, then the ratio $\frac{I_{max}}{I_{min}}$ is



A. $7:1$

B. $49:1$

C. $4:3$

D. $16:9$

Answer:

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70. An object is 20 cm away from a concave mirror of focal length, 15 cm. If the object moves with a speed of 5 m/s along the axis, then the instantaneous speed of image will be

A. 30 m/s

B. 45 m/s

C. 9 m/s

D. 18 m/s

Answer:

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71. If the critical angle for the material of a prism is C, and the angle of the prism is A, then there will be no emergent ray when

A. A gt 2C

B. A lt C

C. A lt 2C

D. $A \leq 2C$

Answer:

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72. IF E_0 and μ_0 are respectively the electric permittivity and magnetic permeability of free space, ε and μ are the corresponding quantities In a medium, the index of refraction of the medium is

A. $\sqrt{\frac{\mu\varepsilon}{\mu_0\varepsilon_0}}$

B. $\sqrt{\frac{\mu_0\varepsilon_0}{\mu}}$

C. $\sqrt{\frac{\mu_0 \varepsilon_0}{\mu \varepsilon}}$

D. $\sqrt{\frac{\varepsilon}{\mu_0 \varepsilon_0}}$

Answer:

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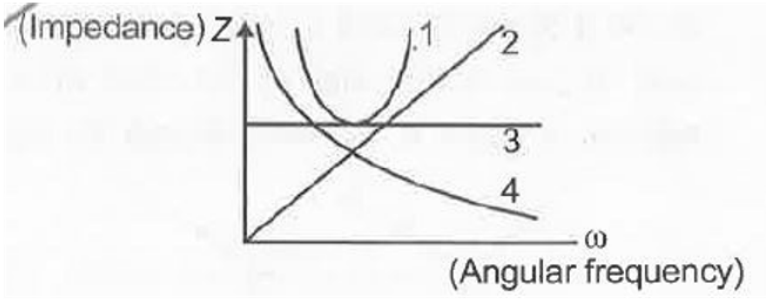
73. Choose the correct combination for the given graph.

(Symbols have their usual meaning)



A. (1)LCR, (2)L, (3)R, (4)C

B. (1)LCR, (2)C, (3)R, (4)L

C. (1)LR, (2)R, (3)C, (4)L

D. (1)RC, (2)C, (3)R, (4)L

Answer:

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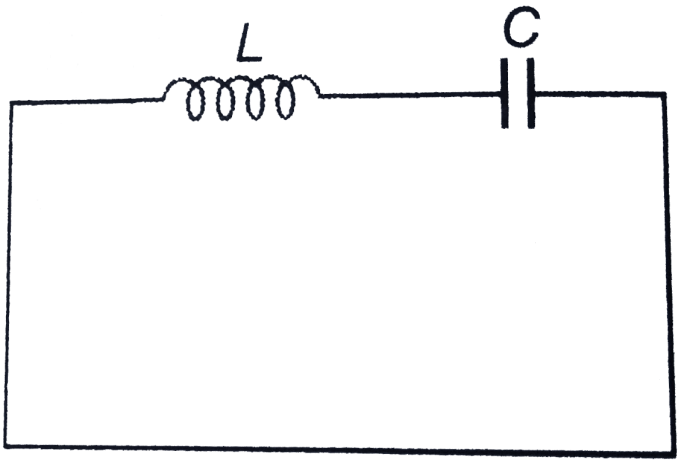
74. In an LC circuit the capacitor has maximum charge q_0. The value of $\left(\frac{dI}{dt}\right)_{\max}$ is



A. $\frac{q_0}{2LC}$

B. $\frac{2q_0}{LC}$

C. $\frac{q_0}{LC}$

D. $\frac{q_0}{\sqrt{LC}}$

Answer:

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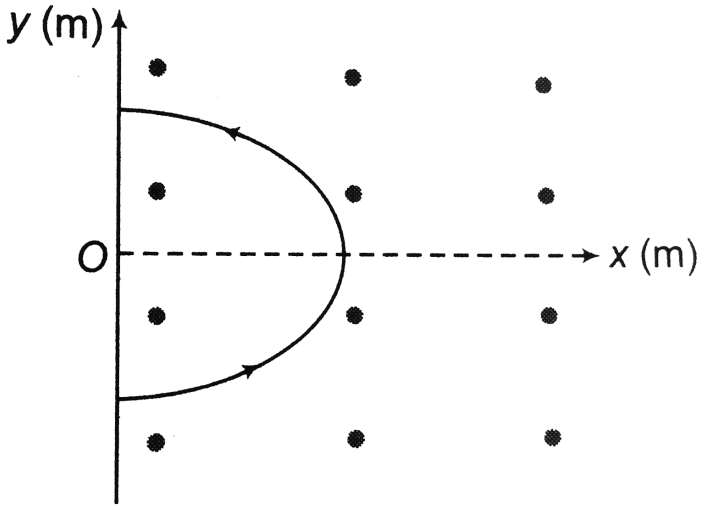
75. A wire carrying a current of $3A$ is bent in the form of a parabola $y^2 = 4 - x$ as shown in figure, where x and y are in metre. The wire is placed in a uniform magnetic field $B = 5\hat{k}$

tesla. The force acting on the wire is



A. $30\hat{i}N$

B. $-30\hat{i}N$

C. $60\hat{i}n$

D. $-60\hat{i}N$

Answer:

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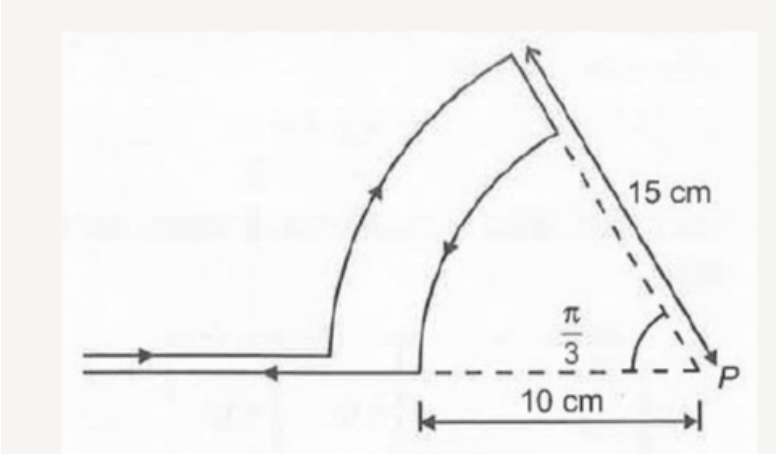
76. The segment of wire shown in figure carries a current of i=5 A. The magnetic field (in Tesla) at the point P is



A. $\frac{28}{3}\mu_0$

B. $\frac{22}{7}\mu_0$

C. $\frac{5}{18}\mu_0$

D. $\frac{25}{18}\mu_0$

Answer:

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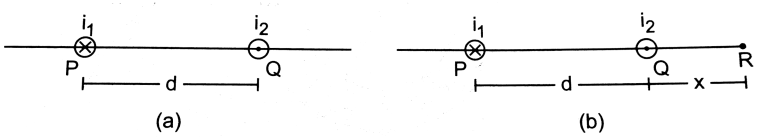
77. Two parallel wires P and Q placed at a separation

$d = 6cm$ carry electric currents i_1= 5A and i_2= 2A in opposite directions as shown in figure. Find the point on the line PQ where the

resultant magnetic field `

is zero.



A. 4 cm from Q on right

B. 2 cm from P on left

C. 4 cm from P on right

D. 2 cm from Q on left

Answer:

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78. Which of the follwing particles will have minimum frequency of revolution when projected with the same velocity perpendicular to a magnetic field?

A. He^+

B. Li^+

C. Electron

D. Proton

Answer:

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79. An electric bulb, when connected across a power supply of $220V$, consumes a power of $60W$. If the supply drops supply is suddently increased to $240V$, what will be the power consumed?

A. 160 W

B. 240 W

C. 112 W

D. 71 W

Answer:

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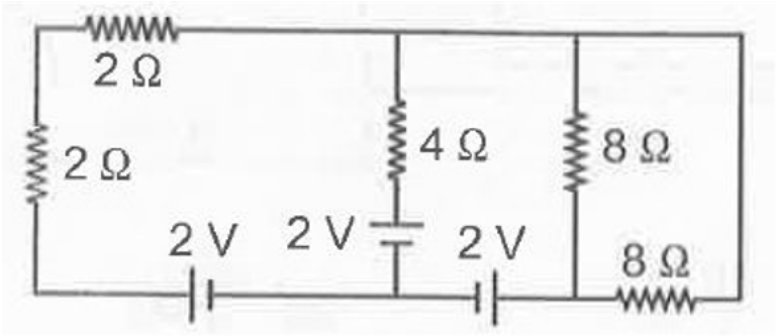
80. Find the current through 4Ω resistor in the circuit shown in figure.



A. $4A$

B. $6A$

C. Zero

D. $2A$

Answer:

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81. The energy density in the electric field created by a point change falls off with the distance from the point charge as

A. $\frac{1}{r^2}$

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

C. $\frac{1}{r^4}$

D. $\frac{1}{r^3}$

Answer:

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82. A metallic sphere having no net charge is placed near a finite metal plate carrying a positive charge. The electric force on the sphere will be

A. Parallel to the plate

B. Zero

C. Towards the plate

D. Away from the plate

Answer:

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83. Two successive resonance frequencies in an open organ pipe are 1944 Hz and 2592 Hz. Find

the length of the tube. The speed of sound in air is $324ms^{-1}$.

A. 100 cm

B. 12.5 cm

C. 25 cm

D. 50 cm

Answer:

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84. An observer moves towards a stationary source of sound with a velocity one-fifth of the velocity of sound. What is the percentage increase in the apparent frequency?

A. 0.05

B. 0.2

C. Zero

D. $0.5\ \%$

Answer:

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85. "The velocity of sound is generally greater in solids than in gas at N.T.P." Why?

A. Both the density and elasticity of solids are low

B. The density of solids is low but the elasticity is high

C. The density of solids is high but the elasticity is low

D. The density of solids is high but the elasticity of solids is very high

Answer:

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86. The rate of cooling of a body depends upon

A. Surface area of body

B. Mass of body

C. Specific heat of material of body

D. All of these

Answer:

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87. The temperature of an ideal gas is increased from 120 K to 480 K. If at 120 K, the rms velocity of the gas molecules is v_{rms} then at 480 K, it becomes

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

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

C. 4v

D. 2v

Answer:

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88. When an ideal diatomic gas is heated at constant pressure the fraction of the heat

energy supplied which increases the internal energy of the gas is

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

B. $\frac{5}{7}$

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

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

Answer:

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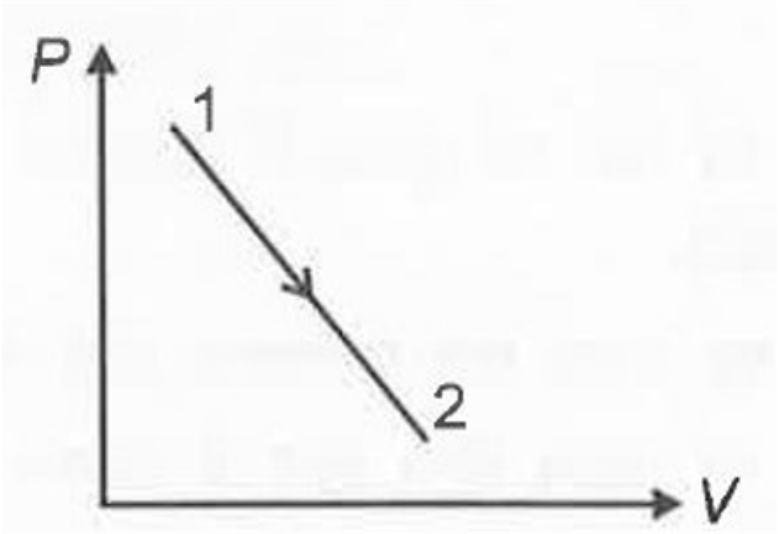
89. A volume V versus pressure P graph was obtained from state 1 to state 2 when a given mass of a gas is subjected to temperature changes. During the process the gas is



A. Heated in the beginning and cooled towards end

B. Cooled in the beginning and heated towards end

C. Heated continuously

D. Cooled continuously

Answer:

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90. The potential energy of a particle in motion along X axis is given by $U = U_0 - u_0$ cos ax. The time period of small oscillation is

A. $\frac{2\pi}{a}\sqrt{\frac{m}{U_0}}$

B. $2\pi\sqrt{\frac{m}{aU_0}}$

C. $2\pi\sqrt{\frac{ma}{U_0}}$

D. $2\pi\sqrt{\frac{U_0}{ma}}$

Answer:

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91. A child is standing with folded hands at the center of a platform rotating about its central axis. The kinetic energy of the system is K. The

child now stretches his arms so that the moment of inertia of the system doubles. The kinetic energy of the system now is: a) K/4 b) K/2 c) 2K d) 4K

A. $\frac{K}{4}$

B. 4K

C. 2K

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

Answer:

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92. A boat of mass 90 kg is floating in still water. A boy of mass 30 kg walks from one end to the other on it. If the length of the boat is 3 m, then the distance through which the boat will move is

A. 0.45 m

B. 0.65 m

C. 0.75 m

D. 0.25 m

Answer:

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93. A ball impinges directly on another ball at rest. The first ball is brought to rest by the impact. If half of the kinetic energy is lost by the impact, the value of coefficient of restitution is

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

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

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

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

Answer:

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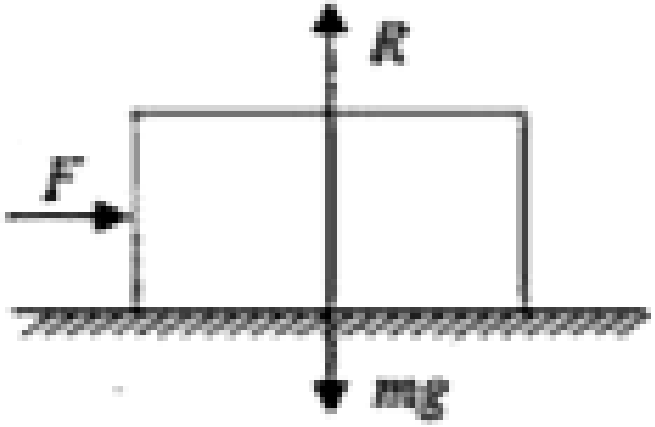
94. A block of mass 2 kg is placed on the floor. The coefficient of static friction is 0.4. A force F of 2.5 N is applied on the block as shown in Fig. 15.4.4. The force of friction between the

block and the floor is $\left(g = 9.8m/s^2\right)$



A. 20.15 N

B. 20 N

C. 10 N

D. 12.5 N

Answer:

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95. A body falls from a height h = 200 m. The ratio of distance travelled each 2 s, during t = 0 to t = 6 of the journey is

A. $1:3:5$

B. $1:2:3$

C. $1:4:9$

D. $1:2:4$

Answer:

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96. The Poisson's ratio of a material is 0.4. If a force is applied to a wire of this material, there is a decrease of cross-sectional area by 2%. The percentage increase in its length is

A. 0.01

B. 0.5%

C. 0.03

D. 2.5%

Answer:

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97. A particle executes SHM with an amplitude of 2 cm. When the particle is at 1 cm from the mean position, the magnitude of its velocity equal to that of its acceleration. Then its time period in seconds is

A. $\frac{2\pi}{\sqrt{3}}$

B. $\frac{\sqrt{3}}{2\pi}$

C. $\frac{1}{2\pi\sqrt{3}}$

D. $2\pi\sqrt{3}$

Answer:

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98. A body weight 50 g in air and 40 g in water. How much would it weigh in a liquid of specific gravity 1.5?

A. 65 g

B. 45 g

C. 30 g

D. 35 g

Answer:

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99. 10 min are taken to emptied a rectangular vessel of height h through an orifice in its bottom. How much time will it take to be emptied the vessel when half filled ?

A. 5 minutes

B. 3 minutes

C. 9 minutes

D. 7 minutes

Answer:

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100. A small cone fitted with water is revloved in a vertical circle of radius 4 m and does not

fall down. What must be the maximum period of revolution ?

A. 8 s

B. 4 s

C. 1 s

D. 10 s

Answer:

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101. Moment of inertia of a uniform circular disc about a diameter is I. Its moment of inertia about an axis perpendicular to its plane and passing through a point on its rim will be

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

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

C. $\sqrt{2}I$

D. 2I

Answer:

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102. The terminal velocity of small sized spherical body of radius r falling veertically in a viscous liquid is given by a following proportionality

A. vr^2 = Constant

B. $\frac{v}{r^2}$ = Constant

C. $\frac{v}{r}$ = Constant

D. vr = Constant

Answer:

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103. The magnitude of gravitational potential energy of a body at a distance r from the centre of earth is u. Its weight at a distance 2r from the centre of earth is

A. $\frac{U}{4r}$

B. $\frac{U}{\sqrt{2}r}$

C. $\frac{U}{r}$

D. $\frac{U}{2r}$

Answer:

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104. The kinetic energy K of a particle moving along a circle of radius R depends upon the distance S as $K = \beta S^2$, where β is a constant. Tangential acceleration of the particle is proportional to

A. S

B. $S\sqrt{S}$

C. $\sqrt{S}$

D. $\frac{1}{\sqrt{S}}$

Answer:

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105. If speed (V),acceleration (A) and force (F) are considered as fundamental units, the dimesnion of Young 's modulus will be :

A. Fa^2v^{-3}

B. Fa^2v^{-2}

C. Fa^2v^{-5}

D. Fa^2v^{-4}

Answer:

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