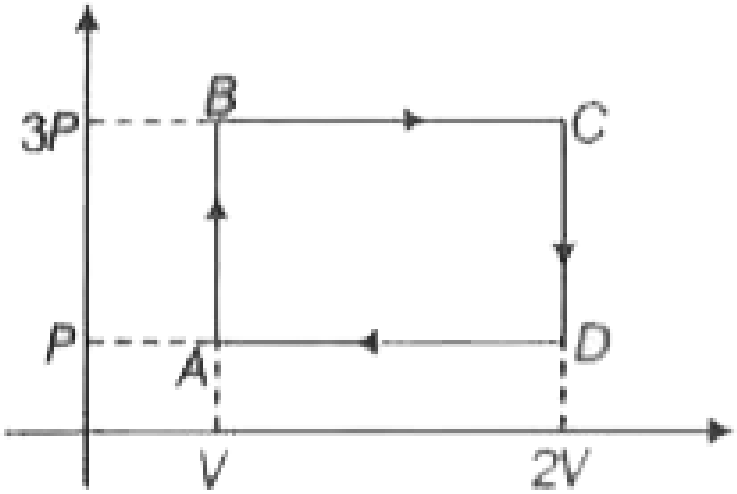
PHYSICS

BOOKS - TS EAMCET PREVIOUS YEAR PAPERS

AP EAMCET ENGINEERING ENTRANCE EXAM

Physics

1. A monoatomic ideal gas through a cyclic process as shown in the figure . The efficiency of this process is



A. 19. 04 %

B. 40. 04 %

C. 50.00 %

D. 10.00 %

Answer:

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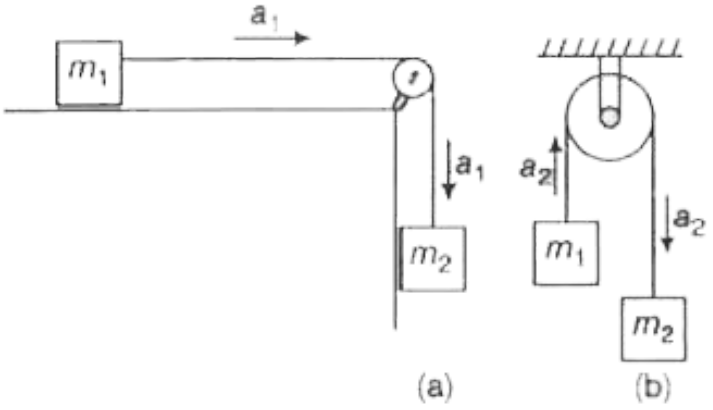
2. Two situations are shown in fig. (a) and (b)

In each case $m_1 = 3kg$ and $m_2 = 4kg$. If a_1, a_2 are the respective accelerations of the blocks in these situations, then the values of a_1 and a_2 are respectively $\left[g = 10ms^{-2}\right]$



A. $\frac{20}{7}ms^{-2}, \frac{10}{7}ms^{-2}$

B. $\frac{10}{7}ms^{-2}, \frac{25}{7}ms^{-2}$

C. $\frac{40}{7}ms^{-2}, \frac{10}{7}ms^{-2}$

D. $\frac{30}{7}ms^{-2}, \frac{5}{7}ms^{-2}$

Answer: C

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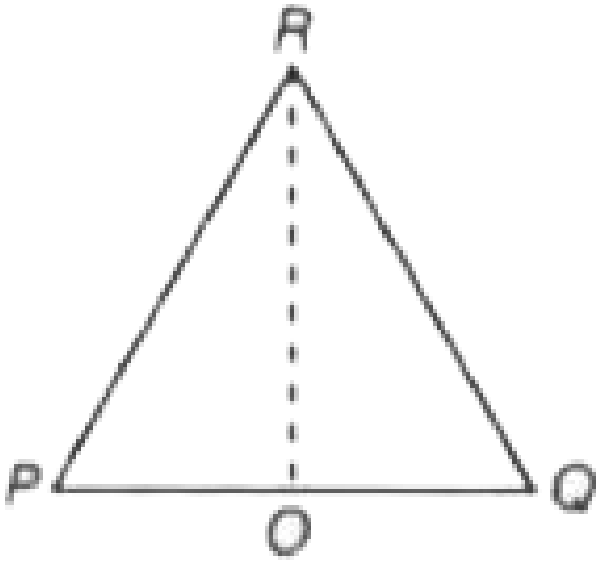
3. Three uniform thin aluminum rods each of length 2 m form an equilateral triangle PQR as shown in the figure. The mid point of the rod PQ is at the origin of the coordinate system . If the temperature of the system of rods increases by $50^{\circ}C$ the increase in y-coordinate of the ceentre of mass of hte system of the rods is ..... mm.

(Coefficient of volume expansion of aluminium = $12\sqrt{3} \times 10^{-6}K^{-1}$)



A. 0.05

B. 0.8

C. 0.1

D. 0.2

Answer: D

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4. An infinitely long thin straight wire has uniform linear charge density of $\frac{1}{3}Cm^{-1}$. Then the magnitude of the force acting on a charge $3\mu C$ situated at a point of 18 cm away from the wire is $\left(\frac{1}{4\pi\varepsilon_0} = 9 \times 10^9 Nm^2C^{-2}\right)$

A. $2 \times 10^5 N$

B. $10^5 N$

C. $\frac{1}{3} \times 10^6 N$

D. $3 \times 10^{11} N$

Answer: B

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5. An electrostatic paint sprayer has a metal sphere of diameter 18 cm and at a potential of 25 kV. The charge on the metal sphere is

A. $0.25 \mu C$

B. $2.5 \mu C$

C. $0.5 \mu C$

D. $25 \mu C$

Answer: A

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6. A body is projected from the top of a tower with a velocity $\bar{u} = 3\hat{i} + 4\hat{j} + 5\hat{k} ms^{-1}$, where $\hat{i}, \hat{j}$ and $\hat{k}$ are unit vectors along east, north and vertically upwards respectively. If the height of the tower is 0 m , horizontal range of the body on the ground is $\left(g = 10 ms^{-2}\right)$

A. 15 m

B. 25 m

C. 9 m

D. 12 m

Answer: A

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7. Two long parallel conducting wires carrying currents are seperated by a distance 'x' . Work done per unit length in changing the distance between the wires is proportional to

A. $\frac{1}{\log_e x}$

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

C. $\log_e x$

D. x

Answer: C

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8. A Zener diode voltage regulator operated in the range 120 V - 180 V produces a constant supply of 110 v and 250 aM to the load . If the maximum current is equally shared between the load and the

Zener diode, then the values of load resistance (R_L) and series resistance (R_S) are respectively

A. $R_L = 280\Omega, R_S = 70\Omega$

B. $R_L = 440\Omega, R_S = 140\Omega$

C. $R_L = 70\Omega, R_S = 280\Omega$

D. $R_L = 440\Omega, R_S = 1400\Omega$

Answer: B

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9. Equation of a projectile is given by $y = Px - Qx^2$, where P and Q are constants. The ratio of maximum height to the range of the projectile is

A. $\frac{Q^2}{2P}$

B. $\frac{P^2}{Q}$

C. 4P

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

Answer: D

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10. The transverse displacement of a string of a linear dinsity $0.01 kgm^{-1}$, clamped at its ends is given by $Y_{x,t} = 0.03 \sin\left(\frac{2\pi x}{3}\right)\cos(60\pi t)$, where x and y arein metres and time t is in seconds . Tension in the string is

A. 9 N

B. 36 N

C. 162 N

D. 81 N

Answer: D

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11. A girl of mass 50 kg swinging on a cardle. If she moves with a velocity of $2ms^{-1}$ upwards in a direction making an angle 60° with the vertical, then the power generated is $\left(g = 9.8ms^{-2}\right)$

A. 245 W

B. $490\sqrt{2}W$

C. $490\sqrt{3}W$

D. 980 W

Answer: C

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12. Two point surces S_1 and S_2 are 24 cm apart. Where should a convex lens of focal length 9 cm be placed them , so that the images of both sources are formed at the same place ?

A. 8 cm

B. 12 cm

C. 6 cm

D. 10cm

Answer: B

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13. Assertion (A) It is more difficult to push a magnet into a coil with more number of turns.

Reasong (R) The emfincuced in a coil opposes the motion of a magnet when it is moved towards the coil .

A. A is false , R is ture

B. Both A and R are true. R is correct explanation of A

C. A is ture, R is false

D. Both A and R are true. R is not correct explanation of A

Answer: B

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14. A wall is made of equally thick layers P and Q of different materials. Thermal conductivity of Q is half of that of the P . In the steady state , If the temperature difference across the wall is $24^\circ C$, then the temperature difference across the layer 'P' is .....

A. $12^\circ C$

B. $16^\circ C$

C. $4^\circ C$

D. $8^\circ C$

Answer: D

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15. In the determination of the internal resistance of a cell with a potentiometer, the error in the measurement of the balancing length is ± 1 m m . When the cell alone is connected in the circuit, the balancing length is obtained at 60 cm and when the cell is shunted with a resistance of $10\Omega \pm 2\%$, the balancing length is ovtained at 50 cm. The error int he determination of The internal resistance of the cell is .....

A. 2 . 4 %

B. 4 . 2%

C. 1 . 8%

D. 5 . 6%

Answer: B

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16. The half life of a stream of radioactive particles moving along as straight path with a constant kinetic energy of 4 eV is 1 minute. The percentage of particles which decay before travelling a distance of 3.6 km is (Mass of the radioactive particles $= 3.2 \times 10^{-21}$ kg and charge of the electron $= 1.6 \times 10^{-19} C$).

A. 87 . 5

B. 175

C. 37 . 5

D. 75

Answer: A

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17. The process of recovering the modulating signal from the modulated carrier wave is called

A. amplification

B. detection

C. rectification

D. noise

Answer: B

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18. Two bodies of masses 4m and 9m are seperated by distance 'r' . The gravitational potential at a point on this line joining them where the gravitational field becomes zero is

A. $\frac{-25Gm}{r}$

B. $\frac{-4Gm}{r}$

C. $\frac{-9Gm}{r}$

D. $\frac{-13Gm}{r}$

Answer: A

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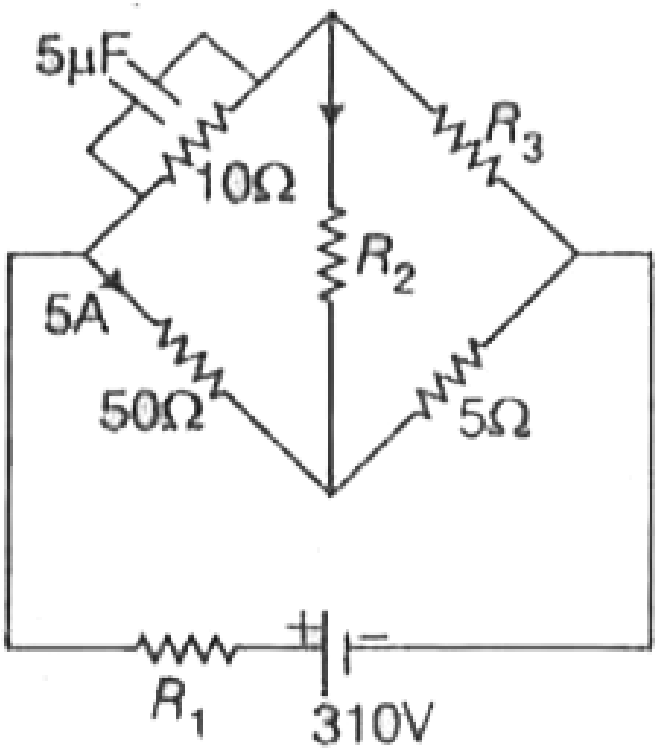
19. If the charge on the capacitor is 1 mC in the given circuit, then $\frac{R_1R_2}{R_3} = \ldots\ldots\Omega$.



A. 6

B. 0. 4

C. 0. 6

D. 10

Answer: C

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20. The amplitude of electric field in an electromagnetic wave is $60Vm^{-1}$. Then the amplitude of magnetic field is

A. $2 \times 10^{-7}T$

B. $2 \times 10^{7}T$

C. $6 \times 10^{7}T$

D. $6 \times 10^{-7}T$

Answer: A

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21. A bird is tossing (flying to and pro) between two cars moving towards each other on a straight road. One car has speed of $54kmh^{-1}$ while the other has the speed of $36kmh^{-1}$. The bird

starts moving from first can towards the other and is moving with the speed of $36kmh^{-1}$ where the two cars were separated by 36 km . The total distance covered by the bird before the cars meet each other is

A. 14400 m

B. 1440 m

C. 244 m

D. 24400 m

Answer: A

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22. If the average translational kinetic energy of molecule in a gas is equal to the kinetic energy of an electron acceleration from rest

through 10 V , then the temperature of the gas molecule is

(Boltzmann constant $= 1.38 \times 10^{-23} JK^{-1}$)

A. $7.73 \times 10^{23} K$

B. $730 K$

C. 737 K

D. $77.3 \times 10^{3} K$

Answer: D

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23. A closed organ pipe of length 'L' and an open organ pipe contain gases of densities $\rho(1)$ and ρ_2 respectively . The compressibility of gases are equal in both the pipes . If the frequencies of their first overtones are same then, the length of the open organ pipe is

A. $\frac{4L}{3}\sqrt{\frac{\rho_2}{\rho_1}}$

B. $\frac{4L}{3}\sqrt{\frac{\rho_1}{\rho_2}}$

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

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

Answer: B

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24. One mole of a gas expands such that its volume 'v' changes with absolute temperature 'T' in accordance with the ralation $V = HT^2$ where 'K' is a constant . If the temperature of the gas changes by $60^\circ C$, then work done by the gas is (R is universal gas constant) .

A. KRIn 60

B. Rin 60

C. 40 KR

D. 120 R

Answer: D

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25. When a coil is connected to AC supply of frequency 50 Hz , current of 4 A flows in it and it consumes 240 w power . If the potential difference across the coil is 100v . Then the inductance value of the coil is

A. $L = (5\pi)H$

B. $L = \frac{\pi}{5}H$

C. $L = \frac{1}{5\pi}H$

D. $L = \frac{1}{25\pi}H$

Answer: C

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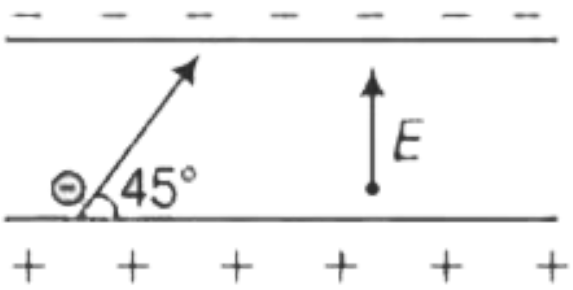
26. The uniform electric field intensity between the two plates of a parallel plate capacitor is $1 \times 10^3 Vm^{-1}$ acting vertically upwards as shown in the figure.

The plates are sufficiently long and have separation 2 cm. A particle of negative charge $1\mu C$ and mass 2 g is projected at an angle 45° with the electric field from the lower plate with a velocity 'u' . The maximum velocity acquired by the particle , if it is not hit the upper plate is



A. $2ms^{-1}$

B. $1ms^{-1}$

C. $0.\ 1ms^{-1}$

D. $0.2ms^{-1}$

Answer: D

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27. Both an electron and a photon have same de-Broglie wavelength of $1.2.\text{Å}$. The ratio of their energies is nearly

A. $1:100$

B. $1:10$

C. $1:1000$

D. $1:1$

Answer: A

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28. When the terminals of a cells are connected by a wire of resistance 4Ω , the potential difference across the cell is 1.6 V . If a wire of the same resistance is connected in parallel with the first, the potential difference becomes $1 . 33$ v . The emf and internal resistance of the cell are respectively

A. $1V, 1\Omega$

B. $2V, 1\Omega$

C. $1V, 2\Omega$

D. $2V, 2\Omega$

Answer: B

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29. Two concentric coils of 20 turns each are placed in same plane. Their radii are 30 cm and 60 cma nd carry 0 . 4 A and 0 . 6 currents

respectively in opposite directions. The magnetic induction at the centre in tesla is .....

A. $\frac{8}{3}\mu_0$

B. $\frac{2}{3}\mu_0$

C. $\frac{5}{3}\mu_0$

D. $\frac{10}{3}\mu_0$

Answer: D

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30. Time period of a simple pendulum of length 'L' is T_1 . Time period of a uniform rod of same length 'L' suspended from one end and oscillating in a vertical plane is T_2 . Amplitude of oscillation is small in both the cases . Them $\frac{T_1}{T_2}$ is

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

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

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

D. 1

Answer: B

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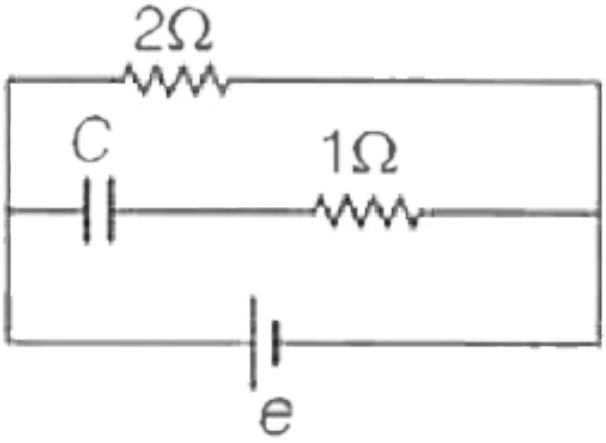
31. In steady state,a capacitor of capacitance $2\mu F$ is charged to $4\mu C$, as shown in figure. If the internal resistance of the cell is 0.5Ω , then the emf of the cell is



A. 4V

B. 5 V

C. 2 . 5 V

D. 2 V

Answer: C

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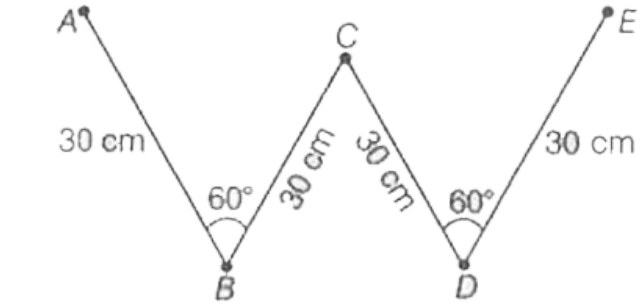
32. A uniform thin rod of 120 cm length and 1600 g mass is bent as shown in the figure. The moment of inertia of the bent rod about and axis passing through the point 'O' and perpendicular to the

plane of the paper is ..... $kg - m^2$.



A. 0 . 084

B. 0 . 360

C. 0 . 018

D. 0 . 120

Answer: A

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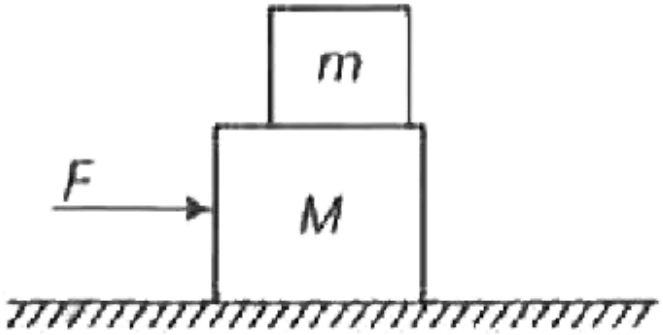
33. Two block of masses 'M' and 'm' are placed on one another on a smoothe horizontal surface as shown in the figure.

The force 'F' is acting on the mass 'M' horizontally during time intervel 't' Assuming no relative sliding between the blocks, the work done by friction on the blocks is .....



A. $\frac{Ft}{2(M+m)}$

B. $\frac{M+m}{mt^2}$

C. $\frac{mF^2t^2}{2(M+m)^2}$

D. $\frac{F^2t^2}{(M+m)}$

Answer: C

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34. A solid sphere is projected up along an inclined plane of inclination 30° with the horizontal with a speed of $4ms^{-1}$. If it rolls without slipping , the maximum distance traversed by it is . .. . . $\left(g = 10ms^{-2}\right)$

A. $2.\ 24m$

B. 112 m

C. 1 . 12 m

D. 22.4 m

Answer: A

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35. Fully filled open water tank has two holes on either sides of its walls. One is a square hole of side x cm at a depth of 2 m from the

top, and the other hole is equilateral triangle of side 4 cm at a depth of 6 m from the top. If the rate of flow of water is same from both the holes, then 'x' is

A. 1 . 73 cm

B. 12 cm

C. 6 . 92 cm

D. 3 . 46 cm

Answer: A

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36. The radius of orbit of an electron and the speed of electron in the ground state of hydrogen atom are $5.5 \times 10^{-11} m$ and $4 \times 10^{6} ms^{-1}$ respectivley . Then , the orbital period of this electron in the first excited state will be . . . . . .

A. $6.908 \times 10^{-6} s$

B. $9.608 \times 10^{-16} s$

C. $7.806 \times 10^{-16} s$

D. $8.9068 \times 10^{-16} s$

Answer: A

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37. Two slits separated by 0 . 5 mm are illuminated by light of wavelength 500 nm . The screen is at a distance of 120 cm from the slits . The phase difference between the interfering waves at a point 3 mm on the screen from the central bright fringe is . . . . .

A. 5π

B. π

C. 3π

D. 7π

Answer: A

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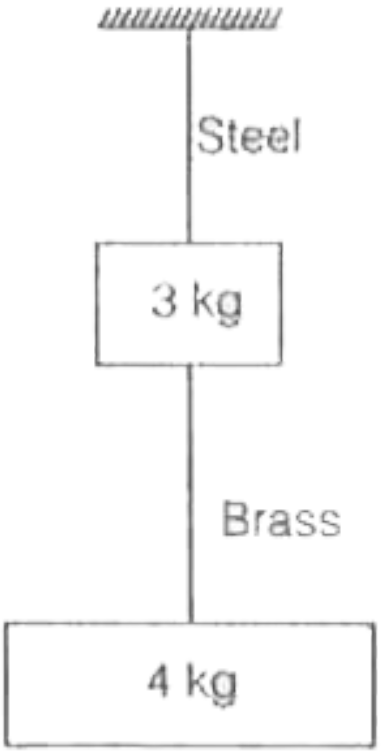
38. The ratios of length areas of cross-section and Young's modulii of steel of that of brass wires shown in the figure are a,b and c respectively . The ratio of increase in the lengths of brass of that of steel wires is [Assume that the masses of steel and brass wires are

negligible]



A. $\frac{4a}{7bc}$

B. $\frac{7bc}{4a}$

C. $\frac{4bc}{7a}$

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

Answer: C

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39. A person of 60 kg mass is in a lift which is coming down such that the man exerts a force of 150 N on the floor of the lift. Then the accelaration of the lift is $\left(g = 10ms^{-2}\right)$

A. $7.7ms^{-2}$

B. $40.0ms^{-2}$

C. $22.5ms^{-2}$

D. $15.0ms^{-2}$

Answer: A

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40. Match the following

List - I	List-II
(a) High retentivity	(i) Telephone diaphram
(b) High resistivity	(ii) Diamagnet
(c) Low coercivity	(iii) To decrease eddy current losses
(d) Negative susceptibility	(iv) Permanent magnet

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

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

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

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

Answer: B

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41. IF the charge of electron c , mass of electron m, speed of light in vaccum c and Planck's constant h are taken as fundamental

quantities. Then the permeability of vaccum μ_0 can be expressed as

A. $-\frac{h}{mc^2}$

B. $\frac{hc}{me^2}$

C. $\frac{h}{ce^2}$

D. $\frac{mc^2}{he^2}$

Answer:

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42. The velocity of an object moving in a straight line path is given as a function of time by $v = 6t - 3t^2$, where v is in ms^{-1}, t is in s. The average velocity of the object between , t=0 and t=2 s is

A. 0

B. $3ms^{-1}$

C. $2ms^{-1}$

D. $4ms^{-1}$

Answer:

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43. A gun and a target are at the same horizontal level separated by a distance of 600 m. The bullet is fired from the gun with the velocity of $500ms^{-1}$ In order to hit the target , the gun should be aimed to a height h above the target. The value of h is (Acceleration due to gravity,$g = 10ms^{-2}$)

A. 2.4 m

B. 3.6 m

C. 7.2 m

D. 10.8 m

Answer:

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44. A projectile is thrown in the upward direction making an angle of 60° with the horizontal with a velocity of $140ms^{-1}$. Then the time after which its velocity makes an angle 45° with the horizontal is (Acceleration due to gravity $g = 10ms^{-2}$)

A. 0.5124 s

B. 51.24 s

C. 5.124 s

D. 512.4 s

Answer:

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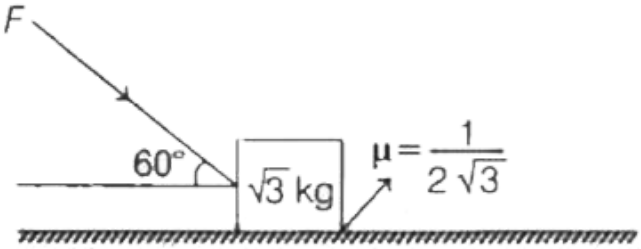
45. The maximum value of the applied force F such that the block as shown in the arrangement does not move is (Acceleration due to gravity, $g = 10ms^{-2}$)



A. 20 N

B. 15 N

C. 25 N

D. 10 N

Answer:

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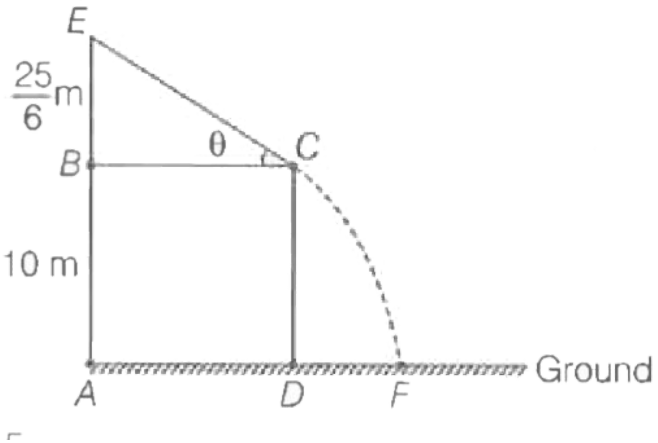
46. A rough inclined plane BCE of height $\left(\frac{25}{6}\right)m$ is kept on a rectangular wooden black ABCD of height 10 m , as shown in the figure. A small block is allowed to slide down from the top E of the inclined plane. The coefficient of kinetic friction between the block and the inclined plane is $\frac{1}{8}$ and the angle of inclination of the inclined plane is $\sin^{-1}(0.6)$. IF the small block finally reaches the ground at a point F, then DF will (Acceleration due to gravity, $g = 10ms^{-2}$)



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

B. $\frac{10}{3}m$

C. $\frac{13}{3}m$

D. $\frac{20}{3}m$

Answer:

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47. Two particles P and Q each of mass 3m lie at rest on the X-axis at point (-a,0) and (+a,0) respectively. A third particle R of mass 2m intially at the origin moves towards the particle Q. IF all the collisions of the system of 3 particles are elastic and head on, the total number of collisions in the system is

A. 2

B. 3

C. 4

D. 5

Answer:

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48. A motor engine pumps 1800 L of water per minute from a well dpth 30 m and allows to pass through a pipe of cross-sectional area $30cm^2$. Then the power of the engine is (Acceleration due to gravity, $g = 10ms^{-2}$)

A. 20.5 kW

B. 15.5 kW

C. 10.5 kW

D. 9.5 kW

Answer:

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49. A solid sphere of 100 kg and radius 10 m moving in a space becomes a circular disc of radius 20 m in one hour. Then the rate of change of moment of inertia in the process is

A. $\frac{40}{9} kgm^2 s^{-1}$

B. $\frac{10}{9} kgm^2 s^{-1}$

C. $\frac{50}{9} kgm^2 s^{-1}$

D. $\frac{25}{9} kgm^2 s^{-1}$

Answer:

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50. A semicircular plate of mass m has radius r and centre c. The centre of mass of the plate is at a distance x from its centre c. Its

moment of inertia about an axis passing through its centre of mass and perpendicular to its plane is

A. $\frac{mr^2}{2}$

B. $\frac{mr^2}{4}$

C. $\frac{mr^2}{2} + mx^2$

D. $\frac{mr^2}{2} - mx^2$

Answer:

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51. Two bodies of masses m_1 and m_2 initially at rest at infinite distance apart move towards each other under gravitational force of attraction. Their relative velocity of approach when they are separated by a distance r is (G= universal gravitational constant.)

A. $\left[\frac{2G(m_1 - m_2)}{r}\right]^{1/2}$

B. $\left[\frac{2G(m_1+m_2)}{r}\right]^{1/2}$

C. $\left[\frac{r}{2G(m_1m_2)}\right]^{1/2}$

D. $\left[\frac{r}{2G}m_1m_2\right]^{1/2}$

Answer:

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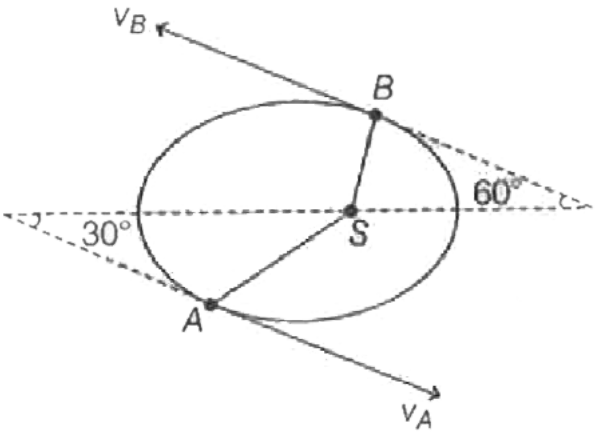
52. A planet is revolving around the sun as shown in the figure. The radius vectors joining the sum and the planet at points A and B are $90 \times 10^6 km$ and $60 \times 10^6 km$, respectively. The ratio of velocities of the planet at the points A and B when its velocities makes angle

30° and 60° with major axis of the orbit is



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

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

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

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

Answer:

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53. A solid copper cube of 7 cm edge is subjected to a hydraulic pressure of 800 kPa. The volume contraction of the copper cube is (Bulk modulus of copper =140 Gpa)

A. $196 \times 10^{-3} cm^3$

B. $19.6 \times 10^{-6} cm^3$

C. $19.6 \times 10^{-3} cm^3$

D. $196 \times 10^{3} cm^3$

Answer:

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54. A long cylindrical glass vessel has a pinhole of diameter 0.2 mm at its bottom. The depth to which the vessel can be lowered vertically in a deep water bath without the water entering into the

vessel is (surface tension of water, T=$0.07Nm^{-1}$, and accleration due to gravity, $g = 10ms^{-2}$)

A. 14 cm

B. 7 cm

C. 21 cm

D. 28 cm

Answer:

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55. The focal length of a spherical mirror made of steel is 150 cm. IF the temperature of the mirror increases by 200 K, its focal length become (coefficient of linear expansion of steel $\alpha = 12 \times 10^{-60}C^{-1}$)

A. 186.3 cm

B. 153.6 cm

C. 150.036 cm

D. 150.36 cm

Answer:

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56. A metal rod of length 10 cm and area of cross section $2.8 \times 10^{-4} m^2$ is covered with a non-conducting substance. One end of it is maintained at $80^\circ C$, while the other end is put in ice at $0^\circ C$. It is found that 20 gm of ice melts of 5 min. The thermal conductivity of the metal in $Js^{-1}m^{-1}K^{-1}$ is (Latent heat of ice is $80calg^{-1}$).

A. 70

B. 80

C. 90

D. 100

Answer:

Watch Video Solution

57. A gas expands with temperature according to the relation, $V = kT^{2/3}$ where k is a constant Word done when the temperature changes by 60 K is (R= Universal gas constant).

A. 10 R

B. 20 R

C. 50 R

D. 40 R

Answer:

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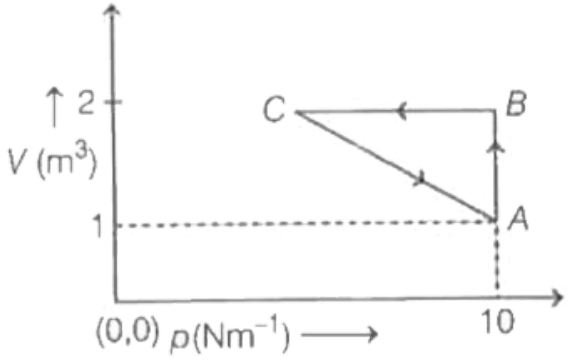
58. An ideal gas is taken through the cycle $A \to B \to C \to A$ as shown in the figure . If the net heat supplied to the gas in the cycles is 5J. The magnitude of word done during the process $C \to A$ is



A. 5 J

B. 10 J

C. 15 J

D. 20 J

Answer:

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59. At T(k), copper (atomic mass=635 u) has fcc unit cell structure with edge length of xA. What is the approximate density of Cu in gcm^{-3} at that temperature? ($N_A = 6.0 \times 10^{23} mol^{-1}$)

A. $\frac{42.3}{x^3}$

B. $\frac{423}{x^3}$

C. $\frac{423}{x^3}$

D. $\frac{212}{x^3}$

Answer:

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60. The number of moles of solute present in the solutions of I, II and III is respectively

I. 500 mL of 0.2 M NaOH

II. 200 mL of 0.1 N H_2SO_4

III. 6g of urea in 1 kg of water

A. 0.1,0.01,0.1

B. 0.1,0.02,0.1

C. 0.2,0.01,0.1

D. 0.1,0.01,0.2

Answer:

View Text Solution

61. 6g of a mixture of napthalene $(C_{10}H_8)$ and anthracene $(C_{14}H_{10})$ is dissolved in 300 gram of benzene. If the depression in freezing point is 0.70 K, the composition of napthalene and anthracene in the mixture respectively in g are (molal depression constant of benzene is 5.1 K mol^{-1})

A. 2.60,3.40

B. 3.40,2.60

C. 2.90,3.10

D. 3.10,2.90

Answer:

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62. Under which of the following conditions E value of the cell, for the cell reaction given is maximum?

$Zn(s) + Cu^{2+}(aq) \Leftrightarrow Cu(s) + Zn^{2+}(aq)$

$$\left(\frac{2.303\ RT}{F} \text{ at } 298\ \text{K} = 0.059\ \text{V},\right.$$
$$\left. E^{\circ}_{Zn^{2+}/Zn} = -0.76\ \text{V}, E^{0}_{Cu^{2+}/Cu} = +0.34\ \text{V}\right)$$

A. $C_1 = 0.1M, C_2 = 0.01M$

B. $C_1 = 0.01M, C_2 = 0.1M$

C. $C_1 = 0.1M, C_2 = 0.2M$

D. $C_1 = 0.2M, C_2 = 0.1M$

Answer:

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63. In the first order thermal decomposition of $C_2H_5I(g) \rightarrow C_2H_4(g) + HI(g)$, the reactant in the beginning exerts a pressure of 2 bar in a closed vessel at 600 K. IF the partial pressure of the reactant is 0.1 bar after 100 minutes at the same temperature the rate constant in min^{-1} is $(\log 2 = 0.3010)$

A. 6.0×10^{-4}

B. 6.0×10^{-3}

C. 3.0×10^{-3}

D. 3.0×10^{-4}

Answer:

View Text Solution

64. Identify the correst statements from the following:

I. Sulphur sol is an example of a multimolecular colloid.

II. Tyndall effect is observed when the diameter of the dispersed particles is not much smaller than the wavelength of the light used.

III. The process of removing a dissolved substance from a colloidal solution by means of diffusion through a suitable membrane is called peptisation.

IV.Eosin,gelatin are examples of negatively charged sols,

A. I,II,III

B. I,II,IV

C. I,III,IV

D. II,III,IV

Answer:

View Text Solution

65. Which of the following statements is not correct?

I. Magneitite II. Kaolinite III. Siderite IV. Calamine

A. I,II,III

B. II,III,IV

C. I,II only

D. III,IV only

Answer:

View Text Solution

66. Which of the following statements is not correct?

A. From SO_2 to TeO_2 reducing power decreases

B. The order of boiling points of hydrides of 16^{th} group elements in $H_2S < H_2Se < H_2Te < H_2O$

C. Rhombic sulphur has S_8 molecules while monoclinic sulphur has S_6 molecules.

D. The bond angle in ozone molecule is 117°

Answer:

View Text Solution

67. Noble metals, like gold and platinum are soluble in which of the following mixtures?

A. 1:1 mixture of conc. HNO_3 and conc. H_2SO_4

B. 1:3 mixture of conc. HCI and conc. HNO_3

C. 1:3 mixture of conc. HNO_3 and conc. HCI

D. 1:3 mixture of conc. H_2SO_4 and conc. HCl

Answer:

View Text Solution

68. Identify the set of acidic oxides.

A. Na_2O, CaO, BaO

B. ZnO, PbO, BeO

C. CO, NO, N_2O

D. Mn_2O_7, CrO_3, V_2O_6

Answer:

View Text Solution

69. The wavelengths of light absorbed by the complexes $[Ni(H_2O)_6]^{2+}$, $[Ni(en)_3]^{2+}$, $[Ni(H_2O)_4en]^{2+}$ are $\lambda_1, \lambda_2, \lambda_3$ respectively. The correct order of wavelengths is

A. $\lambda_1 > \lambda_2 > \lambda_3$

B. $\lambda_3 > \lambda_2 > \lambda_1$

C. $\lambda_1 > \lambda_3 > \lambda_2$

D. $\lambda_2 > \lambda_3 < \lambda_1$

Answer:

View Text Solution

70. $KMnO_4$ oxidises $S_2O_3^{2-}$ to SO_4^{2-} in medium x and NO_2^- to NO_3^- in medium y,x and y are respectively.

A. acidic,basic

B. acidic,acidic

C. acidic,neutral

D. neutral,acidic

Answer:

View Text Solution

71. Match the following:

	List I		List II
(A)	Teflon	I.	$SnCl_2$
(B)	Anionic polymerisation	II.	C_2F_4
(C)	Cationic polymerisation	III.	Bakelite
(D)	Thermosetting polymer	IV.	Polystyrene
		V.	RLi

A. II I V III

B. II V I IV

C. II V I III

D. V II I IV

Answer:

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72. Identify the correct set of monosaccharides present in sucrose (X), lactose (Y) and maltose (Z).

A. glucose,fructose galactose, glucose glucose,fructose

B. glucose,fructose galactose, glucose glucose,glucose

C. glucose,glucose galactose, glucose glucose,fructose

D. galactose, glucose glucose, fructose glucose,fructose

Answer:

View Text Solution

73. Which of the following are broad spectrum antibiotics?

Penicillin G	Chloram-phenicol	Ofloxacin	Ampicillin
(I)	(II)	(III)	(IV)

A. I, II only

B. I, II, III

C. II, III, IV

D. I, III only

Answer:

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74. Arrange of following organic halides in correct order of reactivity towards S_N2 displacement.

$(CH_3)_2C(Br)CH_2CH_3$, $BrCH_2(CH_2)_3CH_3$, $CH_3CH(Br)(CH_2)_2CH_3$

(P) (Q) (R)

A. $P > Q > R$

B. $R > P > Q$

C. $P > R > Q$

D. $Q > R > P$

Answer:

View Text Solution

75. The bond angle between C-O and O-H bonds in alcohols is close to

A. 109°

B. 120°

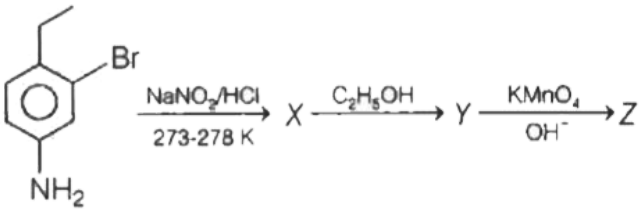
C. 180°

D. 90°

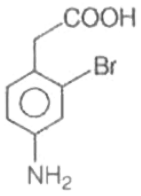
Answer:

View Text Solution

76. Identify Z in the following sequence of reactions.



A.



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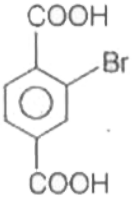
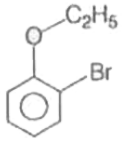
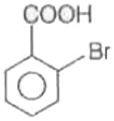


C.



D.



Answer:

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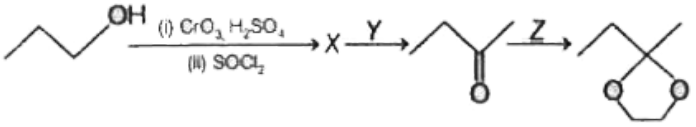
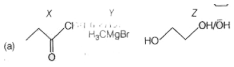
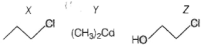
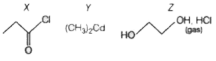
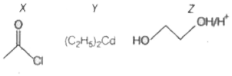
77. Identify X,Y,Z in the following reactions sequence.



A. 

B. 

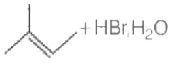
C. 

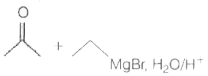
D. 

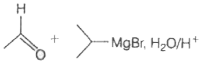
Answer:

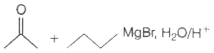
View Text Solution

78. 2-methyl-2 butane on hydration gave an alcohol X. Isomers of X could be prepared from which of the following?

A. 

B. 

C. 

D. 

Answer:

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79. Acetic acid on heating with NH_3 forms A. When A reacts with $LiAH_4$ followed by hydrolysis gives B. When B is heated with chloroform in KOH medium gives C. What are B and C respectively?

A. CH_3CONH_2, CH_3CH_2NC

B. $CH_3CH_2NH_2, CH_3CH_2NC$

C. $CH_3CH_2NH_2, CH_3COOH$

D. $CH_3CH_2CH_2NH_2, CH_3CH_2NC$

Answer:

View Text Solution

80. N divisions on the main scale of a vernier calipers coincide with (N +1) division of the vernier scale. If each division of main scale is a units, then the least count of the calipers is :

A. $\frac{a}{N}$

B. a

C. $\frac{a}{N+1}$

D. $\frac{Na}{N+1}$

Answer: C

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81. When a body is in SHM, then match the following .

List - I	List- II
A. Vlecity is maximum	I. At extreme position
B. KEis $\left(\frac{3}{4}\right)^{th}$ oh the total energy	II. At mean position
C. PE is $\left(\frac{3}{4}\right)^{th}$ of total energy	III. At half of the amplitude
D. Acceleration is maximum	IV. $At\frac{\sqrt{3}}{2}$ times of the amplitude

A. $\begin{matrix} A & B & C & D \\ III & I & IV & II \end{matrix}$

B. $\begin{matrix} A & B & C & D \\ I & III & IV & II \end{matrix}$

C. $\begin{matrix} A & B & C & D \\ II & III & IV & I \end{matrix}$

D. $\begin{matrix} A & B & C & D \\ II & I & IV & III \end{matrix}$

Answer: C

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82. Ship A is moving Westwards with a speed of $20kmh^{-1}$ and another ship B which is at 200 km South of A is moving Northwards with a speed of $10kmh^{-1}$. The time after which the distance between them is shortest and the shortest distance between them respectively,

A. $4h, 80\sqrt{5}km$

B. $50\sqrt{2}h, \sqrt{10}km$

C. $100\sqrt{2}h, 2\sqrt{10}km$

D. $80\sqrt{5}h, 4km$

Answer: A

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83. A body is projecte at an angle of 60° with the horizontal such that the vertical component of its initial velocity is $40ms^{-1}$. The magnitude of velocity of the projectile at one quarter of its time of flight is nearly,

(Acceleration due to gravity, $g = 10ms^{-2}$)

A. $3.\ 54ms^{-1}$

B. $35.40ms^{-1}$

C. $30.54ms^{-1}$

D. $34.5ms^{-1}$

Answer: A

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84. A block of mass 48 kg kept on a smooth horizontal surface is pulled by a rope of length 4 m by a horizontal force of 25 N applied to the other end. If the linear density of the rope is $0.5kgm^{-3}$, the force acting on the block is

A. 24 N

B. 25 N

C. 12 N

D. 13 N

Answer: A

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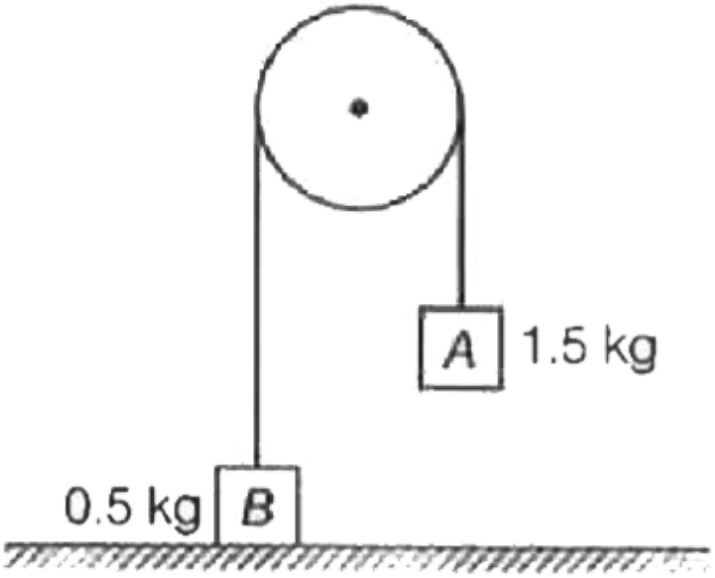
85. Two blocks A and B of masses 1.5 kg and i.5 kg, respectively are connected by a massless inextensible string passing over a

frictionles pulley as shown in the figure. Block A is lifted until block B touches the ground and then block B touches the ground and then block A is released. the initial height of block A is 80 cm when block B just touches the ground. the maximum height reached by block B from the ground after the block A falls on the ground is



A. 80 cm

B. 120 cm

C. 140 cm

D. 160 cm

Answer: B

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86. A body is released from height of 30 m vertically downwards. The speed of the body at which potential is twice that of kinetic energy is

(Acceleration due to gravity , $g = 10ms^{-2}$)

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

B. $10\sqrt{2}ms^{-1}$

C. $10ms^{-1}$

D. $20ms^{-1}$

Answer: B

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87. The work done by a force $F = -5x^4\hat{i}N$ in displacing a dody from, x = 2 m to x = - 2 m is

A. 6 J

B. 8 J

C. 64 J

D. 0 J

Answer: C

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88. A wheel having moment of inertia $2kg - m^2$ about its axis, rotates at 50 rpm about the same axis . The torque required to stop the wheel in one minute is

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

B. $\frac{\pi}{18} Nm$

C. $-\frac{\pi}{12} Nm$

D. $\frac{3\pi}{8} Nm$

Answer: B

Watch Video Solution

89. The angular retardation of a rotating flywheel is proportional to the angle through which it rotates. If its kinetic energy gets reduced by ΔE while it rotates through at an angle θ, then

A. $\Delta E \propto \theta^2$

B. $\Delta E \propto \sqrt{\theta}$

C. $\Delta E \propto \theta$

D. $\Delta E \propto \theta^{\frac{3}{2}}$

Answer: A

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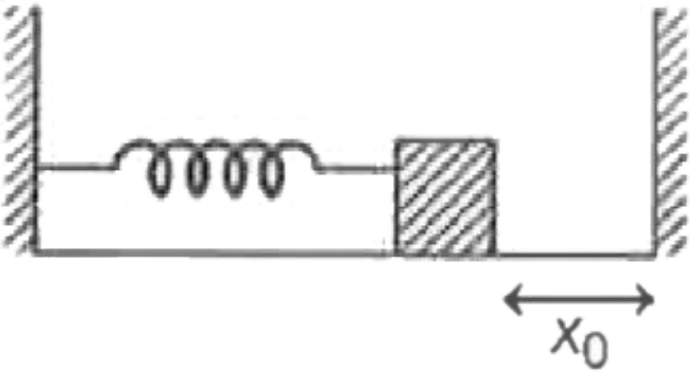
90. One end of spring of force constant k is fixed to a vertical wall and the other to a block of mass m resting on a smooth horizontal surface. There is another wall at a distance, x_0 from the block . The spring is then compressed by $2x_0$ and released. The time taken by the block to strike the other wall is



A. $\frac{1}{6}m\sqrt{\frac{m}{k}}$

B. $\sqrt{\frac{m}{k}}$

C. $\frac{2\pi}{3}\sqrt{\frac{m}{k}}$

D. $\frac{\pi}{64}\sqrt{\frac{m}{k}}$

Answer: C

Watch Video Solution

91. The amplitude of a damped oscillator becomes half in one minute. The amplitude after 3 munutes will be $\frac{1}{x}$ times the original . Then , x is

A. 4

B. 8

C. 6

D. 12

Answer: B

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92. A uniform rod of length l and density ρ is revolving about a vertical axis passing through its one end. If ω is the angular velocity of the rod then the centrifugal force per unit area of the rod is

A. $\frac{\rho\omega^{2/2}}{4}$

B. $\frac{\rho\omega^{2/2}}{12}$

C. $\frac{\rho\omega^{2/2}}{2}$

D. $\frac{\rho\omega^{2/2}}{8}$

Answer: C

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93. Two capillary tubes of same length each of 50 cm but of different radii 4 mm and 2mm are connected in series. When water flows, the pressure, difference between the ends of the first tube is

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

B. $\frac{\rho}{17}$

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

D. $\frac{\rho}{8}$

Answer: B

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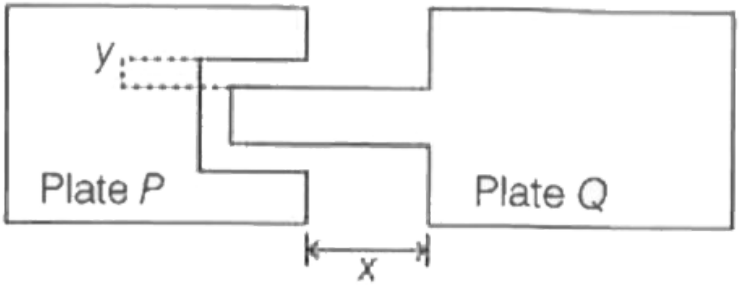
94. Two metal plates P and Q of same material are arranged as shown in the figure. If both the plates are uniformly heated

through the same range of temperature, then



A. both x and y increase

B. both x and y decrease

C. x decreases and y increase

D. x increases and y decrease

Answer: B

Watch Video Solution

95. A liquid of mass 250 g is kept warm in a vessel using an electric heater. The liquid is maintained at 57° when the power supplied by

the heater is 30 W and surrounding temperature is 27° C . As the heater is switched off, it took 10 s time for the temperature of the liquid to fall from 47° C to $46.9^\circ C$. The specific heat capacity of the liquid is

A. $8000 jkg^{-1}K^{-1}$

B. $9000 jkg^{-1}K^{-1}$

C. $6000 jkg^{-1}K^{-1}$

D. $12000 jkg^{-1}K^{-1}$

Answer: D

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96. The amount of heat that must be supplied to 35 g of oxgen at room temperature to raise its temperature by $80^\circ C$ at constant

volume is

(Molecular mass of oxygen is 32 and $R = 8.3 Jmol^{-1}K^{-1}$)

A. 2.84 kJ

B. 1.68 kJ

C. 1.81 kJ

D. 2.88 kJ

Answer: C

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97. A Carnot engine of efficiency 40% , takes heat from a source maintained at a temperature of 500 K . If is desired to have an engine of efficiency 60% . Then , the source temperature for the same sink temperature must be

A. 650 K

B. 750 K

C. 550 K

D. 850 K

Answer: B

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98. For a gas the value of $\frac{R}{C_v} = 0.4$ so the gas is

(R-universal gas constant)

A. monoatomic

B. diatomic

C. triatomic

D. polyatomic

Answer: B

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99. A cylindrical tube open at both ends has a fundamental fruquency f in air. The tube is dipped vertically in water so that 60% of the tube is in water. Then , the fundamental frequency of air column is

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

B. $\frac{5f}{4}$

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

D. 2f

Answer: B

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100. A train approaching a railway crossing at a speed of 120 km/h sounds a whistle of frequency 576 Hz, when it is 288 m away from the crossing . The frequency heard by the observer standing on the road perpendicular to the track from the crossing at a distance of 384 m is

(Speed of sound in air $= 340ms^{-1}$)

A. 632 Hz

B. 612 Hz

C. 512 Hz

D. 472 Hz

Answer: B

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101. A small object is enclosed in a transparent solid sphere of radius 8 cm. the object is situated at 2 cm from the centre of the sphere. If its image appears to be at 3.2 cm from the nearest side, then the refractive index of the material of the sphere is

A. 1.62

B. 1.45

C. 1.55

D. 1.50

Answer: D

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102. A Young 's double slit experimental setup is immersed in water of refrective index 1.33 . It has slit seperation 1 mm and the distance

between slits and screen is 1.33 m . If the wavelength of incident light on slits is 6300 $\mathring{A}$, then the fringe width on the screen is

A. 6 . 3 m m

B. 0 . 63 m m

C. 0 . 63 m

D. 6 . 3 m

Answer: B

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103. In a hydrogen atom, an electron of mass 9.1×10^{-31} kg revolves about a proton in circular orbit of radius 0 . 53 $\mathring{A}$. The radial acceleration and angular velocity of electron are respectively .

A. $9 \times 10^{22} ms^{-2}, 4.1 \times 10^{16} s^{-1}$

B. $4.1 \times 10^{16} ms^{-2}, 9 \times 10^{22} s^{-1}$

C. $9 \times 10^{16} ms^{-2}, 4.1 \times 10^{22} s^{-1}$

D. $4.1 \times 10^{22} ms^{-2}, 9 \times 10^{16} s^{-1}$

Answer: A

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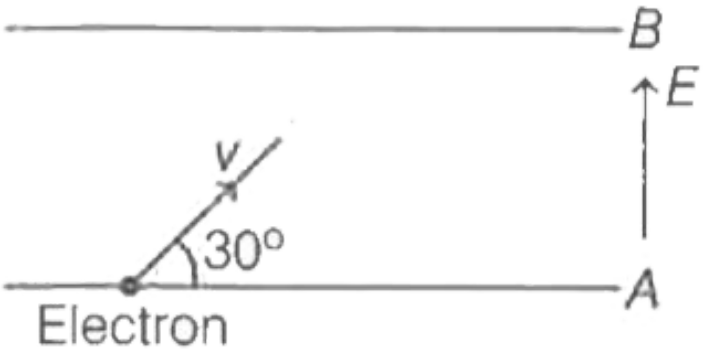
104. Two long parallel plates A and B are separated by a distance of 4 cm with an electric field of $45.5 Vm^{-1}$ between the plates normally from plate A to plate B , as shown in the figure. An electron is projected from plate A with velocity v at an angle of 30° with the surface of plate A . The maximum value of v so that the electron does not hit plate B is

(Assume gravity free space, charge of electron $= 1.6 \times 10^{-19}$ C

and mass of electron $= 9.1 \times 10^{-31}$ kg)



A. $400 kms^{-1}$

B. $3200 kms^{-1}$

C. $800 kms^{-1}$

D. $1600 kms^{-1}$

Answer: D

Watch Video Solution

105. Three point charges of 2 mC each are kept at the vertices of an equilateral triangle of side 50 cm . If the system is supplied energy at the rate 2 kW, the time taken to move one of the charges to the mid point of the line joining the other two charge is

A. 18 s

B. 36 s

C. 72 s

D. 144 s

Answer: C

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106. Two identical charged spheres separated by a distance repel other with a force F. If 10% of electrons are transferred from one

sphere of the other ,then the force between them becomes

A. F

B. 1.21 F

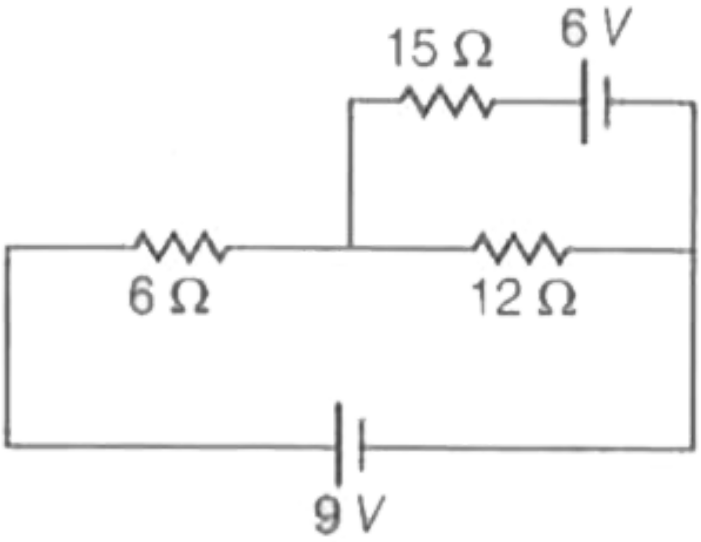
C. 0 . 99 F

D. 0 . 81 F

Answer: C

Watch Video Solution

107. In the given circuit, the electric cruuents through 15 Ω , respectively are :



A. 0 A, 0. 5 A

B. 0 A, 1 A

C. 0 . 5 A, 1 A

D. 1 A, 0 A

Answer: A

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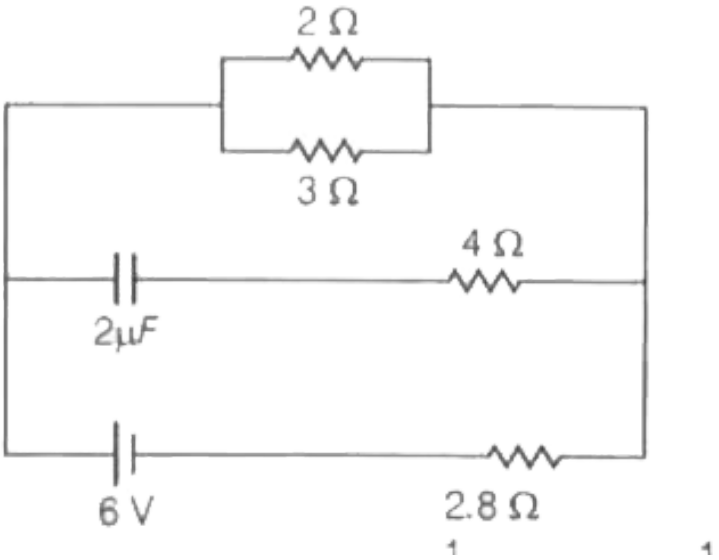
108. In the given circuit, the current through 2 Ω resistor is



A. $9A$

B. $0.9A$

C. $\frac{1}{9}A$

D. $\frac{1}{0.9}A$

Answer: B

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109. A circular coil connected to a battery of emf E produced a certain magnetic induction field at its centre. The coil is unwound, stretched to double its length rewound into a coil of $\frac{1^{rd}}{3}$ of the original radius and connected to a battery of emf E to produce same field at the centre. Then , E is

A. $\frac{2E}{9}$

B. $\frac{3E}{7}$

C. $\frac{9E}{4}$

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

Answer: A

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110. Assertion (A) The work done by the electrostatic force is zero when a point charge move in a circular path around another charge.

Reason (R) The dot product of force and displacement vectors gives work done.

A. Both (A) and (R) are correct and (R) is the correct explanation of (A)

B. Both (A) and (R) are correct but (R) is not correct explanation of (A)

C. (A) is correct but (R) is not correct.

D. (A) is not correct but (R) is correct.

Answer: A

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111. The magnetic susceptibility of a paramagnetic substance at -173° C is 1.5×10^{-2} . To have the susceptibility 0.5×10^{-2} , the change in temperature in $.^{\circ} C$ is

A. 100

B. 180

C. 200

D. 220

Answer: C

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112. A coil of mean area 500 cm^2 and having 1000 turns is held with its plane perpendicular to a uniform field of 00 . 4 G . If the coil is turned through 180° in $\frac{1}{10}$ second , then the average induced emf

is

(Take ,1 G $= 10^{-4}T$)

A. 0 . 0 4 V

B. 0 . 4 V

C. 4 V

D. 40 V

Answer: A

Watch Video Solution

113. An emf of 15 V is applied to a circuit containing 5 H inductance and 10 Ω resistance. The ratio of the currents at time, $t = \infty$ and $t = 1$ s is

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

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

C. $\frac{e}{1-e^2}$

D. $\frac{e^2}{e^2-1}$

Answer: D

Watch Video Solution

114. The amplitude of the electric field in a parallel beam of plane electromagnetic waves of intensity 53.1 W m^{-1} is

(Permittivity of free space $= 8.85 \times 10^{-12} C^2 N^{-1} M^{-2}$)

A. $400 NC^{-1}$

B. $50 NC^{-1}$

C. $100 NC^{-1}$

D. $200 NC^{-1}$

Answer: D

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115. An α -particle moves in a circular path of radius 1 cm in a uniform magnetic field of 0 .1 25 T . The de-Broglie wavelength associated with the α- particle is

A. $1.65 \times 10^{-12} m$

B. $3.3 \times 10^{-12} m$

C. $4.95 \times 10^{-12} m$

D. $6.6 \times 10^{-12} m$

Answer: A

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116. When a hydrogen atom emits a photon during a transition from n = 4 to n = 2, its recoil speed is about ,

A. $4.28ms^{-1}$

B. $0.814ms^{-1}$

C. $0.07ms^{-1}$

D. $0.407ms^{-1}$

Answer: B

Watch Video Solution

117. If the binding energy of N^{14} is 7 . 5 Mev per nucleons and that of N^{15} is 7 . 7 MeV per nucleon, then, the energy is required to remove a neutron from N^{15} is

A. $5.25MeV$

B. 0 . 2 MeV

C. 10 . 5 MeV

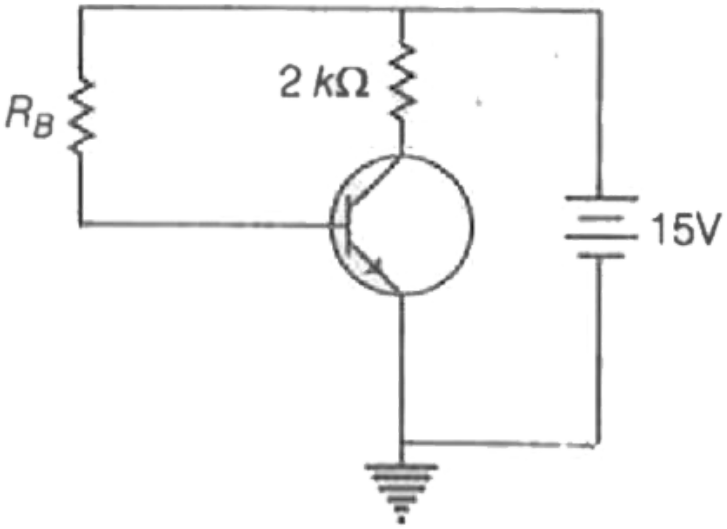
D. 0 . 4 MeV

Answer: C

Watch Video Solution

118. In the following common-emitter circuit, $\beta = 100$ and $V_{CE} = 7. If V_{BE}$ is negligible, then the base current

is



A. 0 . 0 1 mA

B. 0 . 0 4 mA

C. 0 . 02 mA

D. 0 . 0 3 mA

Answer: B

View Text Solution

119. The frequency suitable for beyond - the - horizon communication using sky waves is

A. $10^{12} Hz$

B. $10^{9} Hz$

C. $10^{7} Hz$

D. $10^{4} Hz$

Answer: C

Watch Video Solution

120. A car moving with a certain velocity jumps form an inclined plane placed at one bank of a river and reaches the other bank by attained a maximum height of 80 m if the same car moving with the same velocity jumps from another inclinded plane having different angle of inclination and reaches the same point on the other bank

by attaining maxmimum height of 45 m then the width of the river is

A. 80 m

B. 60 m

C. 125 m

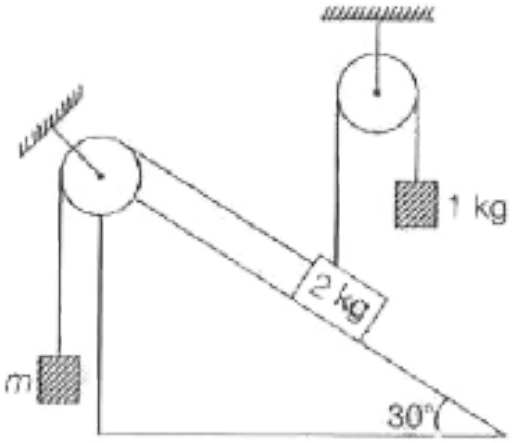
D. 240 m

Answer: D

Watch Video Solution

121. A system containing masses and pulleys connected on an inclined plane is shown in the figure If the system is in equilibrium

then the value of m is



A. 1 kg

B. 0.5 kg

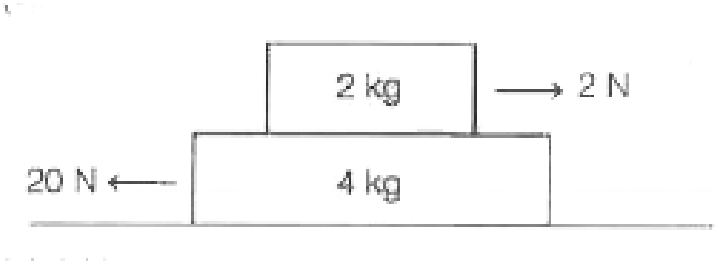
C. 0.75 kg

D. 0.25 kg

Answer: B

Watch Video Solution

122. In the arrangement shown in the figure the coefficient of friction between two blocks is 0.5 the force of friction between the two blocks is (assume that the 4 kg block is placed on a smooth horizontal surface (acceleration due to gravity =10 ms^2)



A. 8N

B. 10 N

C. 6N

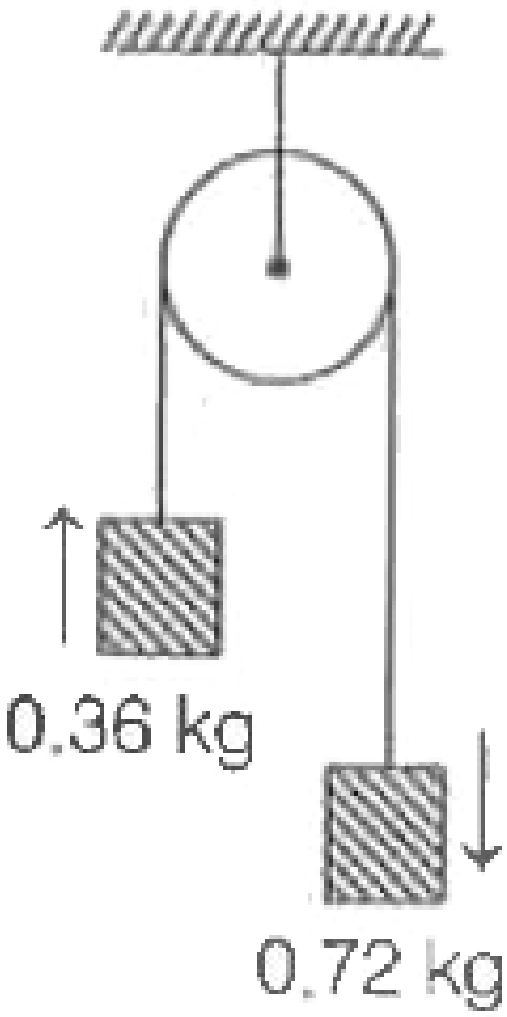
D. 4N

Answer: A

Watch Video Solution

123. In the arrangement shown in the figure work dione by the string on the block of mass 0.36 kg during the first second after the blocks are released from state of rest is (Ignotre friction and mass of the string)

(acceleration due ot gravity g=$10ms^{-2}$)



A. 8J

B. 4J

C. 12J

D. 2J

Answer: A

Watch Video Solution

124. A man who is running has half the kinetic energy of a boy of half his mass the man speeds up by 1 ms^{-1} and then has the same kinetic energy as the boy the initial speed of the boy is

A. $\sqrt{2}+1ms^{-1}$

B. $2\left(\sqrt{2}+1\right)ms^{-1}$

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

D. $2ms^{-1}$

Answer: B

Watch Video Solution

125. A solid sphere rools dwon without slipping on a smooth inclined plane of inclination $\sin^{-1}(0.42)$ if the acceleration due to gravity is $10ms^{-2}$ the acceleration of the rolling sphere is

A. $1ms^{-2}$

B. $2ms^{-2}$

C. $3ms^{-2}$

D. $4ms^{-2}$

Answer: C

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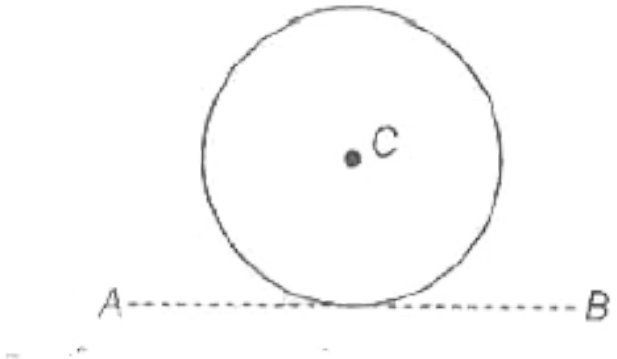
126. A thin wire of length / having a linear density p is bent in to a circular loop with c as its centre as shown in the figure the moment of inertial of the loop about the line AB is



A. $\frac{5}{16} \cdot \frac{pl^3}{\pi^3}$

B. $\frac{1}{16} \frac{pl^3}{\pi^2}$

C. $\frac{1}{8} \frac{pl^3}{\pi^3}$

D. $\frac{3}{8} \frac{pl^3}{\pi^2}$

Answer: D

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127. A particle executing SHM along a straight line has zero velocity at point A and B whose distance from 0 on the same line OAB are a and b respectively if the velocity at the mid point between A and B is v then its time period is

A. $\frac{\pi(b+a)}{v}$

B. $\pi\left(\frac{b-a}{v}\right)$

C. $\left(\frac{b+a}{2v}\right)$

D. $\left(\frac{b-a}{2v}\right)$

Answer: B

Watch Video Solution

128. A rocket is launched striaght up from the surface of the earth the earth the minimum velocity with which it should coast is

(Escape velocity on the surface of the earth is $11.2kms^{-1}$)

A. $11.2kms^{-1}$

B. $10.7kms^{-1}$

C. $9.7kms^{-1}$

D. $8.7kms^{-1}$

Answer: C

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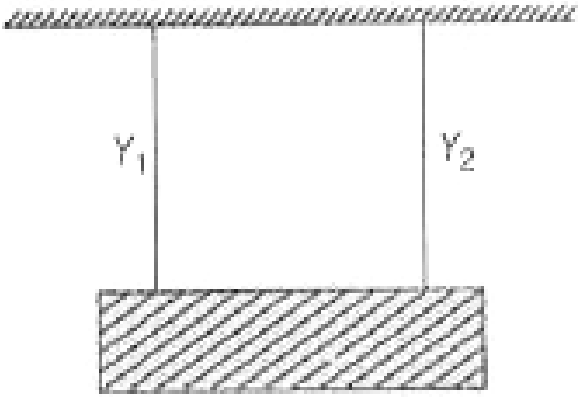
129. Two wires of equal length and equal cross sectional area are suspended as shown in the figure their young modulii are y_1 and y_2

respectively the equaivalent young 's modulus is



A. $y_1 + y_2$

B. $\frac{y_1 + y_2}{2}$

C. $\frac{y_1 y_2}{y_1 + y_2}$

D. $\sqrt{y_1 y_2}$

Answer: B

Watch Video Solution

130. A rain drop of radius r is falling through air startin from rest the work done by all the forces on the drop when it attains terminal velocity is proportional to

A. r^3

B. r^7

C. r^5

D. r^4

Answer: B

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131. Which of the following statement is correct regarding p-V graph?

1 slop of p-V graph in an isothermal process is $\frac{p}{v}$

2 slope of p-V graph in an adiabatic process is $-\frac{p}{v}$

3 slope of p-V graph in an isochoric process is $\frac{\gamma p}{v}$

4 slope of p-V graph in an isobaric porcess is zero

A. 1,3,4 are correct

B. 2,3 are correct

C. 1,4 are correct

D. 2,3,4 are correct

Answer: C

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132. Two metalic spheres p and Q are made of same material have same smoothness but the weight of p is 8 times that of Q if the two are heated to same temperature and left to cool then the ratio of rate of cooling of Q to that of p is

A. 4

B. 8

C. 2

D. 1

Answer: C

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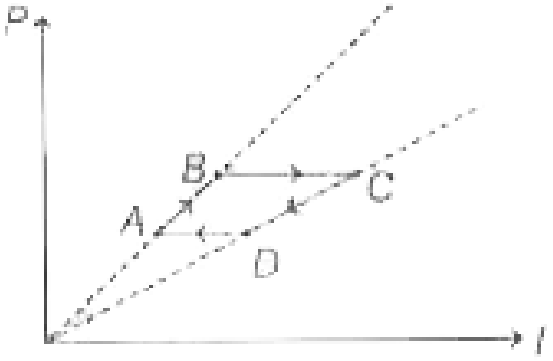
133. Three moles of an ideal monotomic gas performs a cycle ABCDA as shown in the figure The temperatures of the gas at the states A,B,C and D are 400 K , 800 k 2400 k and 1200 k respecitvely the work done by the gas during this cycle is

R is universal gas constant



A. 1200 R

B. 3600 R

C. 2400 R

D. 2000 R

Answer: C

Watch Video Solution

134. An insulated system contains 4 moles of an ideals diatomic gas at temperature T when a gas is dissociated in to atoms and the temperature remained constant then the relaton between Q and T is

R = universal gas constant

A. Q = RT

B. Q=2RT

C. Q=3RT

D. Q=4Rt

Answer: A

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135. Under standard conditions the density of a gas is $\frac{1400}{1089}$ kg m^{-3} and the speed of sound progagation in it is 330 ms^{-1} then the number of degrees of freedom of the gas molecules is

A. 2

B. 7

C. 5

D. 3

Answer: C

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136. When the air column of aresonance tube is vibrated together with a tuning fork 3 beats are heard per second either the

temperature of the air columns is $51^{\circ}C$ or 16° C the frequency of the tuning fork is

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137. Two source A and B are producing notes of frequency 680 Hz. A listener moves from A to B with a constant velcoity v. if the speed of sound in air is 340 ms^{-1}, the value of y so that the hears 10 beats per second is

A. $2.0ms^{-1}$

B. $2.5ms^{-1}$

C. $3.0ms^{-1}$

D. $3.5ms^{-1}$

Answer: B

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138. A thin converging lens of focal length f= 25 cm forms the image of an object on a screen placed at a distance of 75 cm from the lens. The screen is moved closer to the lens by a distance of 25 cm. The distance through which the object has to be shifted, so that its image on the screen in sharp again is

A. 50 cm towards the lens

B. 50 cm away from the lens

C. 12.5 cm towards the lens

D. 12.5 cm away from the lens

Answer: D

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139. A ray of light is incident on the surface of a glass plate of refractive index $\sqrt{3}$ at the polarising angle . The angle of refraction of the ray is

A. 30°

B. 45°

C. 60°

D. 37°

Answer: A

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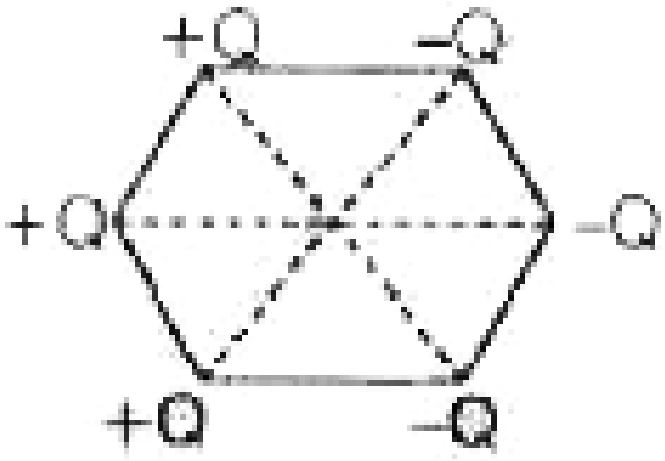
140. Six point charge each of the magnitude Q are placed at the vertices of a regular hexagon of side a as shown in the figure Electric field intensity on the line passing through the centre o and

perpendicular to the plane of the figure at a large distance $x(>>a)$ from o is

$\left(\text{Let } . \frac{1}{4\pi \in_0} = k\right)$



A. $k \times \frac{4Qa}{x^3}$

B. $k \times \frac{2Qa}{x^3}$

C. $k \times \frac{8Qa}{x^3}$

D. 0

Answer: A

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141. A ball of mass 1 g having a charge of 20 μC is tied to one end of a string of length 0.9 m can rotate in a vertically plane in a uniform electric minimum horizontal velocity that must be given to the ball at the lowest position so that is complete the verticle circle is $\left(\leq tg = 10ms^{-1} \right)$

A. $9ms^{-1}$

B. $18ms^{-1}$

C. $36ms^{-1}$

D. $6ms^{-1}$

Answer: D

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142. A regular hexagon of side 5 cm has charge $10\mu C$ at each of its vetices . The potential at the centre of hexagon is

A. o v

B. $18 \times 10^5 V$

C. $1.08 \times 10^7 v$

D. $1.08 \times 10^5 v$

Answer: C

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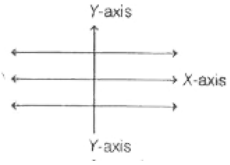
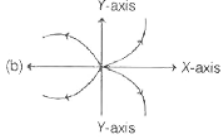
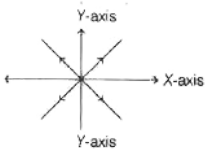
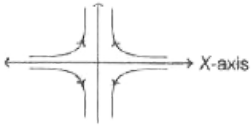
143. The potential in an electric field varles as $v = \left(x^2 - y^2\right)$. The electric lines of the force in $x - y$ plane are

A.



B. 

C. 

D. 

Answer: C

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144. The length of a potentiometer wires is l.A cell of emf E is balanced at a length $\left(\frac{l}{3}\right)$ from positive end of the wire . If the length of the wire is increased by $\left(\frac{l}{2}\right)$ the distance at which the same cell gives the balancing point is

(Cell in the primary is ideal and no series resistance is present in the primary circuit .)

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

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

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

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

Answer: B

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145. n identical reistance are taken in which $\frac{n}{2}$ resistors are joined in series in the left gap and the remaining $\frac{n}{2}$ resistances are joined in parallel in the right gap of metre bridge. Balancing length in cm is

A. $100, \frac{n^2}{n^2+4}$

B. $100. \frac{n^2}{n^2+1}$

C. $400. \frac{1}{n^2+4}$

D. $400. \frac{1}{n^2+1}$

Answer: A

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146. The magnetic field normal to the plane of a coil of N turns and radius r which carries a current I is measured on the axis of the coil at a distance h from the centre of the coil. This is smaller than the field at the centre by ther fraction.

A. $\frac{3}{2}.\frac{h^2}{r^2}$

B. $\frac{2}{3}.\frac{h^2}{r^2}$

C. $\frac{3}{2}.\frac{r^2}{h^2}$

D. $\frac{2}{3}.\frac{r^2}{h^2}$

Answer: A

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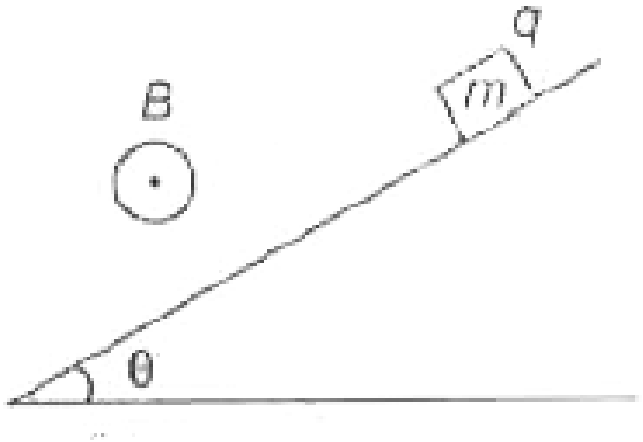
147. A small block of mass 20 g and charge 4 mc is released on a long smooth inclined plane of inclination angle of 45° A uniform horizontal magnetic field of 1 T is acting parallel to the surface as shown in the figure . The time from the start when the block loses contact with the surface of the plane is



A. 2 s

B. 3 s

C. 5 s

D. 6 s

Answer: C

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148. Match the following List - I with List - II

	List-I		List-II
A.	$\oint EdA$	(i)	0
B.	$\oint BdA$	(ii)	$-\frac{d\phi_B}{dt}$
C.	$\oint Edl$	(iii)	$\frac{Q}{\epsilon_0}$
D.	$\oint Bdl$	(iv)	$\mu_0(i_c + i_d)$

Codes

	A	B	C	D
(a)	(iii)	(ii)	(i)	(iv)
(c)	(iii)	(i)	(ii)	(iv)

	A	B	C	D
(b)	(iv)	(i)	(iii)	(ii)
(d)	(iii)	(i)	(iv)	(ii)

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149. Two concetric coplanar circular conducing loops have radii R and r $(R > > r)$. Their mutual inductance is proportional to

A. $\frac{r}{R}$

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

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

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

Answer: C

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150. When an inductor L and a resistor R in series are connected across a 12 v, 50 Hz supply a current of 0.5 A flows in the circuit . The

current differs in the phase from applied voltage by $\frac{\pi}{3}$ radian . Then the value of R is

A. 10Σ

B. 3Σ

C. 12Σ

D. 15Σ

Answer: C

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151. A point source of electromagnetic rediation has an average power output of 960 W. The peak value of the electric field at a distance 400 cm from the source is

A. $60Vm^{-1}$

B. $120Vm^{-1}$

C. $30Vm^{-1}$

D. $180Vm^{-1}$

Answer: A

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152. All electrons ejected from a metallic surface by incident light of wavelength 400 nm travelled 1 m in the direction of uniform electric field of $2NC^{-1}$ and came to rest. The work function of the surface is

A. $1.1eV$

B. $2.2eV$

C. $3.1eV$

D. $5.1eV$

Answer: A

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153. Speed of electron in its 1st Bohr's orbit is given by $2.18 \times 10^6 ms^{-1}$. It the time period of electron in n th orbit is measured as 4.10 femto second, the value of n is

A. 1

B. 2

C. 3

D. 4

Answer: C

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154. A radioactive substance of half life 138. 6 days is placed in a box . After n days only 20% of the substance is present then the value of n is

[in (5)= 1.61]

A. 693

B. 138.6

C. 277.2

D. 322

Answer: D

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155. Three amplifiers with voltage gains 10 ,20 and 30 are connected in series . If the input signal has a peak value of 1 mV then the peak

value of the ouptut voltage is

A. 6V

B. 60 V

C. 0.6 V

D. 0.06 V

Answer: A

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156. A TV tower has a height 160 m. Its coverage rangle is nearly (Earth's radius R= 6400 km)

A. 45255 m

B. 55265 m

C. 452.55 km

D. 552. 65 m

Answer: A

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