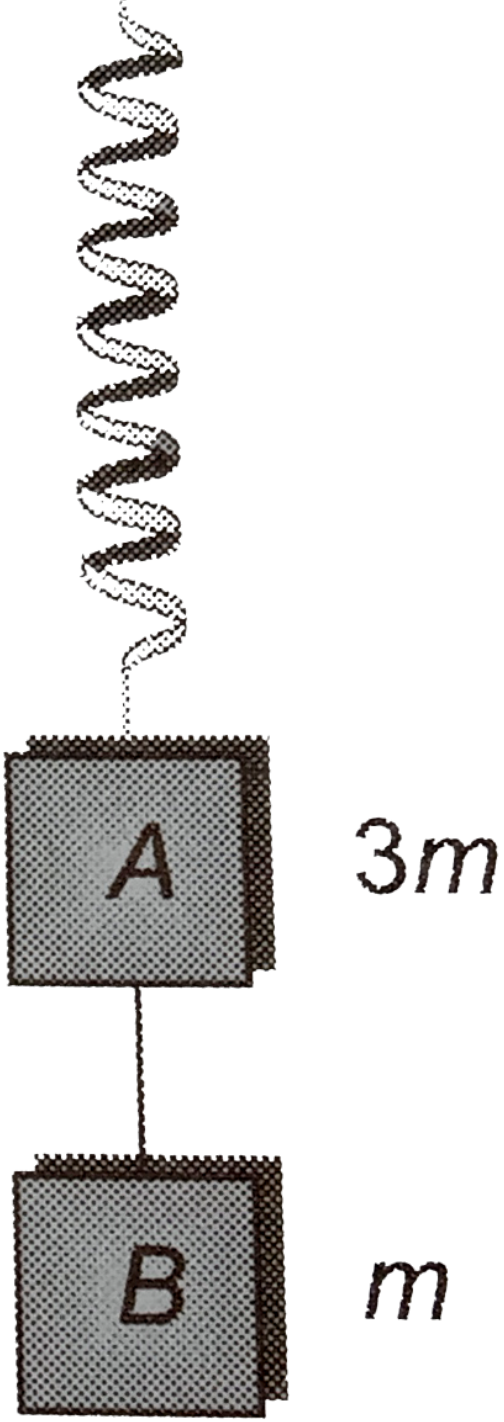
PHYSICS

BOOKS - DC PANDEY ENGLISH

SOLVD PAPERS 2017 NEET, AIIMS & JIPMER

Solved Papers 2017 Neet

1. Two block A and B of masses $3m$ and m respectively are connected by a massless and inextensible string. The whole system is suspended by a massless spring as shown in figure. The magnitudes of acceleration of A and B immediately after the string is cut, are resectively


A
3m
B
m

A. $g, \frac{g}{3}$

B. $\frac{g}{3}, g$

C. g,g

D. $\frac{g}{3}, \frac{g}{3}$

Answer: B

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2. The acceleration due to gravity at a height 1 km above the earth is the same as at a depth d below the surface of earth. Then

A. $d = \frac{1}{2} km$

B. d=1km

C. $d = \frac{3}{2} km$

D. d=2km

Answer: D

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3. A particle executies linear simple harmonic motion with an amplitude $3cm$ .When the particle is at $2cm$ from the mean position , the magnitude of its velocity is equal to that of acceleration .The its time period in seconds is

A. $\frac{\sqrt{5}}{\pi}$

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

C. $\frac{4\pi}{\sqrt{5}}$

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

Answer: C

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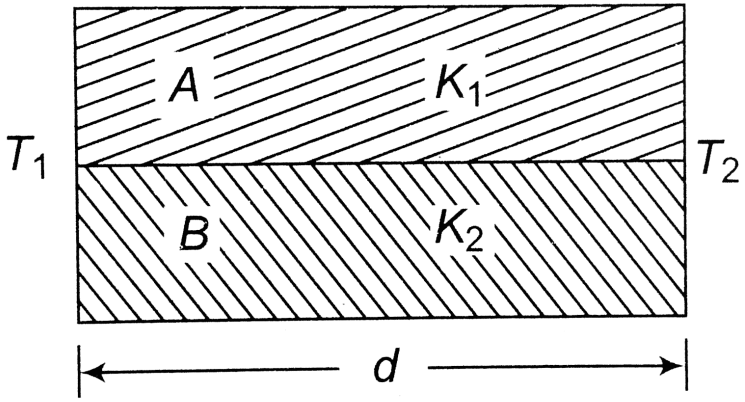
4. Two rods A and B of different materials are welded together as shown in figure. Their thermal conductivities are K_1 and K_2. The thermal conductivity of the composite rod will be



A. $\frac{k_1 + k_2}{2}$

B. $\frac{3(k_1 + k_2)}{2}$

C. $k_1 + k_2$

D. $2(k_1 + k_2)$

Answer: A

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5. The two harmonics of a tube closed at one end and open at other are 200 Hz and 260 Hz. What is the funamental frequency of the system?

A. 10HZ

B. 20 HZ

C. 30HZ

D. 40HZ

Answer: B

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6. The bulk modulus of a spherical object is B if it is subjected to uniform pressure p, the fractional decrease in radius is:

A. $\frac{P}{B}$

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

C. $\frac{3P}{B}$

D. $\frac{P}{3B}$

Answer: D

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

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

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

D. $\frac{1}{c}G\frac{e^2}{4\pi\varepsilon_0}$

Answer: A

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8. One end of a string of length l is connected lo a particle of mass m and the other to a small peg on a smooth horizontal table. If the particle moves in a circle with speed v, the net force on the particle directed towards the centre is (where T is the tension in the string)

A. T

B. $T + \frac{mv^2}{l}$

C. $T - \frac{mv^2}{l}$

D. Zero

Answer: A

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9. A rope is wound around a hollow cylinder of mass $3kg$ and radius $40cm$. What is the angular acceleration of the cylinder if the rope is pulled with a force of $30N$?

A. $25m/s^2$

B. $0.25rad/s^2$

C. $25rad/s^2$

D. $5m/s^2$

Answer: C

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10. Two car moving in opposite directions approach each other with speed of $22m/s$ and $16.5m/s$ respectively. The driver of the first car blows a horn having a frequency $400Hz$. The frequency heard by the driver of the second car is [velocity of sound $340m/s$].

A. 350HZ

B. 361HZ

C. 411HZ

D. 448HZ

Answer: D

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11. Two astronauts are floating in gravitational free space after having lost contact with their spaceship. The two will:

A. keep floating at the same distance between them

B. move towards each other

C. move away from each other

D. will become stationary

Answer: B

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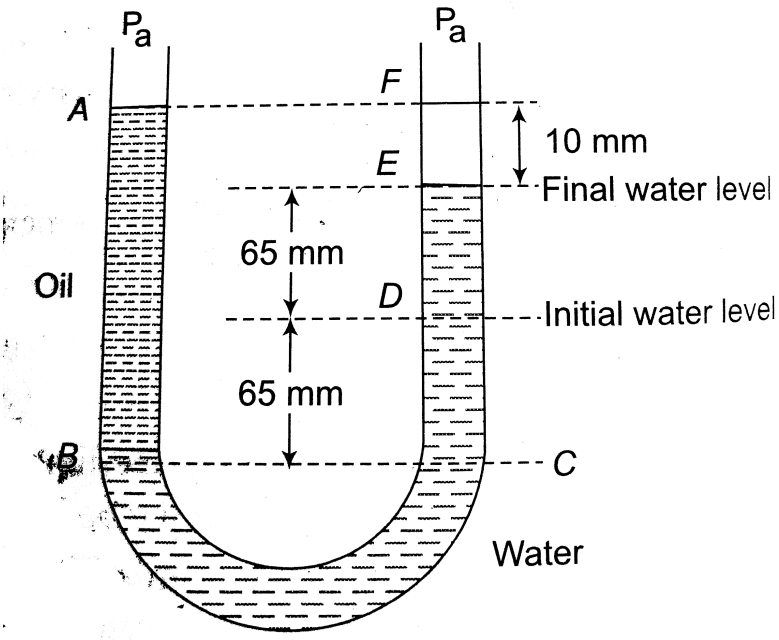
12. A U-tube with both ends open to the atmosphere is partially filled with water. Oil, which is immiscible with water. Is poured into one side until it stands at a distance of $10mm$ above the water level on the other side. Meanwhile the water rises by $65mm$ from its original level (see diagram). The density of the oil is:



A. $650kgm^{-3}$

B. $425kgm^{-3}$

C. $800kgm^{-3}$

D. $928kgm^{-3}$

Answer: D

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13. A spring of force constant k. is cut into lengths of ratio $1:2:3$. They are connected in series and the new force constant is k'. Then they are connected in parallel and force constant is k''. Then $K':K''$ is

A. $1:6$

B. $1:9$

C. $1:11$

D. $1:14$

Answer: C

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14. Which of following statements are correct ? l (a) Centre of mass of a body always coincides with the centre of gravity of the body

(b) Central of mass of a body is the point at which the total garvitational torque on the body is zero

(c) Couple on a body produces both trasnlational and rotation motion in a body

(d) Mechinical advantage greater than one means that small efforts can be used to lift a large load

A. (2) and (4)

B. (1) and (2)

C. (2) and (3)

D. (3) and (4)

Answer: B

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15. A gas mixture coinsists of (2) moles of oxygen and (4) moles of argon at temperature (T). Neglecting all vibrational modes, the total internal energy of the system is (jee 1999)

(a) 4 RT (b) 15 RT (c) 9 RT (d) 11 RT.

A. 4RT

B. 15RT

C. 9RT

D. 11RT

Answer: D

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16. Consider a drop of rain water having mass 1 g falling from a height of $1km$. It hits the ground with a speed of $50m/s$ Take g constant with a volume $10m/s^2$. The work done by the

(i) gravitational force and the

(ii) resistive force of air is :

A. (i)-10J, (ii) -8.25 J

B. (i)1.25 J, (ii) -8.25 J

C. (i)100 J, (ii) -8.25 J

D. (i)10J, (ii) -8.25 J

Answer: D

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17. A Carnot engine, having an efficiency of $\eta = 1/10$ as heat engine, is used as a refrigerator. If the work done on the system is 10J, the amount of energy absorbed from the reservoir at lower temperature is

A. 1J

B. 90J

C. 99J

D. 100J

Answer: B

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18. The x and y coordinates of the particle at any time are $x = 5t - 2t^2$ and $y = 10t$ respectively, where x and y are in meters and t in seconds. The acceleration of the particle at t=2s is:

A. 0

B. $5m/s^2$

C. $-4m/s^2$

D. $-8m/s^2$

Answer: C

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19. Preeti reached the metro station and found that the escalator was not working. She walked up the stationary escalator in time t_1. On other days, if the remains stationary on the moving escalator, then the escalator takes her up in time t_2. The time taken by her to walk up on the moving escalator will be :

A. $\frac{t_1 + t_2}{2}$

B. $\frac{t_1 t_2}{t_2 - t_1}$

C. $\frac{t_1 t_2}{t_2 + t_1}$

D. $t_1 - t_2$

Answer: C

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20. A spherical black body with radius 12 cm radiates 450 w power at 500 K. If the radius is halved and the temperature doubled, the power radiated in watts would be

A. 225

B. 450

C. 1000

D. 1800

Answer: D

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21. Two discs of same moment of inertia rotating about their regular axis passing through centre and perpendicular to the plane of disc with angular velocities ω_1 and ω_2. They are brought

into contact face to face coinciding the axis of rotation. The expression for loss of energy during this process is

A. $\frac{1}{2}I(\omega_1 + \omega_2)^2$

B. $\frac{1}{4}I(\omega_1 - \omega_2)^2$

C. $I(\omega_1 - \omega_2)^2$

D. $\frac{1}{8}I(\omega_1 - \omega_2)^2$

Answer: B

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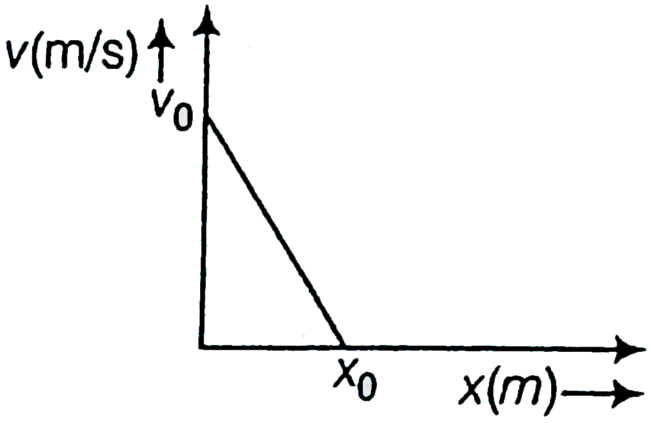
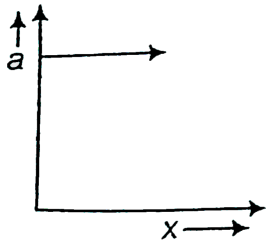
1. Mark correct option



A.



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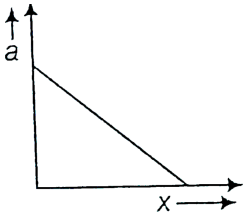
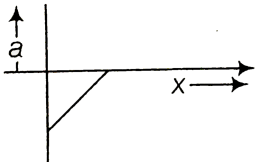
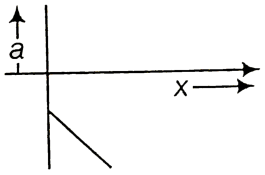


C.



D.



Answer: C

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2. The driver of a car treavelling with speed $30ms^{-1}$ toward a hill sounds a horn of frequenvy 600 Hz. If the velocity of sound in air is $300ms^{-1}$ the frequency of reflected sound as heard by diver is

A. 550HZ

B. 555.5HZ

C. 720HZ

D. 500HZ

Answer: C

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3. A spaceship is launched into a circular orbit close to the earth's surface . What additional velocity has now to be imparted to the spaceship in the orbit to overcome the gravitational pull. Radius of earth $= 6400km, g = 9.8m/s^2$.

A. $3.28km/s$

B. $12km/s$

C. $10km/s$

D. $40km/s$

Answer: A

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4. A force $F = -K\left(y\hat{i} + x\hat{j}\right)$ (where K is a positive constant) acts on a particle moving in the x-y plane. Starting from the origin, the particle is taken along the positive x-axis to the point $(a, 0)$, and then parallel to the y-axis to the point (a, a). The total work done by the force F on the particle is

A. $-2ka^2$

B. $2ka^2$

C. $-ka^2$

D. ka^2

Answer: C

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5. At what minimum acceleration should a monkey slide a rope whose breaking strength is $\frac{2}{3}$rd of its weight?

A. $2/3g$

B. g

C. $1/3g$

D. zero

Answer: C

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6. Four blocks of the same mass m connected by cords are pulled by a force F on a smooth horizontal surface as shown in Determine the tensions T_1, T_2 and T_3 in the cords.

A. $T_1 = \frac{1}{4}F, T_2 = \frac{3}{2}F, T_3 = \frac{1}{4}F$

B. $T_1 = \frac{1}{4}F, T_2 = \frac{1}{2}F, T_3 = \frac{1}{2}F$

C. $T_1 = \frac{3}{4}F, T_2 = \frac{1}{2}F, T_3 = \frac{1}{4}F$

D. $T_1 = \frac{3}{4}F, T_2 = \frac{1}{2}F, T_3 = \frac{1}{2}F$

Answer: C

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7. What is the maximum height attained by a body projected with a velocity equal to one- third of the escape velocity from the surface of the earth? (Radius of the earth=R)

A. $R/2$

B. $R/3$

C. $R/5$

D. $R/8$

Answer: D

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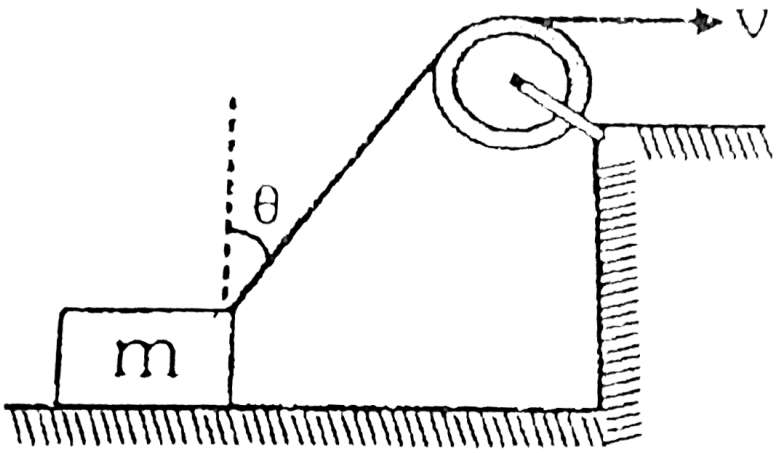
8. A block is dragged on a smooth plane with the help of a rope which moves with a velocity v as shown in figure. The horizontal velocity of the block is :



A. $\frac{V}{\sin\theta}$

B. $V\sin\theta$

C. $\frac{V}{\cos\theta}$

D. $V\cos\theta$

Answer: A

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9. Two satellites S_1 and S_2 are revolving round a planet in coplanar and concentric circular orbit of radii R_1 and R_2 in te same direction respectively. Their respective periods of revolution are 1 hr and 8 hr. the radius of the orbit of satellite S_1 is equal to 10^4km. Find the relative speed in kmph when they are closest.

A. $\pi/2 \times 10^4$

B. $\pi \times 10^4$

C. $2\pi \times 10^4$

D. $4\pi \times 10^4$

Answer: B

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10. 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. 172.8 J

D. 144 J

Answer: C

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11. The Coefficient of cubical expansion of mercury is $0.0018/^{\circ}C$ and that of brass $0.000006/^{\circ}C$, find the true barmetric height at $0^{\circ}C$.The scale is supposed to be coreect at $15^{\circ}C$

A. 74.122 cm

B. 79.125 cm

C. 42.161cm

D. 142.39 cm

Answer: A

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12. A particle of mass m is moving in a circular path of constant radius r such that its centripetal acceleration a_c is varying with time t as $a_c = k^2rt^2$, where k is a constant. The power delivered to the particle by the forces acting on it is :

A. $2\pi mk^2r^2t$

B. mmk^2r^2t

C. $1/3mk^4r^2t_5$

D. zero

Answer: B

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13. A body of mass 5×10^{-3} kg is launched upon a rough inclined plane making an angle of 30° with the horizontal. Obtain the coefficient of friction between the body and the plane if the time of ascent is half of the time of descent.

A. 0.346

B. 0.921

C. 1.926

D. 2.912

Answer: A

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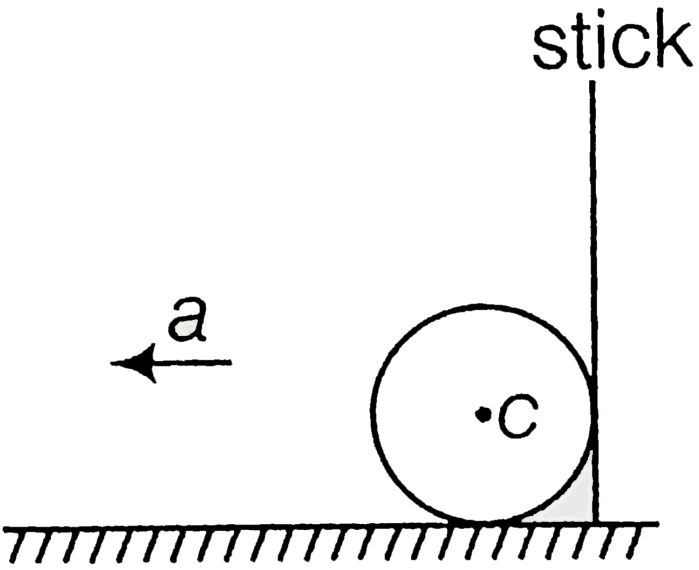
14. A boy is pulshing a ring of mass 3 kg and radius 0.6 m with a stick as shown in figure. The stick applies a force of 3N on the

ring and rolls it without slipping with an acceleration of 0.4 m/s^2



The coefficient of friction between the ground and the ring is large enough that rolling always occurs and the coefficeient of friction between the stick and the ring is $\frac{f}{10}$ The vlaue of F is

A. 2N

B. 4N

C. 6N

D. 3N

Answer: A

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15. A body of mass m is released from a height h to a scale pan hung from a spring. The spring constant of the spring is k, the mass of the scale pan is negligible and the body does not bounce relative to the pan, then the amplitude of vibration is

A. mg

B. $\frac{mg}{k}\sqrt{\frac{1+2hk}{mg}}$

C. $\frac{mg}{k}+\frac{mg}{k}\sqrt{\frac{1+2hk}{mg}}$

D. None of the above

Answer: B

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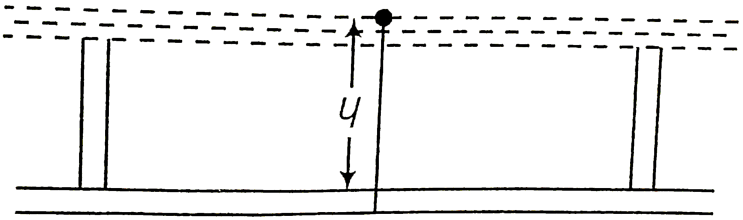
16. In an experiment to measure the height of bridge by droping stone into water underneath. If the error in measurment of time is 0.2s at the end of 4s, then the error in estimation of height of bridge will be (neglect the water resistance i.e thrust)



A. $\pm 19.68m$

B. $\pm 17.22m$

C. $\pm 7.84m$

D. $\pm 12.22m$

Answer: C

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17. A person of weight 70 kg wants to loose 7 kg by going up and dwon 12 m stairs.Assume he burns twice as much fat while going up than going down.If 1 kg of fat is burnt on expending 9000 k-cal.How many times must he go up and down to reduce his 7 kg weight?

$(Takeg = 10ms^{-2})$

A. 18×10^3times

B. 24×10^3times

C. 30×10^3times

D. 21×10^3times

Answer: D

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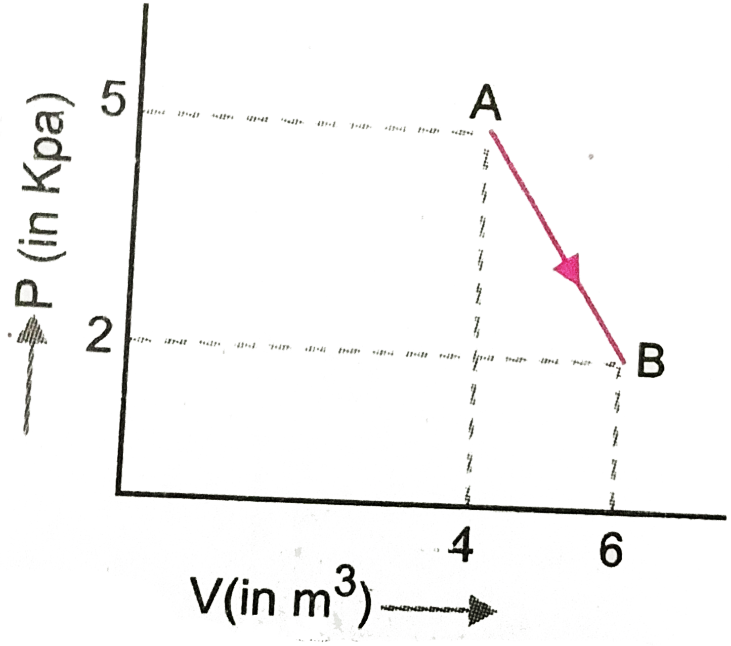
18. One mole of an ideal diatomic gas undergoes a transition from A to B along a path AB as shown in (figure). The change in internal energy of the gas during the transition is $(\gamma = 3/5)$



A. $20kJ$

B. $-12kJ$

C. $-20kJ$

D. $20J$

Answer: A

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19. Assertion For looping a verticla loop of radius, r the minimum velocity at lowest point should be $\sqrt{5gr}$. Reason In this event the velocityh at the highest point will be zero.

A. Both assertion and reson are true and reason is the correct explanation of assertion

B. Both assetion and reason are true but reason is not the correct explanation of assertion

C. Assertion is true but reason is false

D. Both assetion and reason are flase

Answer: C

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20. Assertion A spring of force constatn k is cut in to two piece having lengths in the ratio 1:2 The force constant of series combination of the two parts is $\frac{3k}{2}$

The spring connected in series are represented by $k = k_1 + k_2$

A. Both assertion and reson are true and reason is the correct explanation of assertion

B. Both assetion and reason are true but reason is not the correct explanation of assertion

C. Assertion is true but reason is false

D. Both assetion and reason are flase

Answer: D

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21. Assertion The total kinetic energy of a rolling solid sphere is the sum of translational and rotationla kinetic energies .

Reason For all solid bodies. Totla kinetic energy is always twice of translational kinetic energy.

A. Both assertion and reson are true and reason is the correct explanation of assertion

B. Both assetion and reason are true but reason is not the correct explanation of assertion

C. Assertion is true but reason is false

D. Both assetion and reason are flase

Answer: C

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22. Assertion It is hotter over the top of a fire than at the same distance on the sides .

Reason In the upwared direction , the heat propagate through convection.

A. Both assertion and reson are true and reason is the correct explanation of assertion

B. Both assetion and reason are true but reason is not the correct explanation of assertion

C. Assertion is true but reason is false

D. Both assetion and reason are flase

Answer: B

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23. Assertion: When $\theta = 45^\circ$ or 135°, the value of R remains the same, only the sign changes.

Reason: R= $\frac{u^2 \sin 2\theta}{g}$

A. Both assertion and reason are true and reason is the correct explanation of assertion

B. Both assetion and reason are true but reason is not the correct explanation of assertion

C. Assertion is true but reason is false

D. Both assertion and reason are false

Answer: A

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24. Assertion In adiabatic expansion the product of p and V always decreses

Reason In adiabatic expansion process, wrok is done by the gas at the cost of internal energy of gas.

A. Both assertion and reson are true and reason is the correct explanation of assertion

B. Both assetion and reason are true but reason is not the correct explanation of assertion

C. Assertion is true but reason is false

D. Both assetion and reason are flase

Answer: B

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25. Assertion : The molecules of a monatomic gas has three degrees freedom.

Reason : The molecules of a diatomic gas has five degrees of freedom.

A. Both assertion and reson are true and reason is the correct explanation of assertion

B. Both assetion and reason are true but reason is not the correct explanation of assertion

C. Assertion is true but reason is false

D. Both assetion and reason are flase

Answer: B

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26. Assertion Molar heat capacity cannot be defined for isothermal process.

Reason In isothermal prcess p-V versus T graph is a dot.

A. Both assertion and reson are true and reason is the correct explanation of assertion

B. Both assetion and reason are true but reason is not the correct explanation of assertion

C. Assertion is true but reason is false

D. Both assetion and reason are flase

Answer: B

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1. Two 20g flatworms climb over a veruy thin walll, 10 cm high.One of the wrom is 20 cm long, the other is wider and only 10 cm long. Which of the following statement is correct reagarding them?

A. 20 cm wormk has done more work against gravity

B. 10 cm worm has done more work against gravity

C. Both worms have done equal work against gravity

D. ratio of work donw by both the worms is 4:5

Answer: B

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2. A rocket is intended to leave the Earth's garvitational field.The fuel in its main engine is a little less than the amount that is necessary and an auxliary engine, (only capable of operating for a short time) has to be used as well.When is it best to switch on the auxiliary engine?

A. at take off

B. When the rocket has nearly stopped with respect to the Earth

C. It doesn't matter.

D. Can't say

Answer: A

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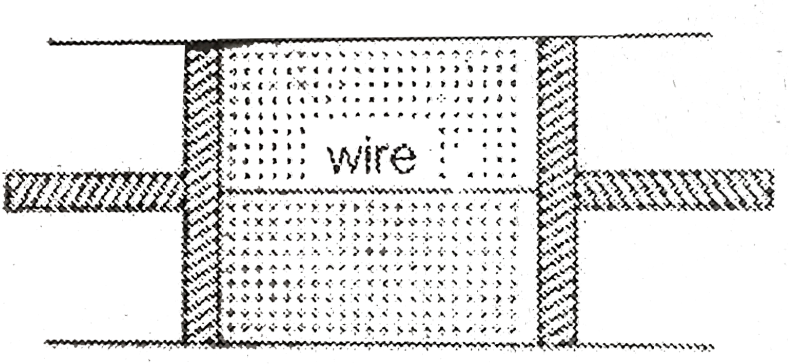
3. A cyindrical tube of uniform cross-sectional area A is fitted with two air tight frictionless pistons. The pistons are connected to each other by a metallic wire. Initially the pressure of the gas is p_0 and temperature is T_0. Atmospheric pressure is also p_0. Now the temperature of the gas is increased to $2T_0$, the tension in the wire will be



A. $2p_0$

B. $p_0 A$

C. $\frac{p_0 A}{2}$

D. $4p_0 A$

Answer: B

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4. A particle of mass m is executing oscillation about the origin on X- axis Its potential energy is V(x)=kIxI Where K is a positive constant If the amplitude oscillation is a, then its time period T is proportional

A. $\sqrt{a}$

B. a

C. $1/\sqrt{a}$

D. $a^{3/2}$

Answer: A

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5. A body is projected veritclaly upwards.The times corresponding to height h while ascending and while descending are t_1 and t_2 respectively.

Then, the velocity of projection will be (take g as acceleration due to gravity)

A. $g\frac{\sqrt{t_1 t_2}}{2}$

B. $\frac{g(t_1 + t_2)}{2}$

C. $g\sqrt{t_1 t_2}$

D. g $\frac{t_1 t_2}{(t_1 + t_2)}$

Answer: B

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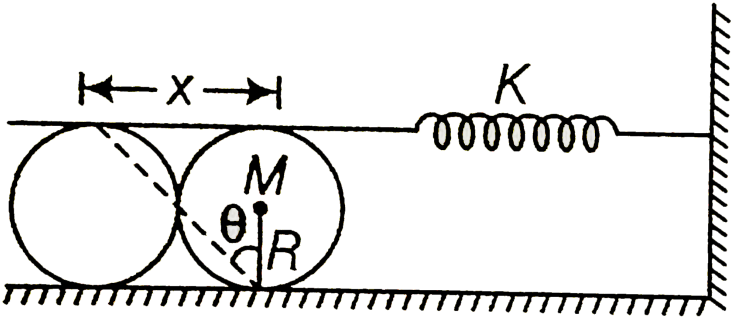
6. A solid cylinder is attached to a horizonatal massless spring as shwn in figure.If the cyclinder rolls without slipping, the time period of oscillation of the cyclinder is



A. $2\pi\sqrt{\frac{x}{g}}$

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

C. $2\pi\frac{\sqrt{3M}}{8K}$

D. $2\pi\frac{\sqrt{3M}}{2K}$

Answer: C

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7. A stream of a liquid of density p flowin horizontally with speed v rushes out of a tube of radius r and hits a verticla wall nearly normally. Assumi g that the liquid does not rebound from the wall, the force exerted o the wall by the impact of the liquid is given by

A. $\pi r \rho v$

B. $\pi r \rho v^2$

C. $\pi r^2 \rho v$

D. $\pi r^2 \rho v^2$

Answer: D

Watch Video Solution

8. The coordinates of a particle moving in a plane are given by $x = a\cos pt$ and $y = b\sin pt$ where a, $b(< a)$ and p are positive constants of appropriate dimensions. Then,

A. (a)The path of the particle is an ellipse

B. (b)Velocity and acceleartion of the particle are perpendicular to each other at $t = \frac{\pi}{2p}$

C. (c)Acceleration of the particle is always directed towards a fixed point

D. (d)distance travelled by the particle in time internval between $t = 0$ and $t = \frac{\pi}{2p}$ is a

Answer: D

Watch Video Solution

Watch Video Solution

9. A skier starts from rest at point A and slides donw the hill without turning or breaking. The friction coefficient is μ When he stops at point B, his horizontal displacement is S. whalt is the height difference between points A and B?

(The velocity of the skier is small so that the additional pressure on the snow due to the curvature can vbe neglected. Neglect also the friction of air and the dependence of μ on the velocity of the skier)

A. $h = \mu S$

B. $h = \frac{\mu}{S}$

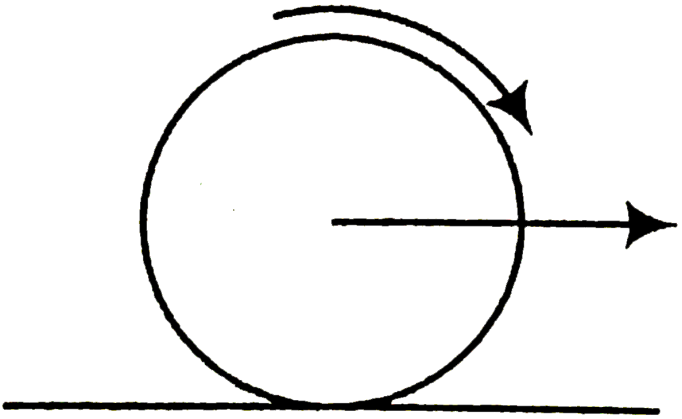
C. $h = 2\mu S$

D. $h = \mu S^2$

Answer: A

Watch Video Solution

10. A bicycle wheel rolls without slipping on a horizonatal floor.W hich one of the following is true about the motion of points on the rim of the wheel, relative to the axis at the wheel's centre?



A. Points near the top move faster than points near the bottom

B. Points near the bottom move faster than points near the top

C. all points on the rim move with the same speed

D. all points have the velocity vectors that are pointing in the radial dirction towards the centre of the wheel

Answer: A

Watch Video Solution

11. The planets with radii R_1 and R_2 have densities p_1, p_2 respectively. Their atmospheric pressues are p_1 and p_2 respectively.Therefore, the ratio of masses of their atmospheres, neglecting variation of g within the limits of atmoshpere is

A. $\rho_1 R_2 p_1 / \rho_2 R_1 \rho_2$

B. $p_1 R_2 \rho_2 / pP_2 R_1 \rho_1$

C. $p_1 R_1 \rho_1 / p_2 R_2 \rho_2$

D. $p_1 R_1 \rho_2 / p_2 R_2 \rho_1$

Answer: D

Watch Video Solution

12. A wide hose pipe is held horizontally by fireman.It delivers water through a nozale at one lirte per second. On increasing the pressure, this increass to two litres per second.The fireman has now to

A. push forward twice as hard

B. pulsh forward four times as hard

C. push backward four times as hard

D. push backward twice as hard

Answer: B

Watch Video Solution

13. The upper half of an inclined plane with inclination ϕ is perfectly smooth while the lower half is rough. A body starting from rest at the top will again come to rest at the bottom if the coefficient of friction for the lower half is given by

A. $\mu = 2\tan\theta$

B. $\mu = \tan\theta$

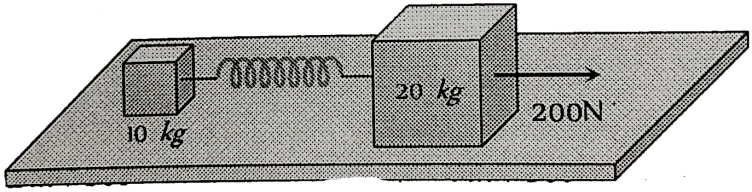
C. $\mu = 2/(\tan\theta)$

D. $\mu = 1/\tan\theta$

Answer: A

Watch Video Solution

14. The masses of 10 kg and 20 kg respectively are connected by a massless spring as shown in figure. A force of 200 N acts on the 20 kg mass. At the instant shown, the 10 kg mass has acceleration $12m/\sec^2$. What is the acceleration of 20 kg mass



A. $4m/s^2$

B. $10m/s^2$

C. $20m/s^2$

D. $30m/s^2$

Answer: A

Watch Video Solution

15. A cylinder rolls up an inclined plane, reaches some height, and then rolls down (without slipping throughout these motions). The directions of the frictional force acting on the cylinder are.

A. up the incline while ascending and down the incline while descending

B. up the incline while ascending as well as descending

C. down the incline while ascending and up the incline while descending

D. down the incline while ascending as well as descending

Answer: B

Watch Video Solution

16. A liquid is allowed to flow into a tube of truncated cone shape. Identify the correct statement from the following

A. The speed is high at the wider end and low at the narrow end

B. The speed is low at the wider end high at the narrow end

C. The speed is same at both ends in a streamline flow

D. The liquid flows with unifrom velocity in the tube

Answer: B

Watch Video Solution

17. Two soap bubbles coalesce.It noticed that, whilst joined together, the radii of the two bubbles are a and b where

a>b.Then the radius of curvature of interface between the two bubbles will be

A. a-b

B. a+b

C. $ab/(a-b)$

D. $ab/(a+b)$

Answer: C

Watch Video Solution

18. The displacement of a particle along the x-axis is given by $x = a\sin^2 \omega t$. The motion of the particle corresponds to

A. simple harmonic motion of frequency ω/π

B. simple harmonic m otion of frequency$3\omega/2\pi$

C. non simple harmonic motion

D. simple harmonic motion of frequency $\omega / 2\pi$

Answer: C

Watch Video Solution

19. Mercury boils at $367^\circ C$. However, mercury thermometers are made such that they can measure temperature up to $500^\circ C$. This is done by

A. maintaining vacuum aboves mercury column in the stem of the thermometer

B. filling nitrogen gas at high pressure above the mercury column

C. filling oxygen gas at high pressure above the mercury column

D. filling nitrogen gas at low pressure above the mercury column

Answer: B

Watch Video Solution

20. Two identical glass spheres filled with air are connected by a thin horizontal glass tube the glass tube contains a pellet of mercury at its mid-point Air in one sphere is at $0^\circ C$ and the other is at $20^\circ C$ if temperature of both the vessels are increased by $10^\circ C$ then neglecting the expansions of the bulbs and the tube

A. the mercury pellet gets displaced towards the sphere at lower temperature

B. the mercury pellet gets displaced towards the spehere at higher temperature

C. the mercury pellet does not get displaced at all

D. the temperature rise causes the pellet to expand without any displacement

Answer: C

Watch Video Solution

21. a graph between prssure P (along y-axis) and absolute temperature, T(along x-axis) for equal moles of two gases has

been drawn . Given that volume of second gas is more than volume of first gas. Which of the following statement is correct?

A. Slope of gas 1 is less than gas 2

B. Slope of gas 1 is more than gas 2

C. Both have some slopes

D. None of the above

Answer: B

Watch Video Solution

22. A piece of blue glass heated to a high temperature and a piece of red glass at room temperature, are taken inside a dimly lit room, then

A. the blue piece will look blue and the red piece will lokk red as usual

B. the red piece will look brighter red and the blue piece will look ordinary blue

C. the blue will look brighter as compared to the red fpiece

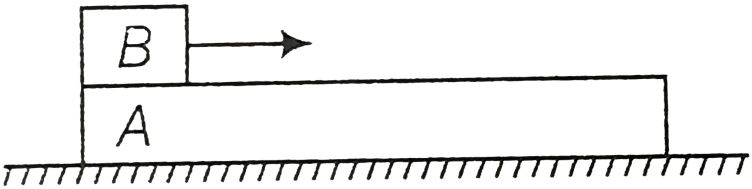
D. both the pieces will look equal red

Answer: C

Watch Video Solution

23. A long block A of mass M is at rest on a smooth horizontal surface.A small block B of mass $M/2$ is placed on A at one end and projected along A with some veklocity v.The coefficient of friction between the block is μ then , the accelerations of blocks

A and B before reaching a common velocity will be respectively



A. $\frac{\mu g}{2}$(towards right), $\frac{\mu g}{2}$(towards left)

B. $\frac{\mu g}{2}$(towards right), (μg)(towrards left)

C. $\frac{\mu g}{2}$(towards right), (μg)(towrards left)

D. (μg)(towards right), $\frac{\mu g}{2}$(towrards left)

Answer: C

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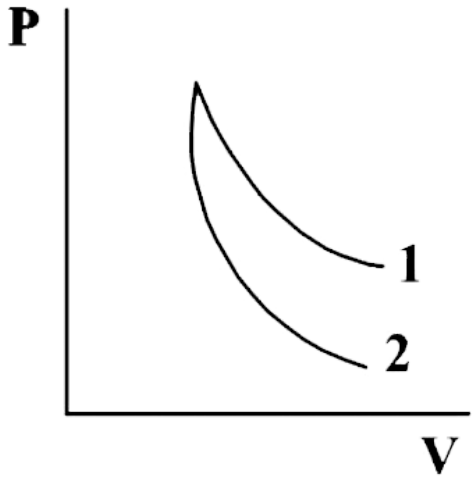
24. P-V plots for two gases during adiabatic processes are shown in the figure. Plots 1 and 2 should corresponds respectively to



A. He and O_2

B. O_2 and He

C. He and Ar

D. O_2 and N_2

Answer: B

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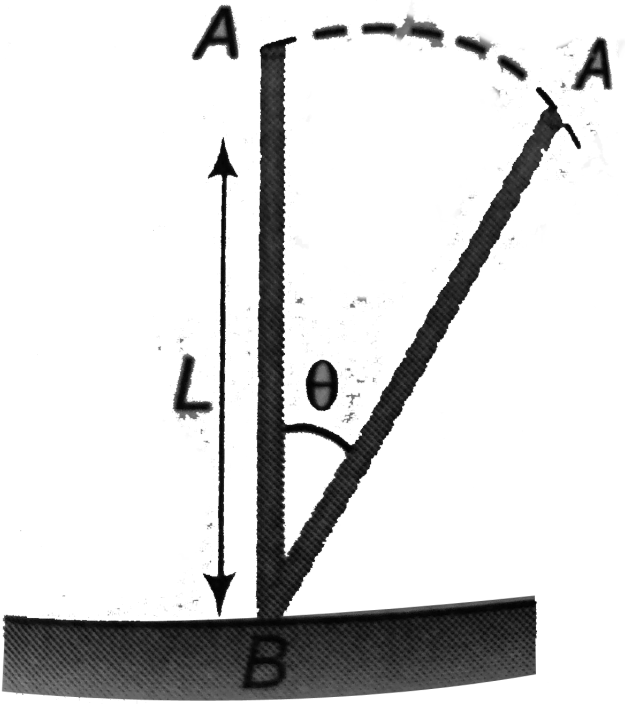


25.

A uniform rod of length L is free to rotate in a vertical plane about a fixed horizontal axis through B. The rod begins rotating from rest. The angular velocity ω at angle θ is given as

A. $\sqrt{\left(\frac{6g}{l}\right)\sin\frac{\theta}{2}}$

B. $\sqrt{\left(\frac{6g}{l}\right)\cos\frac{\theta}{2}}$

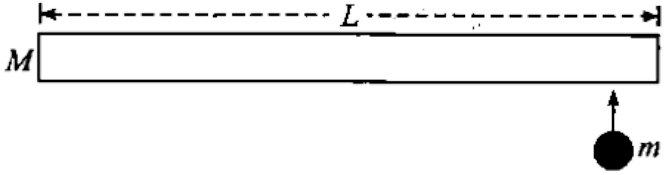
C. $\sqrt{\left(\frac{6g}{l}\right)\sin(\theta)}$

D. $\sqrt{\left(\frac{6g}{l}\right)\cos(\theta)}$

Answer: A

Watch Video Solution

26. A Stick of length L and mass M lies on a fnctionless horizontal surface on which it is free to move in any way. A ball of mass m moving with speed v collides elastically with the stick as shownin figure-5.115. If after the collision ball comes to rest, then what should be the mass of the ball ?



A. $m = 2M$

B. $m = M$

C. $m = M/2$

D. $m = M/4$

Answer: D

Watch Video Solution

27. An iceberg of density $900kg/m^3$ is floating in water of density $1000kg/m^3$. The percentage of volume of ice cube outside the water is

A. 20

B. 35

C. 10

D. 11

Answer: C

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28. A scientist says that the efficiency of his heat engine which operates at source temperature $127^\circ C$ and sink temperature $27^\circ C$ is 26%, then

A. it is impossible

B. it is possible with high probability

C. it is possible with low probability

D. data are insufficient

Answer: A

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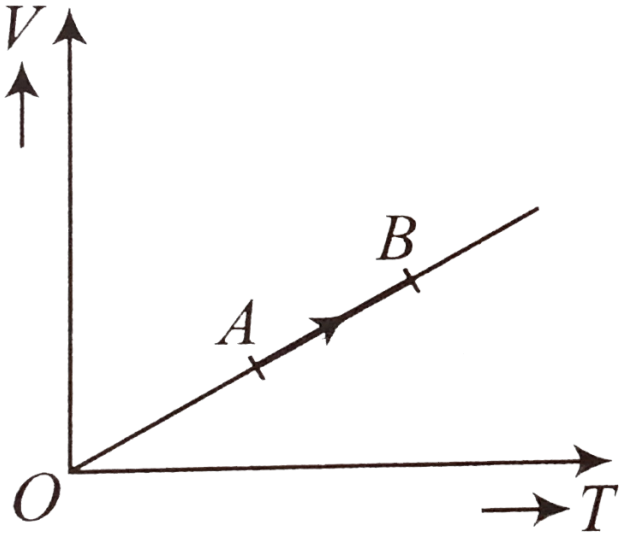
Solved Paper 2018 Neet

1. The volume (V) of a monatomic gas varies with its temperature (T) as shown in the graph. The ratio of work done by the gas, to the heat absorbed by it, when it undergoes a change from state A to state B,is



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

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

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

D. $\frac{2}{7}$

Answer: C

Watch Video Solution

2. The fundamental frequency in an open organ pipe is equal to the third harmonic of a closed organ pipe. If the length of the closed organ pipe is 20 cm, the length of the open organ pipe is

A. 12.5cm

B. 8 cm

C. 13.3cm

D. 16cm

Answer: C

Watch Video Solution

3. At what temperature , will the rms speed of oxygen molecules be sufficient for escaping from the earth ? Take $m = 2.76 \times 10^{-26} kg, k = 1.38 \times 10^{-23} J/K$ and $v_e = 11.2 km/s$.

A. $5.016 \times 10^4 K$

B. $8.326 \times 10^4 K$

C. $2.2508 \times 10^4 K$

D. $1.254 \times 106(4) K$

Answer: B

Watch Video Solution

4. The efficiency of an ideal heat engine working between the freezing point and boiling point of water, is

A. 0.0625

B. 0.2

C. 0.2608

D. 0.125

Answer: C

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5. A tuning fork is used to produce resonance in glass tuve. The length of the air column in the tube can be adjusted by a variable piston. At room temperature of $27^{\circ}C$ two succesive

resonance are produced at 20 cm and 73 cm column length. If the frequency of the tuning fork is 320 Hz. the velocity of sound is air at $27^\circ C$ is

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6. A pendulum is hung the roof of a sufficiently high huilding and is moving freely to and fro like a simple harmonic oscillator .The acceleration of the bob of the pendulum is $20m/s^2$ at a distance of $5m$ from the meanposition .The time period of oscillation is

A. 2S

B. πS

C. $2\pi S$

D. 1S

Answer: B

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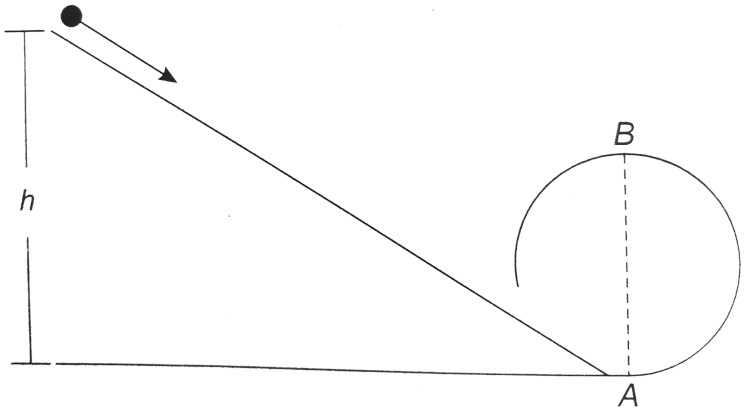
7. A body initially rest and sliding along a frictionless trick from a height h (as shown in the figure) just completes a vertical circle of diameter $AB = D$. The height h is equal to



A. $\frac{7}{5}D$

B. d=1km

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

D. $\frac{5}{4}D$

Answer: D

Watch Video Solution

8. A thin circular ring of mass M and radius r is rotating about its axis with an angular speed ω. Two particles having mass m each are now attached at diametrically opposite points. The angular speed of the ring will become

A. $W_B > W_A > W_C$

B. $W_A > W_B > W_C$

C. $W_C > W_B > W_A$

D. $W_A > W_C > W_B$

Answer: C

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9. A moving block having mass m , collides with another stationary block having mass $4m$. The lighter block comes to rest after collision. When the initial velocity of the block is v, then the value of coefficient of restitution (e) will be

A. 0.8

B. 0.25

C. 0.5

D. 0.4

Answer: B

Watch Video Solution

10. Which one of the following statements is incorrect?

A. Frictional force opposes the relative motion

B. Limiting value of static friction is direct,ly proportional to normal reaction

C. Rolling friction is smaller than sliding friction

D. Coefficeint of sliding friction has dimensions of length

Answer: D

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11. A toy car with charge q moves on a frictionless horizontal plane surface under the influence of a uniform electric field $\vec{E}$. Due to the force $q\vec{E}$, its velocity increases from 0 to $6m/s$ in

one second duration. At that instant the direction of field is reversed.

The car continues to move for two more seconds under the influence of this field. The average velocity and the average speed of the toy car between 0 to 3 seconds are respectively.

A. $1m/s3.5m/s$

B. $1m/s, 3m/s$

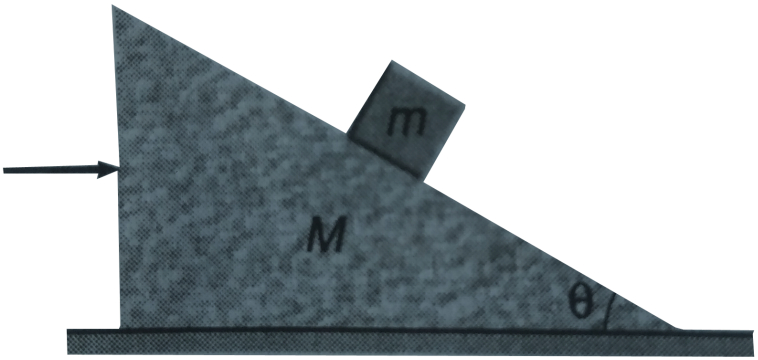
C. $2m/s, 4m/s$

D. $1.5m/s, 3m/s$

Answer: B

Watch Video Solution

12. All surfaces are smooth in following figure. Find F, such that block remain stationary with respect to wedge.



A. $a = g\cos\theta$

B. $a = \frac{g}{\sin\theta}$

C. $a = \frac{g}{\cos ec\theta}$

D. $a = g\tan\theta$

Answer: D

Watch Video Solution

13. The moment of the force, $\vec{F} = 4\hat{i} + 5\hat{j} - 6\hat{k}$ at $(2, 0, -3)$. About the point $(2, -2, -2)$ is given by

A. $-7\hat{i} - 8\hat{j} - 4\hat{k}$

B. $-4\hat{i} - \hat{j} - 8\hat{k}$

C. $-8\hat{i} - 4\hat{j} - 7k$

D. $-7\hat{i} - 4\hat{j} - 8\hat{k}$

Answer: D

Watch Video Solution

14. A student measued the diameter of a small steel ball using a screw gauge of least count $0.001cm$. The main scale reading is $5mm$ and zero of circular scale division coincides with 25

divisions above the reference level. If screw gauge has a zero erroof $-0.004cm$, the correct diameter of the ball is

A. (a)0.053 cm

B. (b)0.525 cm

C. 0.521 cm

D. (d)0.529 cm

Answer: D

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15. Which one of the following is correctly matched ?

A. Rotational kinetic enegy

B. Moment of inertia

C. Angular velocity

D. Angular momentum

Answer: D

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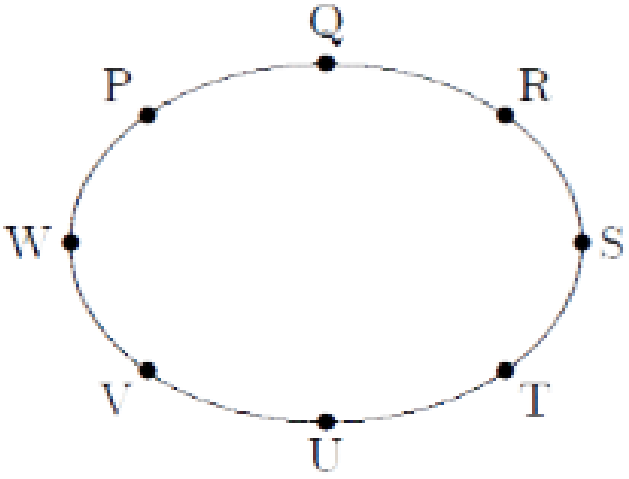
16. A planet travels in an elliptical orbit about a star as shown. At what pair of points is the speed of the planet the same?



A. $K_B < K_A < K_C$

B. $K_A > K_B > K_C$

C. $K_A < K_B < K_C$

D. $K_B > K_A > K_C$

Answer: B

Watch Video Solution

17. If the mass of the sun were ten times smaller and the universal gravitational constant were ten times larger in magnitude, which of the following is not correct?

A. Times period of a simple pendulum on the Earth wourld decrease

B. Walking on the ground would become more difficult

C. Raindrops will fall faster

D. g on the Earth will not change

Answer: D

Watch Video Solution

18. A solid sphere is in rolling motion. In rolling motion a body prosseses translational kinetic energy (K_t) as well as rotational kinetic energy (K_r) simutaneously. The ratio $K_t : (K_t + K_r)$ for the sphere is

A. $10:7$

B. $5:7$

C. $7:10$

D. $2:5$

Answer: B

Watch Video Solution

19. A small sphere falls from rest in a viscous liquid. Due to friction, heat is produced. Find the relation between the rate of production of heat and the radius of the sphere at terminal velocity.

A. r^5

B. r^2

C. r^3

D. r^4

Answer: A

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20. The power radiated by a black body is P, and it radiates maximum energy around the wavelength λ_0. If the temperature of the black body is now changed so that it radiates maximum energy around a wavelength $3\lambda_0/4$, the power radiated by it will increase by a factor of

A. $\frac{256}{81}$

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

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

D. `84/256

Answer: A

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21. Two wires are made of the same material and have the same volume. However wire 1 has cross-sectional area A and wire 2 has cross-sectional area 3A. If the length of wire 1 increases by Δx on applying force F, how much force is needed to stretch wire 2 by the same amount?

A. 4F

B. 6F

C. 9F

D. F

Answer: C

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22. A sample of $0.1g$ of water of $100^{\circ}C$ and normal pressure $\left(1.013 \times 10^{5} Nm^{-2}\right)$ requires 54 cal of heat energy to convert to steam at $100^{\circ}C$. If the volume of the steam produced is 167.1 cc, the change in internal energy of the sample is

A. 42.2J

B. 208.7J

C. 104.3J

D. 84.5J

Answer: B

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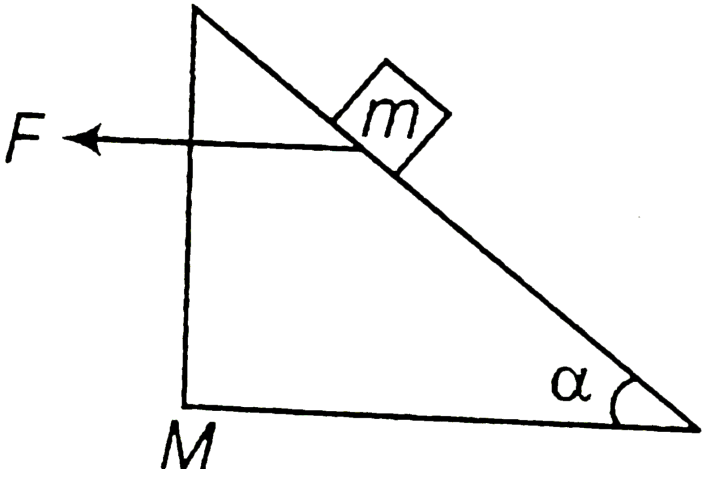
Solved Paper 2018 Aiims

1. A wooden wedge of mass M and inclination anlgle(α) rest on a smooth floor. A block of mass m is kept on wedge.A force F is applied on the wedge as shown in the figure such that block remains stationary with respect to wedge So, magnitude of froce F is



A. (M+m)g tan α

B. g tan α

C. mg cos α

D. (M+m)g cosec α

Answer: A

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2. A piece of ice slides down a 45° incline in twice the time it takes to slide down a frictionless 45° incline . What is the coefficient of friction between the ice and the incline ? .

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

B. $\frac{4}{7\cot\theta}$

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

D. $\frac{7}{9\cot\theta}$

Answer: C

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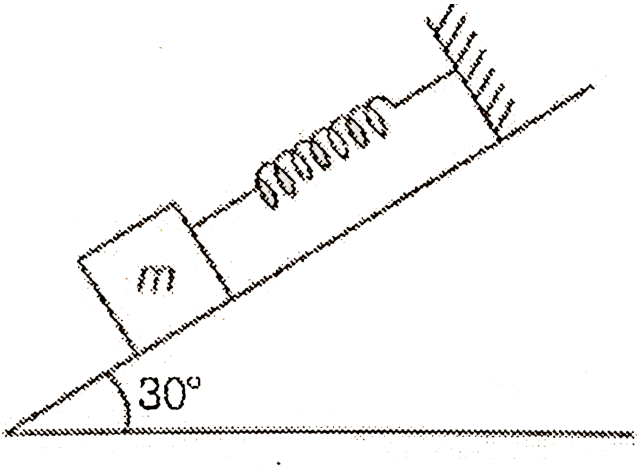
3. A body of mass 5 kg is suspended by a spring balance on an inclined plane as shown in figure. The spring balance measure



A. 50N

B. 25 N

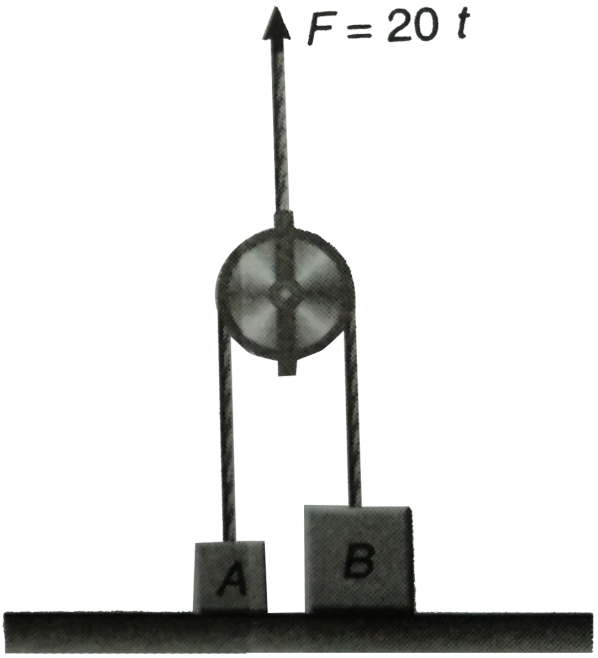
C. 500N

D. 10N

Answer: B

Watch Video Solution

4. Two block A and B of masses $1kg$ and$2kg$ respectively are connected by a string, passing over a light frictionless pulley B as shown. Another string connect the center of pulley. Both the blocks are resting on a horizontal floor and the pulley is help such that string remains just taut. At moment $t = 0$, a force $F = 20t$ starts acting on the pully along vertically upwards direction as shown in figure.Calculate



(a) velocity of A when B loses contact with the floor.

(b) height raised by the pulley upto that instant.

(Take $=g = 10m/s^2$)

A. g, g

B. $g, \frac{g}{2}$

C. $\frac{g}{2}, g$

D. $\frac{g}{2}, \frac{g}{2}$

Answer: C

Watch Video Solution

5. In the fourmula $X = 3YZ^2$, X and Z have dimensions of capacitance and magnetic induction respectivey. What are the dimensions of Y is $MKSQ$ system?

A. $\left[M^{-3}L^{-2}T^{\wedge}(4)Q^4\right]$

B. $\left[ML^2T^{\wedge}(8)Q^4\right]$

C. $\left[M^{-2}L^{-3}T^{\wedge}(2)Q^4\right]$

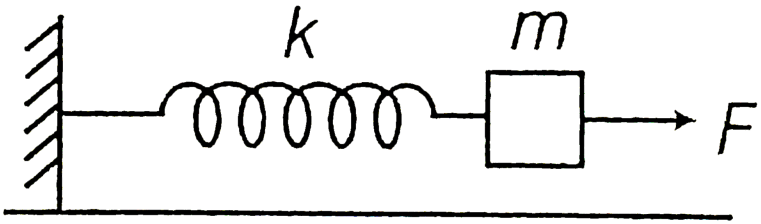
D. $\left[M^{-2}L^{-2}TQ^2\right]$

Answer: A

Watch Video Solution

6. The figure showns a mass m on frictionless surface It is connected to righd wall by the mean of a massless spring of its constant K. Initially , The spring at its natural position.If a force of constant magnitude starts actiing on the block towareds right, then the speed of the block when the defromation in

spring is x, will be



A. $\frac{\sqrt{2F_x - Kx^2}}{m}$

B. $\frac{\sqrt{F_x - Kx^2}}{m}$

C. $\frac{\sqrt{x(F-K)}}{m}$

D. $\frac{\sqrt{F_x - Kx^2}}{2m}$

Answer: A

Watch Video Solution

7. Body of mass M is much heavier than the other body of mass m,.The heavier body with speed v collides with thelighter body

which was at rest initially elastically The speed of lighter body after collisioin is

A. 2V

B. 3V

C. V

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

Answer: A

Watch Video Solution

8. A thin horizontal circular disc is roating about a vertical axis passing through its centre. An insect is at rest at a point near the rim of the disc. The insect now moves along a diameter of the disc to reach its other end. During the journey of the insect, the angular speed of the disc.

A. continously decreases

B. continously increases

C. first increases and then decreases

D. remains unchanged

Answer: C

Watch Video Solution

9. Three bodies having masses 5 kg, 4 kg and 2 kg is moving at the speed of 5 m/s and 2m//s and 5 m/s respectively along X-axis.The magnitude of velocity of centre of mass is

A. $1.0m/s$

B. $4m/s$

C. $0.9m/s$

D. $1.3m/s$

Answer: B

Watch Video Solution

10. Two satellite S_1 and S_2 revolve round a planet in coplanar circular orbits in the same sense. Their periods of revolutions are 1 h nd 8 h respectively. The radius of the orbit of S_1 is $10^4 km$. When S_2 is closet to S_1., find (a). The speed of S_2 relative to S_1 and (b). the angular speed of S_2 as observed by an astronaut in S_1.

A. $3\pi \times 10^4$

B. zero

C. $2\pi \times 10^4$

D. $\pi \times 10^4$

Answer: D

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11. A small planet is revolving around a massive star in a circular orbit of radius R with a period of revolution T. If the gravitational force between the planet and the star were proportional to $R^{-5/2}$, then T would be proportional to

A. $r^3/2$

B. r^2

C. r

D. $r^{5/2}$

Answer: D

Watch Video Solution

12. A body weighs 63 N on the surface of the earth. What is the gravitational force on it due to the earth at a height equal to half the radius of the earth ?

A. 35 N

B. 28N

C. 18N

D. 40N

Answer: B

Watch Video Solution

13. A block of rectangular size of mass m and area of cross section A, float in a liquid of density ρ.If we give a small vertical displacement from equilibrium, It undergoes SHM with time period T, then

A. `T^(2)prop(1)m

B. $T^2 \propto \rho$

C. $T^2 \propto m^{-1}$

D. $T^2 \propto \frac{1}{A^{-2}}$

Answer: A

Watch Video Solution

14. A steel rod 100 cm long is clamped at its middle. The fundamental frequency of longitudinal vibrations of the rod is

given to be 2.53k Hz. What is the speed of sound in steel?

A. $6.2km/s$

B. $5.06km/s$

C. $7.32km/s$

D. $7.45km/s$

Answer: B

Watch Video Solution

15. A pipe of length $85cm$ is closed from one end. Find the number of possible natural oscillations of air column in the pipe whose frequencies lie below $1250Hz$. The velocity of sound in air is $340m/s$.

A. 12

B. 8

C. 6

D. 4

Answer: C

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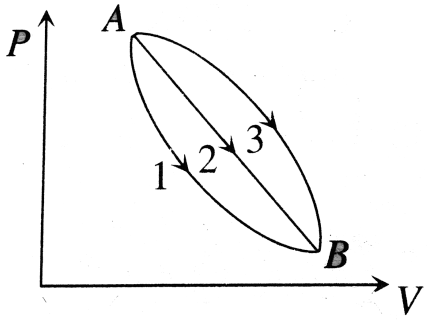
16. An ideal gas of mass m in a state A goes to another state B via three different processes as shown in Fig. If Q_1, Q_2 and Q_3 denote the heat absorbed by the gas along the three paths,

then



A. $Q_1 < Q_2 < Q_3$

B. $Q_1 < Q_2 = Q_3$

C. $Q_1 = Q_2 > Q_3$

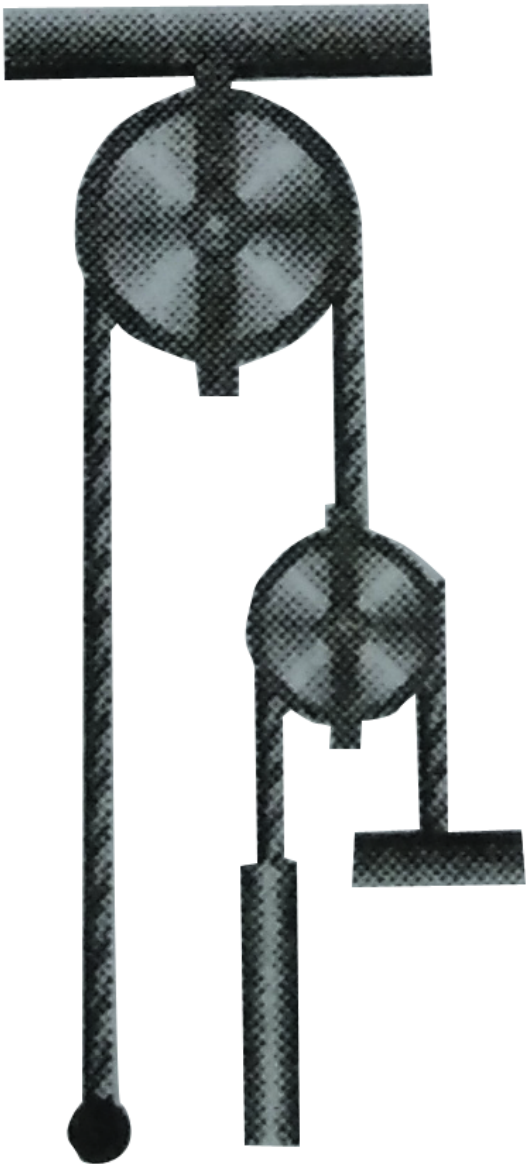
D. $Q_1 > Q_2 > Q_3$

Answer: A

Watch Video Solution

17. In the arrangement shown in figure the mass of the ball is η times as that of the rod. The length of the rod is L the masses of the pulleys and the threads as well as the friction, are negligible. The ball is set on the same level as the lower end of the rod and then released. How soon will the ball be opposite the upper end

of the rod?



A. 1.4s

B. 2.45s

C. 3.25 s

D. 5 s

Answer: A

Watch Video Solution

18. A gas consisting of rigid di-atomic molecules (degree of freedom $= 5$) at pressure $p_0 = 10^5 N/m^2$ and temperature $273K$ was compressed adiabatically 5 times. The mean kinetic energy of rotating molecules in final state is $nx10^{-21}J$. Find value of $'n'$. $\left(K = 1.38 \times 10^{-23}, (5)^{2/5} = 1.90\right)$.

A. 1.44 J

B. 4.55 J

C. $787.98 \times 10^{-23} J$

D. $757.3 \times 10^{-23} J$

Answer: C

Watch Video Solution

19. Assertion : A body can have acceleration even if its velocity is zero at a given instant of time.

Reason : A body is momentarily at rest when it reverses its direction of motion.

A. Both Assertion and Reason are correct, Reason is the coreect expianation of Assertion

B. Bioth Assertion and Reason are Correct but Reason is not the correct expalnation of Assertion

C. Assetion is correct and Reason is incorrect

D. Assertion is incorrect and Reason is correct

Answer: C

Watch Video Solution

20. Assertion The maximum height of projectile is always 25% of the maximum range.

Reasons For maximum range, projectile should be projected at 90°

A. Both Assertion and Reason are correct, Reason is the coreect expianation of Assertion

B. Bioth Assertion and Reason are Correct but Reason is not the correct expalnation of Assertion

C. Assetion is correct and Reason is incorrect

D. Assertion is incorrect and Reason is correct

Answer: A

Watch Video Solution

21. Assertion : Angle of repose is equal to angle of limiting friction. Reason : When the body is just at the point of motion, the force of friction in this stage is called as limiting friction.

A. Both Assertion and Reason are correct, Reason is the coreect expianation of Assertion

B. Bioth Assertion and Reason are Correct but Reason is not the correct expalnation of Assertion

C. Assetion is correct and Reason is incorrect

D. Assertion is incorrect and Reason is correct

Answer: A

Watch Video Solution

22. Statement -1: Two particles moving in the same direction do not lose all their energy in a completely inelastic collision.

Statement -2 : Principle of conservation of momentum holds true for all kinds of collisions.

A. Both Assertion and Reason are correct, Reason is the coreect expianation of Assertion

B. Bioth Assertion and Reason are Correct but Reason is not the correct expalnation of Assertion

C. Assetion is correct and Reason is incorrect

D. Assertion is incorrect and Reason is correct

Answer: D

Watch Video Solution

23. Assertion The angular momentum of system always remain constant.

Reason For a system, $\tau_{ext} = \frac{dL}{dt} = 0$

A. Both Assertion and Reason are correct, Reason is the coreect expianation of Assertion

B. Bioth Assertion and Reason are Correct but Reason is not the correct expalnation of Assertion

C. Assetion is correct and Reason is incorrect

D. Assertion is incorrect and Reason is correct

Answer: D

 Watch Video Solution

24. Assertion : If a pendulum falls freely, then its time period becomes infinite.

Reason : Free falling body has acceleration, equal to 'g'.

A. Both Assertion and Reason are correct, Reason is the coreect expianation of Assertion

B. Bioth Assertion and Reason are Correct but Reason is not the correct expalnation of Assertion

C. Assetion is correct and Reason is incorrect

D. Assertion is incorrect and Reason is correct

Answer: A

 Watch Video Solution

25. Statement I: Smaller drops of liquid resist deforming forces better than the larger drops.

Statement II: Excess pressure inside a drop is directly proportional to its surface area.

A. Both Assertion and Reason are correct, Reason is the coreect expianation of Assertion

B. Bioth Assertion and Reason are Correct but Reason is not the correct expalnation of Assertion

C. Assetion is correct and Reason is incorrect

D. Assertion is incorrect and Reason is correct

Answer: D

Watch Video Solution

26. Assertion In isothermal process, whole of the heat energy supplied to the body is converted into internal energy.

Reason According to the first laq of thermodynamics,

"" $\triangle Q = \triangle U + \triangle W$

A. Both Assertion and Reason are correct, Reason is the coreect expianation of Assertion

B. Bioth Assertion and Reason are Correct but Reason is not the correct expalnation of Assertion

C. Assetion is correct and Reason is incorrect

D. Assertion is incorrect and Reason is correct

Answer: A

 Watch Video Solution

27. Assertion : Internal energy of an ideal gas does not depend upon volume of the gas.

Reason : This is because internal energy of ideal gas depends only on temperature of gas.

A. Both Assertion and Reason are correct, Reason is the coreect expianation of Assertion

B. Bioth Assertion and Reason are Correct but Reason is not the correct expalnation of Assertion

C. Assetion is correct and Reason is incorrect

D. Assertion is incorrect and Reason is correct

Answer: C

Watch Video Solution

28. Assertion : To hear distinct be beats, difference in frequencies of two sources should be less than 10.

Reason : More the number of beats / sec., more is the confusion.

A. Both Assertion and Reason are correct, Reason is the coreect expianation of Assertion

B. Bioth Assertion and Reason are Correct but Reason is not the correct expalnation of Assertion

C. Assetion is correct and Reason is incorrect

D. Assertion is incorrect and Reason is correct

Answer: A

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Solved Paper 2018 Jipmer

1. If a machine perform 4000 J output work and 1000 J is inside loss due to friction , then the find efficiency?

A. 0.8

B. 0.3

C. 0.25

D. 0.6

Answer: A

Watch Video Solution

2. Dimension of force is

A. $\left[M^2L^1T^1\right]$

B. $\left[M^1L^1T^{-2}\right]$

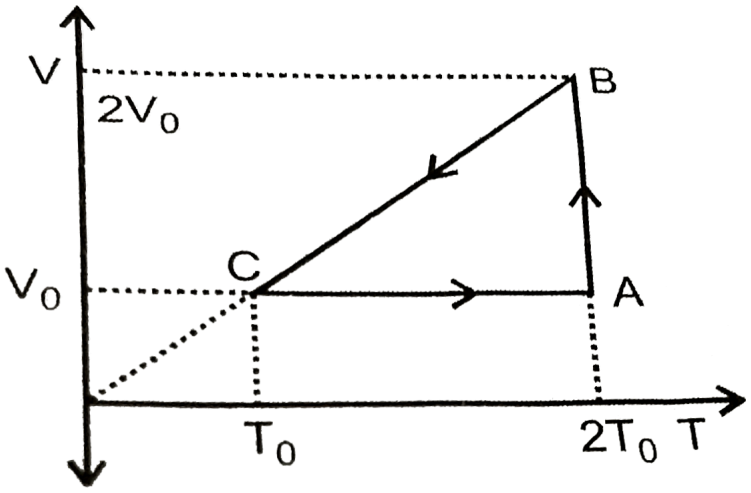
C. $\left[M^2L^{-1}T^{-2}\right]$

D. $\left[M^1L^1T^{-1}\right]$

Answer: B

Watch Video Solution

3. The efficiency of an ideal gas with adiabatic exponent $'\gamma'$ for the shown cyclic process would be



A. $\frac{2\ln 2 - 1}{\gamma/(\gamma - 1)}$

B. $\frac{1 - 1\ln 2}{\gamma/(\gamma - 1)}$

C. $\frac{2\ln 2 + 1}{\gamma/(\gamma - 1)}$

D. $\frac{2\ln 2 - 1}{\gamma/(\gamma + 1)}$

Answer: A

Watch Video Solution

4. Velocity is given by $v = 4t(1 - 2t)$, then find time at which velocity is maximum

A. 0.25 s

B. 1 s

C. 0.45 s

D. 4s

Answer: A

Watch Video Solution

5. The ratio of the radii of gyration of a circular disc about a tangential axis in the plane of the disc and of a circular ring of

the same radius about a tangential axis in the plane of the ring is:-

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

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

C. 1

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

Answer: A

Watch Video Solution

6. If compressibility of material is 4×10^{-5} per atm, pressure is 100 atm and volume is $100 cm^3$ then find $\triangle V = ?$

A. $0.4 cm^3$

B. $0.8cm^3$

C. $0.6cm^3$

D. $0.2cm^3$

Answer: B

Watch Video Solution

7. If speed of sound in air is 340 m/s and in water is 1480 m/s .If frequency of sound is 1000 kHz, then find wavelength in water

A. 2.96 mm

B. 1.48mm

C. 0.74 mm

D. 1mm

Answer: C

Watch Video Solution

8. 1000 N force is required to lift a hook nd 10000 N force is reuires to lift a load slowly.Find power required to lift hook with load with speed v=0.5m/s

A. 5kW

B. 1.5 kW

C. 5.5 kW

D. 4.5 kW

Answer: B

Watch Video Solution

9. How much intense is 80 dB sound in comparision to 40 dB?

A. 10^2

B. 10^4

C. 2

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

Answer: B

Watch Video Solution

10. A force of 10 N acts on a body of mass 0.5 kg for 0.25s starting from rest.What is its momentum now?

A. $0.25N/s$

B. $2.5N/s$

C. $0.5N/s$

D. $0.75N/s$

Answer: C

Watch Video Solution

11. A ball of 0.5 kg colided with wall at 30° and bounced back elastically.The speed of ball was $12m/s$. The contact remained for 1s. What is the force applied by wall on ball?

A. $12\sqrt{3}N$

B. $\sqrt{3}N$

C. $6\sqrt{3}N$

D. $3\sqrt{3}N$

Answer: A

Watch Video Solution

12. Kinetic energy of a particle is increases by 4 times What will be the relation between intital and final momentum?

A. $p_2 = 2P_1$

B. $P_2 = \frac{p_1}{2}$

C. $p_2 = P_1$

D. $p_2 = 4p_1$

Answer: A

Watch Video Solution

13. What is the range of a projectile thrown with velocity $98m/s$ with angle 30° from horizontal ?

A. $490\sqrt{3}m$

B. $245\sqrt{3}m$

C. $980\sqrt{3}m$

D. 100m

Answer: A

Watch Video Solution

14. If the efficiency of an engine is 50% and its work output is 500 J then find input.

A. 1000J

B. 500 J

C. 100J

D. 250J

Answer: B

Watch Video Solution

15. An engine has an efficiency of $\frac{1}{6}$. When the temperature of sink is reduced by $62^{\circ}C$, its efficiency id doubled. Temperature of the source is

A. 470 K

B. 372K

C. 542K

D. 1042K

Answer: C

Watch Video Solution

16. A ball is thrown upwards with a speed u from a height h above the ground.The time taken by the ball to hit the ground is

A. $\sqrt{2}h/g$

B. $\sqrt{8h/g}$

C. $\frac{\sqrt{u^2+2gh}}{g}$

D. $\frac{u}{g}+\frac{\sqrt{2h}}{g}$

Answer: D

Watch Video Solution

17. A body of mass 1 kg executes SHM which is given by

$$y = 6.0\cos\left(100t + \frac{\pi}{4}\right)cm$$

What is the maximum kinetic energy ?

A. 3J

B. 6J

C. 9J

D. 18J

Answer: D

Watch Video Solution

18. A uniform rod ofmass M and length L is hanging from its one end free to rotate in a veritcal plane.A small ball of equal mass is attached of the lowe end as shown. Time period of small

oscillations of the rod is

A. $T = 3\pi\frac{\sqrt{2l_0}}{3g}$

B. $T = 4\pi\frac{\sqrt{l_0}}{3g}$

C. $T = 4\pi\frac{\sqrt{2l_0}}{3g}$

D. $T = 2\pi\frac{\sqrt{2l_0}}{3g}$

Answer: D

Watch Video Solution

19. A box of mass $8kg$ placed on a rough inclined plane of inclination θ its downward motion can be prevented by applying an upward pull F and it can be made to slide upward appliying a force $2F$ .The coefficient of friction between the box and the inclined plane is

A. $\frac{80}{\sqrt{3}}$

B. $40\sqrt{3}$

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

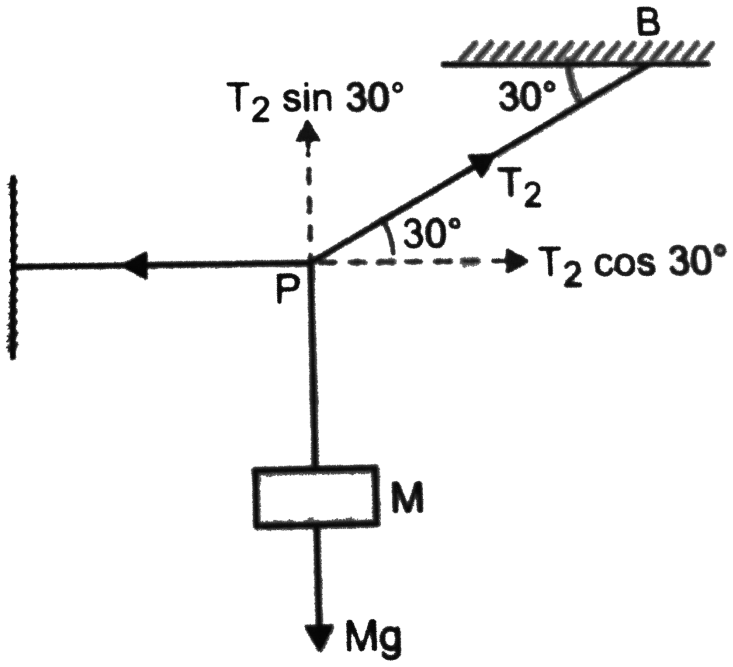
D. $80\sqrt{3}$

Answer: B

Watch Video Solution

20. A mass M is hung with a light inextensible string as shown in

Find the tension in the horizontal part of the string .



A. $\sqrt{2}Mg$

B. $\sqrt{3}Mg$

C. 2Mg

D. 3Mg

Answer: B

Watch Video Solution

21. A Carnot engine absorbs $6 \times 10^5 cal$. At $227^\circ C$. Heat rejected to the sink at $127^\circ C$ is

A. $15 \times 10^8 J$

B. $15 \times 10^4 J$

C. $5 \times 10^5 J$

D. $2 \times 10^4 J$

Answer: C

Watch Video Solution

22. A machine gun fires 360 bullets per minute, with a velocity of $600ms^{-1}$.If the power of the gun is 5.4 kW then mass of each bullet is

A. 5kg

B. 0.5 kg

C. 5g

D. 0.5g

Answer: B

Watch Video Solution

23. A rain drop of radius 0.3 mm falls through air with a terminal viscosity of $1ms^{-1}$. The viscosity of air is 18×10^{-5} poise. The viscous force on the rain drop is

A. $2.05 \times 10^{-7}N$

B. $1.018 \times 10^{-7}N$

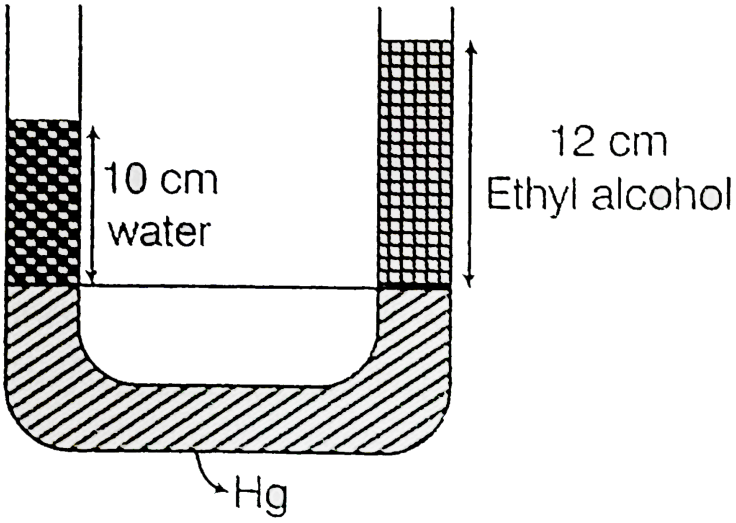
C. $1.05 \times 10^{-7}N$

D. $2.058 \times 10^{-7}N$

Answer: A

Watch Video Solution

24. Find density of ethyl alcohol



A. $0.83\frac{gm}{cm^3}$

B. $0.5\frac{gm}{cm^3}$

C. $1.83\frac{gm}{cm^3}$

D. $0.12\frac{gm}{cm^3}$

Answer: C

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25. How much should the temperature of a brass rod be increased so as to increase its length by $1\,\%$? Given α for brass is $0.00002.^{\circ}\,C^{-1}$.

A. $300^{\circ}C$

B. $400^{\circ}C$

C. $500^{\circ}C$

D. $550^{\circ}C$

Answer: A

Watch Video Solution

26. Y=5 sin $\frac{\pi}{2}(100t - 2x)$, what is time period?

A. 0.04 s

B. 1s

C. 0.06 s

D. 0.02 s

Answer: A

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27. Water flows through a horizontal pipe of varying area of cross-section at the rate 5 cubic metre per minute. What is the velocity of water at a point where pipe radius is 10 cm?

A. $0.2639ms^{-1}$

B. $0.5639ms^{-1}$

C. $0.4639ms^{-1}$

D. $0.3639ms^{-1}$

Answer: B

Watch Video Solution

28. The coefficient of volume expansion of glycerin is $49 \times 10^{-5} K^{-1}$. What is the fractional change in its density for a $30^{\circ} C$ rise in temperature ?

A. 0.0155

B. 0.0145

C. 0.0255

D. 0.0355

Answer: B

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29. A particle executes SHM with an amplitude of $10cm$ and frequency $2Hz$, at $t = 0$, the particle is at point where potential energy and kinetic energy are same. Find the equation of displacement of particle.

A. $KE = 625 \times 10^{-4}J, PE = 150 \times 10^{-3}J$

B. $KE = 150 \times 10^{-4}J, PE = 6.25 \times 10^{-4}J$

C. $KE = 625 \times 10^{-4}J, PE = 625 \times 10^{-4}J$

D. $KE = 150 \times 10^{-3}J, PE = 150 \times 10^{-4}J$

Answer: B

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30. A organ pipe open on both ends in the n^{th} harmonic is in resonanance with a source of 1000 Hz The length of pipe is 16.6

cm and speed of sound in air is $332m/s$.Find the vlue of n.

A. 3

B. 2

C. 1

D. 4

Answer: C

Watch Video Solution

31. $R = (65 \pm 1)ohm$, $l = (5 \pm 0.1)mm$ and

$d = (10 \pm 0.5)mm$.Find error in claculation of resistivity.

A. 0.21

B. 0.13

C. 0.16

D. 0.41

Answer: B

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32. A solid body floating in water has $\frac{1}{5^{th}}$ of its volume immersed in it. What fraction of its volume will be immersed, if it floats in a liquid of specific gravity 1.2 ?

A. $750kgm^{-3}$

B. $650kgm^{-3}$

C. $560kgm^{-3}$

D. $450kgm^{-3}$

Answer: A

Watch Video Solution

33. The work done in blowing a soap bubble of surface tension $0.06Nm^{-1}$ from 2 cm radius to 5 cm radius is

A. 0.004168 J

B. 0.003168 J

C. 0.003158 J

D. 0.004568 J

Answer: B

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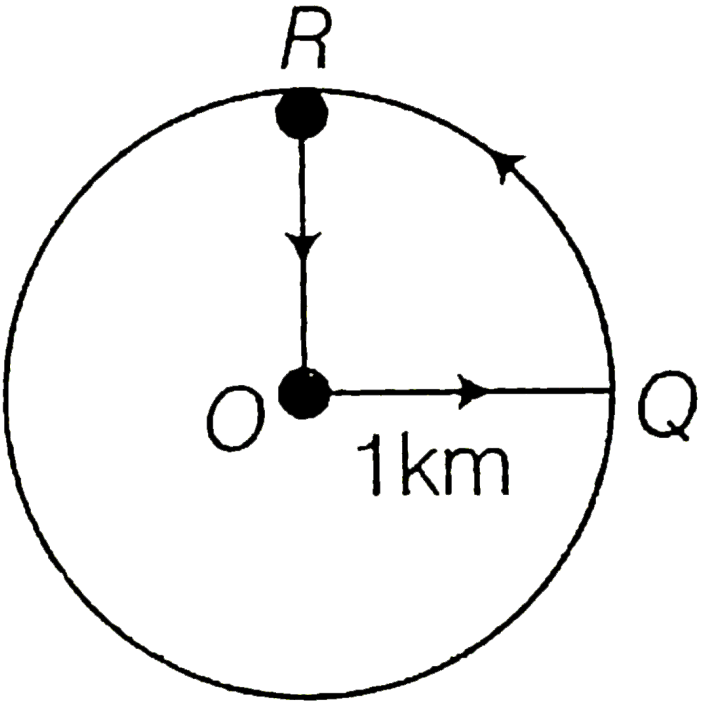
34. A runner starts from O and goes to O following path OQRO in 1 hr What is net displacement and averages speed?



A. $0.357km/hr$

B. $0.0km/hr$

C. $0.257km/hr$

D. $0.1km/hr$

Answer: A

Watch Video Solution

35. A disc of moment of inertia $2kg - m^{23}$ revolving with $8rad/s$ is placed on anothere disc of moment of inertia $4kg - m^2$ revolving $4rad/s$.What is the angular frequency of composite disc?

A. $4rad/s$

B. $\frac{3}{16}rad/s$

C. $\frac{16}{3}rad/s$

D. $\frac{16}{5}rad/s$

Answer: C

Watch Video Solution

36. If the velocity head of a stream of water is equal to 10 cm, then its speed of flow is approximately

A. $6.4ms^{-1}$

B. $7.376ms^{-6}$

C. $6.4756ms^{-1}$

D. None of these

Answer: B

Watch Video Solution

37. Find the distance of a point from the earth's centre where the resultant gravitational field due to the earth and the moon is zero. The mass of the earth is 6.0×10^{24} kg and that of the

moon is $7.4x10^{22}$ kg. The distance between the earth and the moon is $4.0 \times 10^5 km$.

A. zero

B. 3.85×10^7

C. 10^(8)`

D. 3.46×10^8

Answer: B

Watch Video Solution

38. Weight of a body depends directly upon acceleration due to gravity g. Value of g depends upon many factors. It depends upon the shape of earth, rotation earth etc. Weight of a body at a pole is more then that at a place on equator because g is maximum at poles and minimum on equator. Acceleration due to

gravity g varies with latitude λ as per relation given below :

$g_{rot} = g - R\omega^2 \cos^2 \lambda$ where R is radius of earth and ω is angular velocity of earth. A body of mass m weighs W_r in a train at rest. The train then begins to run with a velocity v around the equator from west to east. It observed that weight W_m of the same body in the moving train is different from W_r. Let $v_e$be the velocity of a point on equator with respect to axis of rotation of earth and R be the radius of the earth. Clearly the relative between earth and trainwill affect the weight of the body.

Difference between Weight W_r and the gravitational attraction on the body can be given as

A. $g_p - \frac{1}{4}R\omega^2$

B. $g_p + \frac{1}{4}R\omega^2$

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

D. $g_p + \frac{1}{2}R\omega^2$

Answer: A

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