PHYSICS

BOOKS - D MUKHERJEE PHYSICS (HINGLISH)

KINEMATICS, FORCES

Type 1

1. A particle has an initial velocity of $3\hat{i} + 4\hat{j}$ and an acceleration of $0.4\hat{i} + 0.3\hat{j}$. Its speed after $10s$ is :

A. 10 units

B. 7 units

C. $7\sqrt{2}$ units

D. 8.5 units

Answer: C

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2. A bird flies for 4 seconds with a velocity of $|t-2|m/\sec.$ In a straight line, where $t=$ time in seconds. It covers a distance of

A. 2m

B. 4m

C. 6m

D. 8m

Answer: B

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3. A particle has an initial velocity of $9m/s$ due east and a constant acceleration of $2m/s^2$ due west. The distance coverd by the particle in the fifth second of its motion is :

A. 0

B. 0.5m

C. 2m

D. none of these

Answer: B

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4. A particle moves in a straight line with retardation proportional to its displacement. Its loss in kinetic energy for any displacement x is proportional to

A. x

B. x^2

C. ln x

D. e^x

Answer: B

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5. For a particle moving along a straight line, the displacement x depends on time t as $x = \alpha t^3 + \beta t^2 + \gamma t + \delta$. The ratio of its initial acceleration to its initial velocity depends

A. only on α and β

B. only on β and γ

C. only on α and γ

D. only on α

Answer: B

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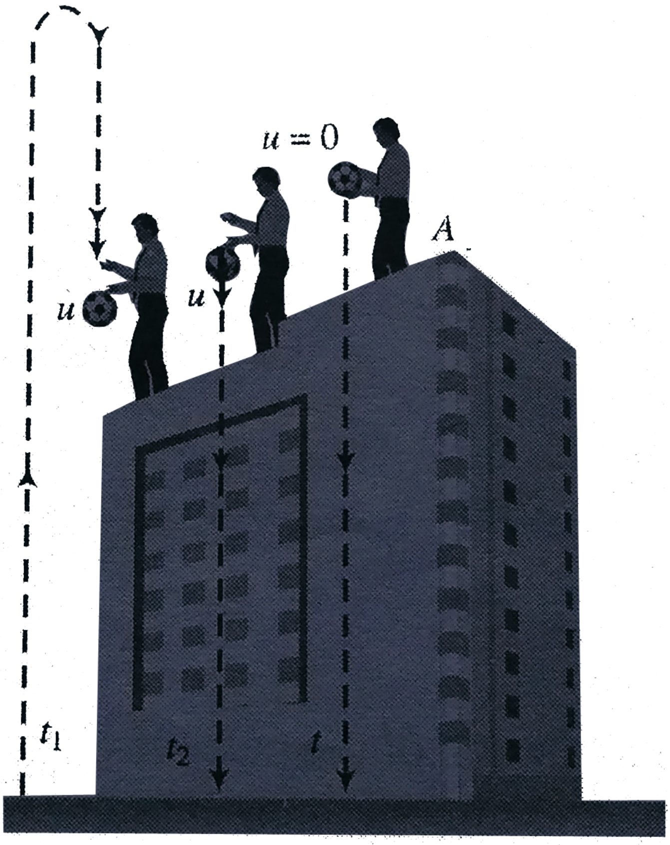
6. A body is thrown vertically upwards from A. The top of a tower . It reaches the ground in time t_1. It it is thrown vertically downwards from A with the same speed it reaches the ground in time t_2, If it is allowed to fall freely from A. then the time it takes to reach the ground.



A. $t_3 = \frac{1}{2}(t_1 + t_2)$

B. $t_3 = \sqrt{t_1 t_2}$

C. $\frac{1}{t_3} = \frac{1}{t_2} - \frac{1}{t_1}$

D. $t_3^2 = t_1^2 - t_2^2$

Answer: B

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7. Water drops fall at regular intervals from a roof. At an instant when a drop is about to leave the roof, the separations between 3 successive drops below the roof are in the ratio

A. $1:2:3$

B. $1:4:9$

C. $1:3:5$

D. $1:5:13$

Answer: C

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8. Three particles A, B and C are thrown from the top of a tower with the same speed. A is thrown up, B is thrown down and C is horizontally. They hit the ground with speeds v_A, v_B and v_C respectively then,

A. $v_A = v_B = v_C$

B. $v_B > v_C > v_A$

C. $v_A = v_B > v_C$

D. $v_A > v_B = v_C$

Answer: A

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9. A balloon starts rising from the ground with an acceleration of $1.25ms^{-2}$. After 8 seconds, a stone is released from the balloon. After releasing, the stone will:

A. cover a distance of 40 m

B. have a displacement of 50 m

C. reach the ground in 4s

D. begin to move down after being released

Answer: C

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10. A particle thrown up vertically reaches its highest point in time t_1 and returns to the ground in a further time t_2. The air resistace exerts a constant force on the particle opposite to its direction of motion.

A. $t_1 > t_2$

B. $t_1 = t_2$

C. $t_1 < t_2$

D. May be (a) or (c) depending on the ratio of the force of air resistance to the weight of the particle

Answer: C

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11. An aeroplane at a constant speed releases a bomb.As the bomb drops away from the aeroplane,

A. it will always be vertically below the aeroplane

B. it will always be vertically below the aeroplane only if the aeroplane is flying horizontally

C. it will always be vertically below the aeroplane only if the aeroplane is flying at an angle of 45° to the horizontal

D. it will gradually fall behind the aeroplane if the aeroplane is flying horizontally

Answer: A

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12. A projectile is moving at $60m/s$ at its highest point, where it breaks into two equal parts due to an internal explosion. One part moves vertically up at $50m/s$ with respect to the ground. The other part will move at

A. $110m/s$

B. $120m/s$

C. $130m / s$

D. $10\sqrt{6}m / s$

Answer: C

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13. Two particles are projected simultaneously in the same vertical plane, from the with speed u_1 and u_2 at angle of projection θ_1 and θ_2 respectively with the horizontal. The path followed by one, as seen by other (as long as both are in flight), is

A. a vertical straight line

B. a straight line making a constant angle $(\neq 90^\circ)$

with the horizontal

C. a parabola

D. a hyperbola

Answer: B

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14. Two particles are projected simultaneously in the same vertical plane from the same point, with different speeds u_1 and u_2, making angles θ_1 and θ_2 respectively with the horizontal, such that $u_1 \cos\theta_1 = u_2 \cos\theta_2$. The path followed by one, as seen by the other (as long as both are in flight), is

A. a horizontal straight line

B. a vertical straight line

C. a parabola

D. a straight line making an angle $|\theta_1 - \theta_2|$ with the horizontal

Answer: B

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15. A stone is thrown with a velocity v at an angle θ with the horizontal.Its speed when it makes an angle β with the horizontal is

A. $v = u \cos \theta$

B. $v = u \cos \theta . \cos \phi$

C. $v = u \cos \theta \sec \phi$

D. `v = u sec theta. cos phi

Answer: C

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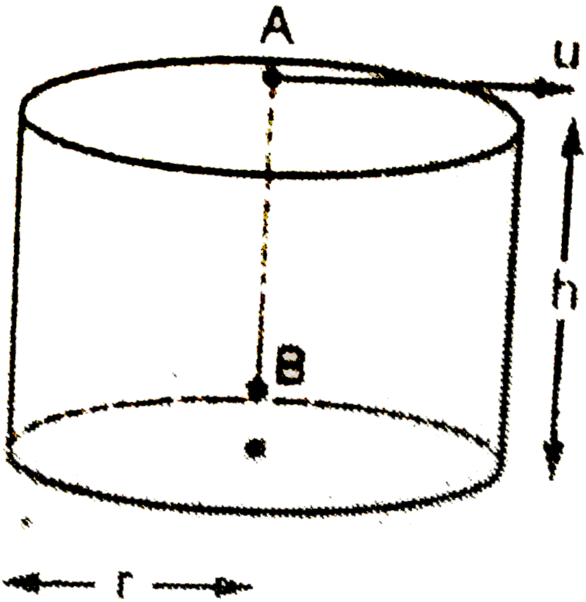
16.



A hollow vertical cylinder of radius r and height h has a smooth internal surface. A small particle is placed in contact with the inner side of the upper rim, at point A, and given a horizontal speed u, tangentical t the rim. it leaves the lower rim at point B, vertically below A. If n is an integer then

A. $\frac{u}{2\pi r}\sqrt{2h/g}=n$

B. $\frac{h}{2\pi r}=n$

C. $\frac{2\pi r}{h}=n$

D. $\frac{u}{\sqrt{2gh}}=n$

Answer: A

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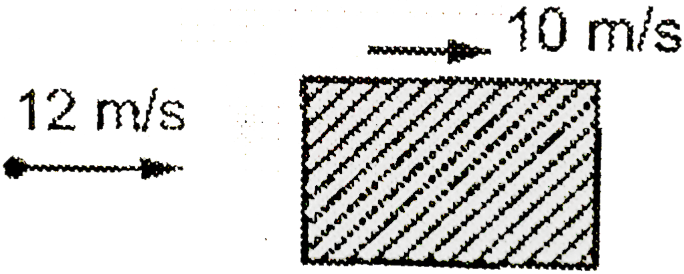
17. A light particle moving horizontally with a speed of $12m/s$ strikes a very heavy block moving in the same direction at $10m/s$. The collision is one-dimensional and elastic. After the collision, the particle will



A. move at $2m/s$ in its original direction

B. move at $8m/s$ in its original direction

C. move at $8m/s$ opposite to its original direction

D. move at $12m/s$ opposite to its original direction

Answer: B

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18. A ball falls vertically onto a floor with momentum p, and then bounces repeatedly. If the coefficient of restitution is e, then the total momentum imparted by the ball on the floor till the ball comes to rest is

A. $p(1+e)$

B. $\frac{p}{1-e}$

C. $p\left(1+\frac{1}{e}\right)$

D. $p\left(\frac{1+e}{1-e}\right)$

Answer: D

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19. A ball falls from rest from a height h onto a floor, and rebounds to a height $h/4$. The coefficient of restitution between the ball and the floor is

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

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

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

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

Answer: B

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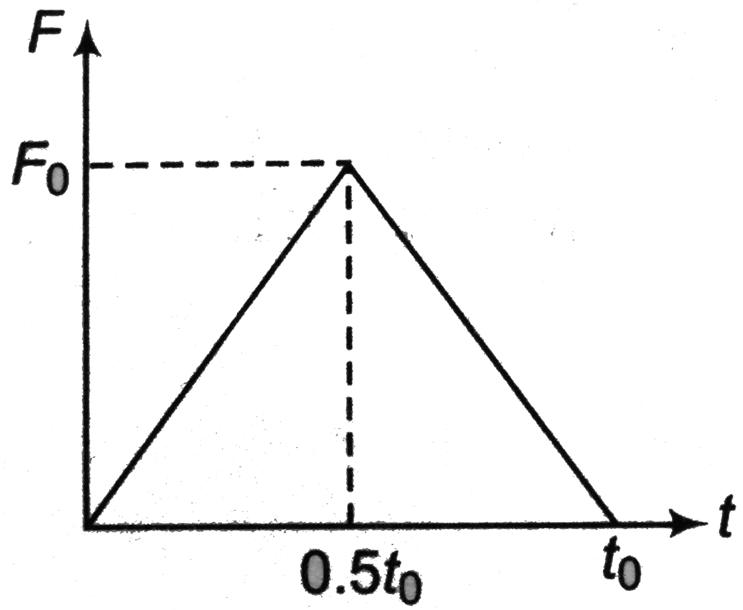
20. A particle of mass m moving with velocity u makes an elastic one-dimentional collision with a stationary particle of mass m. They come in contact for a very small time t_0. Their force of interaction increases from zero to F_0 linearly in time $0.5t_0$, and decreases linearly to zero in further time $0.5t_0$ as shown in figure. The magnitude of F_0 is



A. μ / T

B. $2mu / T$

C. $mu / 2T$

D. none of these

Answer: B

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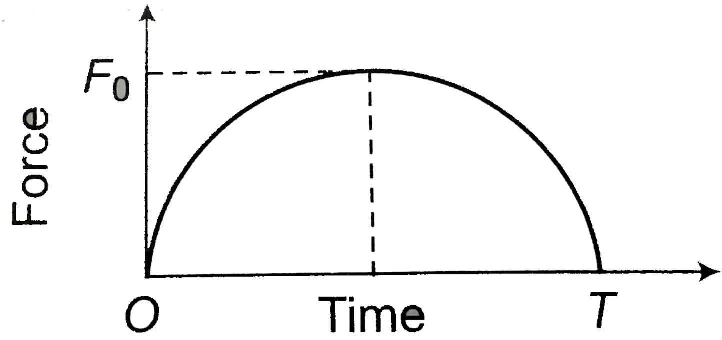
21. A particle of mass m , initially at rest , is acted upon by a variable force F for a brief interval of time T. It begins to move with a velocity u after the force stops acting . F is shown in the graph as a function of time.

The curve is a semicircle.



A. $u = \frac{\pi F_0^2}{2m}$

B. $u = \frac{\pi T^2}{8m}$

C. $u = \frac{\pi F_0 T}{4m}$

D. $u = \frac{F_0 T}{2m}$

Answer: C

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22. Two identical spheres move in opposite directions with speeds v_1 and v_2 and pass behind an opaque screen, where they may either cross without touching (Even 1) or make an elastic hand-on collision (Event 2).

A. We can never make out which event has occurred

B. We cannot make out which event has occurred only if $v_1 = v_2$

C. We can always make out which event has occurred

D. We can make out which event has occurred only if $v_1 = v_2$

Answer: A

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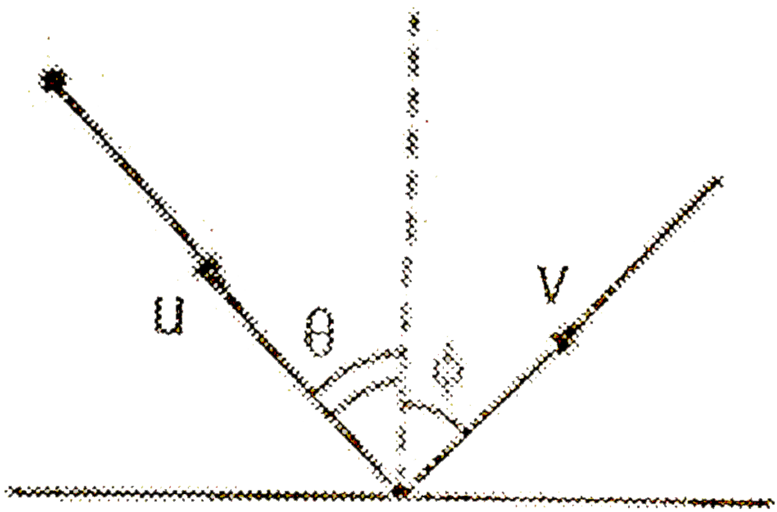
23. A particle strikes a horizontal frictionless floor with a speed u, at an angle θ to the vertical, and rebounds with a speed v, at an angle ϕ to the vertical. The coefficient of restitution between the particle and the floor is e. The magnitude of v is



A. eu

B. $(1-e)u$

C. $u\sqrt{\sin^2\theta+e^2\cos^2\theta}$

D. $u\sqrt{e^2\sin^2\theta+\cos^2\theta}$

Answer: C

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24. In the previous question the angle ϕ is equal to

A. θ

B. $\tan^{-1}[\eta m\theta]$

C. $\tan^{-1}\left[\frac{1}{e}\tan\theta\right]$

D. $(1+e)\theta$

Answer: C

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25. A particle of mass m_1 makes an elastic, one-dimensional collision with a stationary particle of mass m_2.What fraction of the kinetic energy of m_1 is carried away by m_2?

A. $\frac{m_1}{m_2}$

B. $\frac{m_2}{m_1}$

C. $\frac{2m_1m_2}{(m_1+m_2)^2}$

D. $\frac{4m_1m_2}{(m_1+m_2)^2}$

Answer: D

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26. A block of mass M is attached to the lower end of a vertical rope of mass m. An upward force P acts on the upper end of the rope. The system is free to move. The force exerted by the rope on the block is $\frac{PM}{M+m}$

A. in all cases

B. only if the rope is uniform

C. in gravity-free space only

D. only if $P > (M_m)g$

Answer: A

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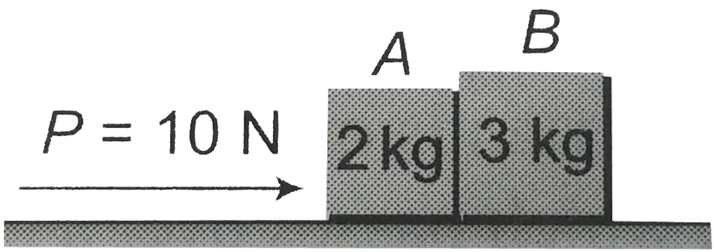
27. Blocks A and B have masses of 2 kg and 3 kg. respectively. The ground is smooth. P is an external force of 10 N. The force exerted by B on A is



A. 8N

B. 6N

C. 8N

D. 10N

Answer: B

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28. A man slides down a light rope whose breaking strength is η times his weight $(\eta < 1)$. What should be his minimum acceleration so that the rope just breaks?

A. ηg

B. $g(1 - \eta)$

C. $\frac{g}{1 + \eta}$

D. $\frac{g}{2 - \eta}$

Answer: B

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29. A particle of small m is joined to a very heavy body by a light string passing over a light pulley. Both bodies are free to move. The total downward force on the pulley is

A. mg

B. 2mg

C. 4mg

D. $> > mg$

Answer: C

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30. A uniform chain of mass m hangs from a light pulley, with unequal lengths of the chain hanging from the two sides of the pulley. The force exerted by the moving chain on the pulley is

A. mg

B. $> mg$

C. $< mg$

D. either (b) or (c) depending of the chain

Answer: C

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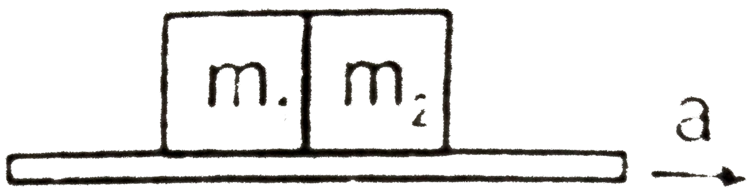
31. Two blocks of masses m_1 and m_2 are placed in contact with each other on a horizontal platform. The coefficient of friction between the platform and the two blocks is the same. The platform moves with an acceleration. The force of interaction between the blocks is :



A. zero in all cases

B. zero only if $m_1 = m_2$

C. nonzero only if $m_1 > m_2$

D. nonzero only if $m_1 < m_2$

Answer: A

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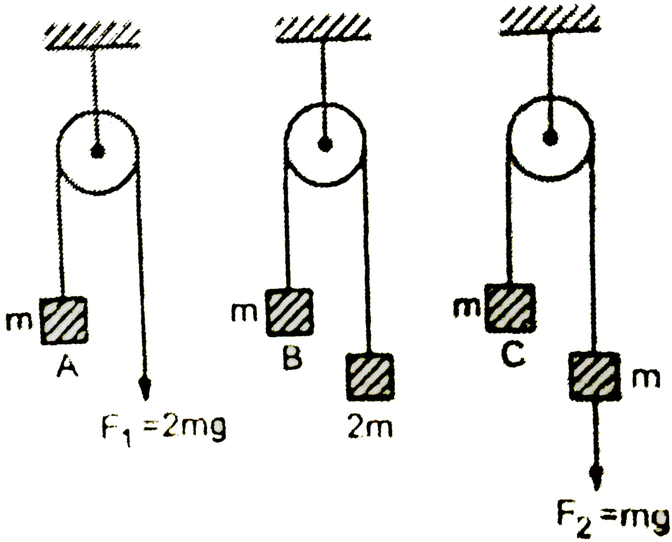
32. In the figure, the blocks A,B and C of mass m each have accelerations a_1, a_2 and a_3 respectively. F_1 and F_2 are external forces of magnitude 2mg and mg respectively.



A. $a_1 = a_2 = a_3$

B. $a_1 > a_3 > a_2$

C. $a_1 = a_2, a_2 > a_3$

D. $a_1 > a_2, a_2 = a_3$

Answer: B

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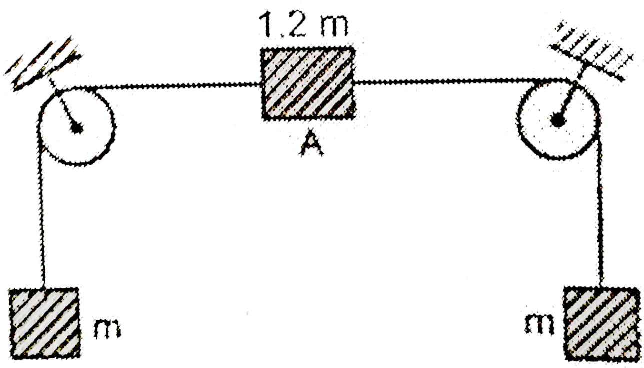
33. In the figure, the vertical sections of the string are long A is released from rest from the position show.



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34. A strip of wood of length l is placed on a smooth horizontal surface. An insect starts from one end of the strip, walks with constant velocity and reaches the other end in time t_1. It then flies off vertically. The strip moves a further distance l in time t_2.

A. $t_2 = t_1$

B. $t_2 < t_1$

C. $t_2 > t_1$

D. Either (b) or (c) depending on the masses of the insect and the strip

Answer: C

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35. In a gravity free space, man of mass M standing at a height h above the floor, throws a ball of mass m straight down with a speed u. When the ball reaches the floor, the distance of the man above the floor will be.

A. $h\left(1+\frac{m}{M}\right)$

B. $h\left(2-\frac{m}{M}\right)$

C. 2h

D. a function of m, M, h and u

Answer: A

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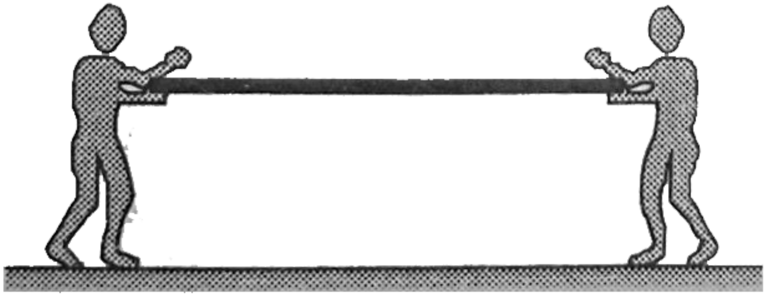
36. 

Two persons pull each other through a massless rope in $tugofwar$ game. Who will win?

A. exerts greater force on the rope

B. exerts greater force on the ground

C. exerts a force on the rope which is greater than the tension in the rope

D. makes a smaller angle with the vertical

Answer: B

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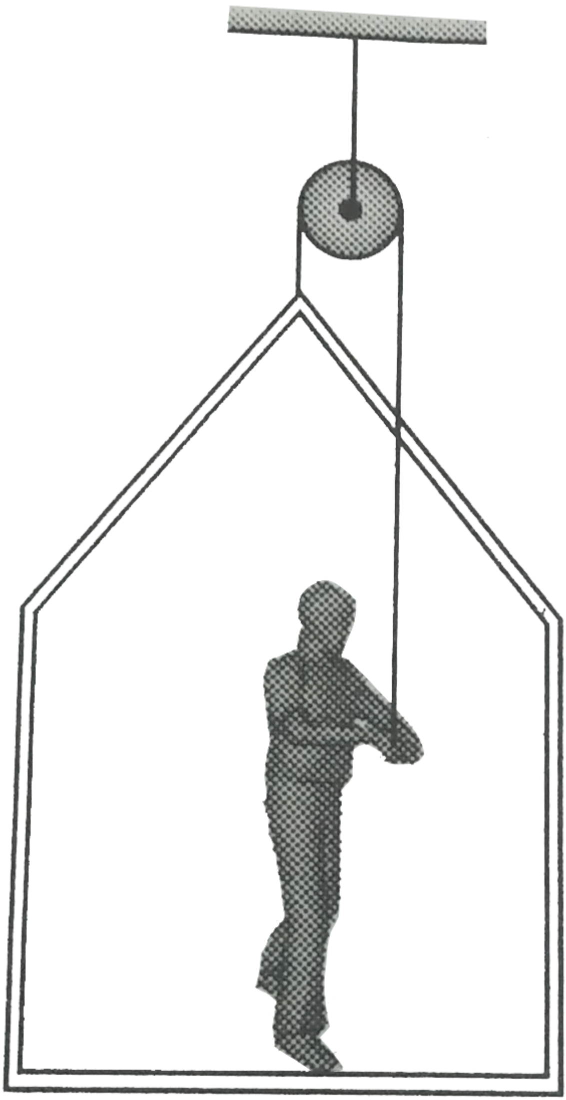
37. A man of mass m stands on a frame of mass M. He pulls on a light rope, which passes over a pulley. The other end of the rope is attached to the frame. For the system to be in equilibrium, what force must the man exert on the rope?



A. $\frac{1}{2}(M + m)g$

B. $(M+m)g$

C. $(M-m)g$

D. $(M+2m)g$

Answer: A

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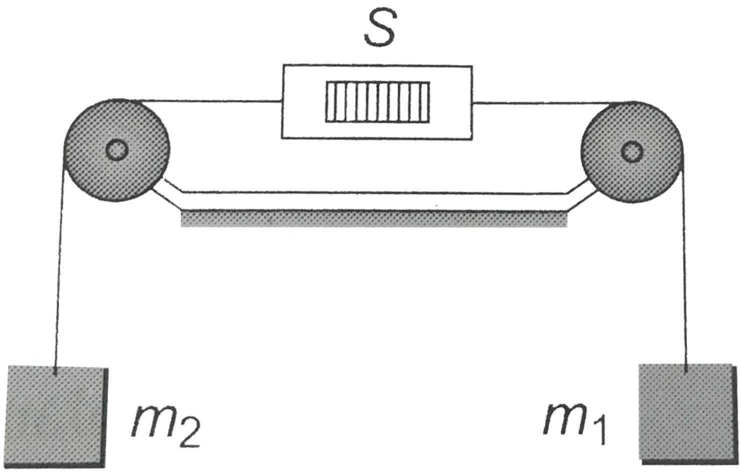
38. In the arrangement shown, the pulleys are fixed and ideal, the strings are light, $m_1 > m_2$ and S is a spring balance which is itself massless. The readings of S (in units of mass) is



A. $m_1 - m_2$

B. $\frac{1}{2}(m_1 + m_2)$

C. $\frac{m_1 m_2}{m_1 + m_2}$

D. $\frac{2m_1 m_2}{m_1 + m_2}$

Answer: D

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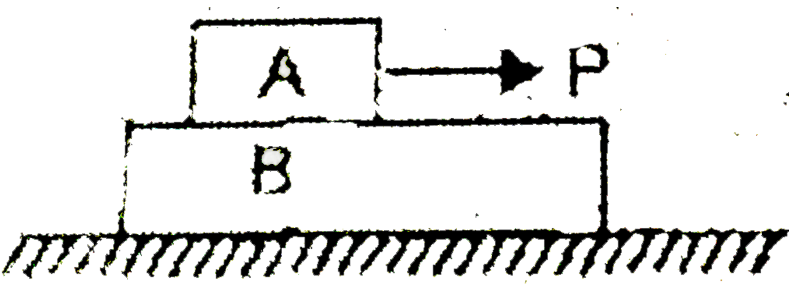
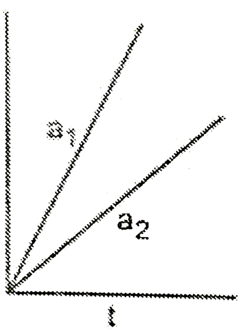
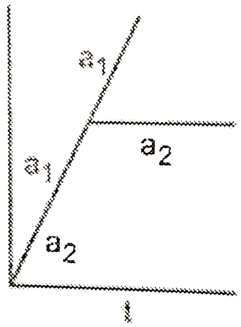
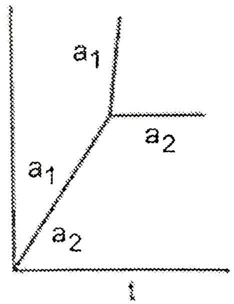
39. Block A is placed on block B. There is friction between the blocks, while the ground is smooth. A horizontal force P, increasing linearly with time, begins to act on A. The accelerations $a_1 \& a_2$ of A and B respectively. Are plotted against time (t). Time correct graph is :

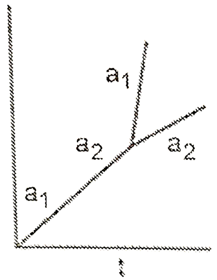




A.

B. 

C. 

D. 

Answer: C

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40. A bicycle moves on a horizontal road with some acceleration. The forces of friction between the road and the front and rear wheels are F_1 and F_2 respectively.

A. Both F_1 and F_2 act in the forward direction

B. Both F_1 and F_2 act in the reverse direction

C. F_1 acts in the forward direction, F_2 acts in the reverse direction.

D. F_2 acts in the forward direction, F_1 acts in the reverse direction.

Answer: D

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41. A car starts from rest to cover a distance s. the coefficient of friction between the road and the tyres is μ. The minimum time in which the car can cover the distance is proportional to

A. μ

B. $\sqrt{\mu}$

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

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

Answer: D

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42. A car starts from rest and moves on a surface in which the coefficient of friction between the road and the tyres increases linearly with distance (x). The car moves with the maximum possible acceleration. The kinetic energy (E) of the car will depend on x as

A. $E \propto \frac{1}{x^2}$

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

C. $E \propto x$

D. $E \propto x^2$

Answer: D

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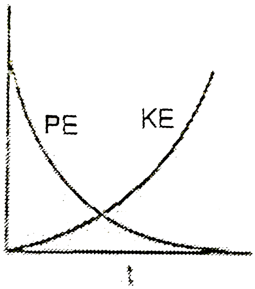
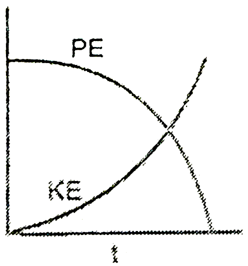
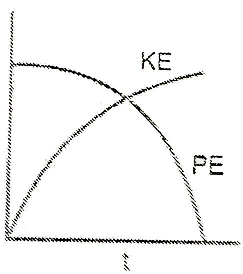
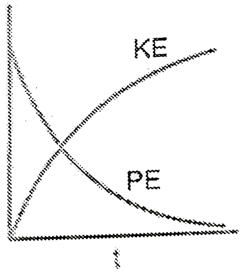
43. A particle falls from rest under gravity. Its potential energy with respect to the ground (PE) and its kinetic energy (KE) are plotted against time (t). Choose the correct graph.

A.


B.


C.


D. 

Answer: B

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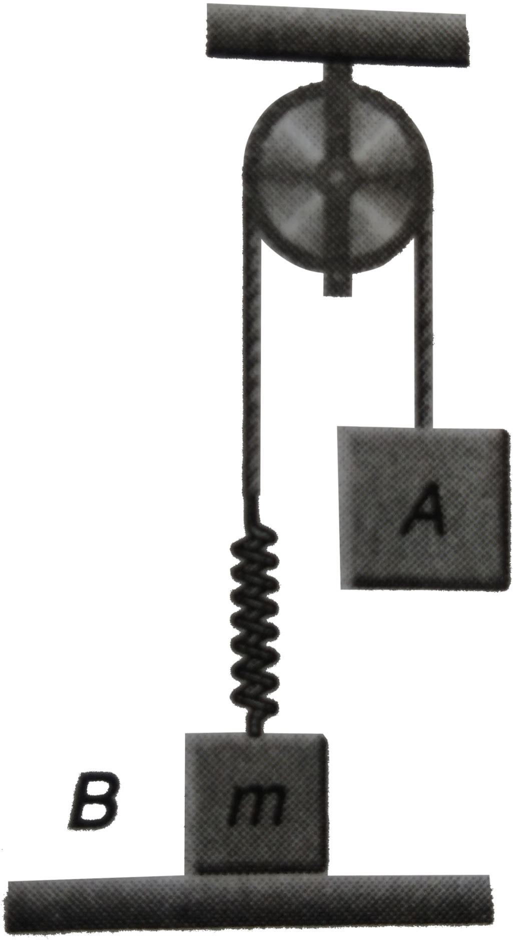
44. In the figure, block A is released from rest when the spring is its natural length for the block B of mass m to leave contact with the ground at some stage what should be the minimum mass of block A?



A. 2M

B. M

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

D. a function of M and the force constant of the spring

Answer: C

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45. A force $F = -K(y\hat{i} + x\hat{j})$ (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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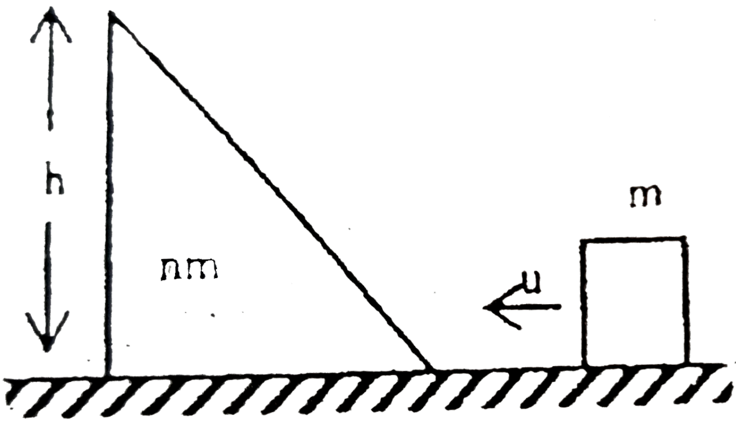
46. A block of mass m is pushed towards a movable wedge of mass nm and height h, with a velocity u. All surfaces are smooth. The minimum value of u for which the block will reach the top of the wedge is



A. $\sqrt{2gh}$

B. $\eta\sqrt{2gh}$

C. $\sqrt{2gh(1+1/\eta)}$

D. $\sqrt{2gh(1-1/\eta)}$

Answer: C

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47. A uniform chain of length l is placed on rough table with length l/n (where $n > 1$) , hanging over the edge. If the chain just begins to slide off the table by itself from this position, the coefficient of friction between the chain and the table is

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

B. $\frac{1}{n-1}$

C. $\frac{1}{n+1}$

D. $\frac{n-1}{n+1}$

Answer: B

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48. A chain is held on a frictionless table with L/4 hanging over. Knowing total mass of the chain is M and total length L, the minimum work required to pull hanging part back to the table is :

A. $\frac{1}{4}mgl$

B. $\frac{1}{8}mgl$

C. $\frac{1}{16}mgl$

D. $\frac{1}{32}mgl$

Answer: D

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49. A spring, which is initially in its unstretched condition, is first stretched by a length x and then again by a further length x. The work done in the first case is W_1 and in the second case is W_2.

A. $W_2 = W_1$

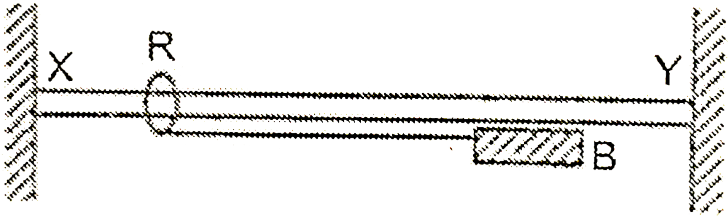
B. $W_2 = 2W_1$

C. $W_2 = 3W_1$

D. $W_2 = 4W_1$

Answer: C

50.



The ring R in the arrangement shown can slide along a smooth, fixed, horizontal rod XY. If is attached to the block B by a light sring. The blocks is released from rest, with the string horizontal.

A. One point in the string will have only vertical motion

B. R and B will always have momenta of the same magnitude

C. When the string becomes vertical, the speeds of R and B will be inversely proportional to their masses

D. R will lose contact with the rod at some point

Answer: A::C

Watch Video Solution

51. A strip of wood of mass M and length l is placed on a smooth horizontal surface. An insect of mass m starts at one end of the strip and walks to the other end in time t, moving with a constant speed.

A. The speed of the insect as seen from the ground is $< \frac{1}{t}$

B. The speed of the strip as seen from the ground is $\frac{1}{l}\left(\frac{M}{M+m}\right)$

C. The speed of the strip as seen from the ground is $\frac{1}{l}\left(\frac{m}{M+m}\right)$

D. The total kinetic energy of the system is $\frac{1}{2}(m+M)\left(\frac{1}{t}\right)^2$

Answer: A::C

Watch Video Solution

52. A charged particle X moves directly towards another charged particle Y. For the 'X plus Y' system, the total momentum is p and the total energy is E.

A. p and E are conserved if both X and Y are free to move

B. (a) is true only if X and Y have similar charges

C. If Y is fixed, E is conserved but not p

D. If Y is fixed, neither E nor p is conserved

Answer: A::C

Watch Video Solution

53. In a one-dimensional collision between two particles, their relative velocity is $\vec{v}_1$ before the collision and $\vec{v}_2$ after the collision.

A. $\vec{v}_1 = \vec{v}_2$ if the collision is elastic

B. $\vec{v}_1 = -\vec{v}_2$ if the collision is elastic

C. $|\vec{v}_2| = |\vec{v}_1|$ in all cases

D. $\vec{v}_1 = -k\vec{v}_2$ in all cases, where $k \geq 1$

Answer: B::C::D

Watch Video Solution

54. A sphere A moving with a speed u and rotating with an angular velocity ω, makes a head-on elastic collision with an identical stationary sphere B. There is no friction between the surfaces of a and B. Disregard gravity.

A. A will stop moving but continue to rotate with an angular velocity ω

B. A will come to rest and stop rotating

C. B will move with a speed u without rotating

D. B will move with a speed u and rotate with an angular velocity ω

Answer: A::C

Watch Video Solution

55. In an elastic collision between spheres A and B of equal mass but unequal radii, A moves along the x-axis and B is stationary before impact. Which of the following is possible after impact ?

A. A comes to rest

B. The velocity of B relative to A remains the same in magnitude but reverses in direction

C. A and B move with equal speeds, making an angle of 45° each will the x-axis

D. A and B moves with unequal speeds, making angles of 30° and 60° with the x-axis respectively.

Answer: A::B::C::D

Watch Video Solution

56. In a one dimensional collision between two identical particles A and B, B is stationary and A has momentum p before impact. During impact, B gives impulse J to A.

A. The total momentum of the 'A plus B' system is p before and after the impact, and $(p - J)$ during the impact

B. During the impact, A gives impulse J to B

C. The coefficient of restitution is $\frac{2J}{p} - 1$

D. The coefficient of restitution is $\frac{J}{p} + 1$

Answer: B::C

Watch Video Solution

57. When a cannot sheel explodes in mid-air,

A. the momentum of the system is conserved in all cases

B. the momentum of the system is conserved only if the shell was moving horizontally

C. the kinetic energy of the system either remains constant or decreases

D. the kinetic energy of the system always increases

Answer: A::D

Watch Video Solution

58. A cannot shell is fired to hit a target at a horizontal distance R. However, it breaks into two equal parts at its highest point. One part (A) returns to the cannon. The other part

A. will fall at a distance of R beyond the target

B. will fall at a distance of 3R beyond the target

C. will hit the target

D. have nine times the kinetic energy of A

Answer: A::D

Watch Video Solution

59. A particle moving with a speed v changes direction by an angle θ, without change in speed.

A. The change in the magnitude of its velocity is zero

B. The change in the magnitude of its velocity is $2v\sin(\theta/2)$

C. The magnitude of the change in its velocity is

$2v\sin(\theta/2)$

D. The magnitude of the change in its velocity is

$v(1-\cos\theta)$

Answer: A::C

Watch Video Solution

60. A block of weight 9.8N is placed on a table. The table surface exerts an upward force of 10 N on the block. Assume $g = 9.8m/s^2$.

A. The block exerts a force of 10N on the table

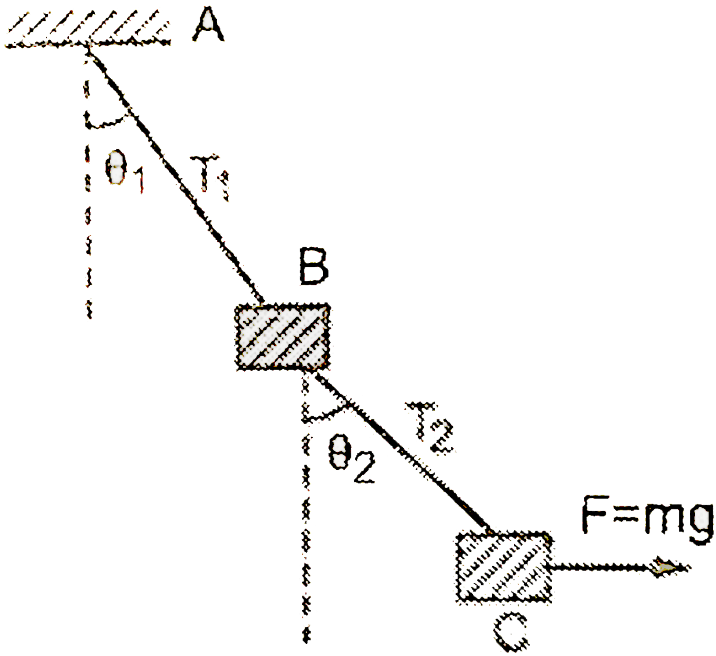
B. The block exerts a force of 19.8 N on the table

C. The block exerts a force of 9.8N on the table

D. The block has an upward acceleration

Answer: A::D

Watch Video Solution



61.

The blocks B and C in the figure have mass m each. The strings AB and BC are light, having tensions T_1 and T_2 respectively. The system is in equilibrium with a constant horizontal force mg acting on C.

A. $\tan\theta_1 = 1/2$

B. $\tan\theta_2 = 1$

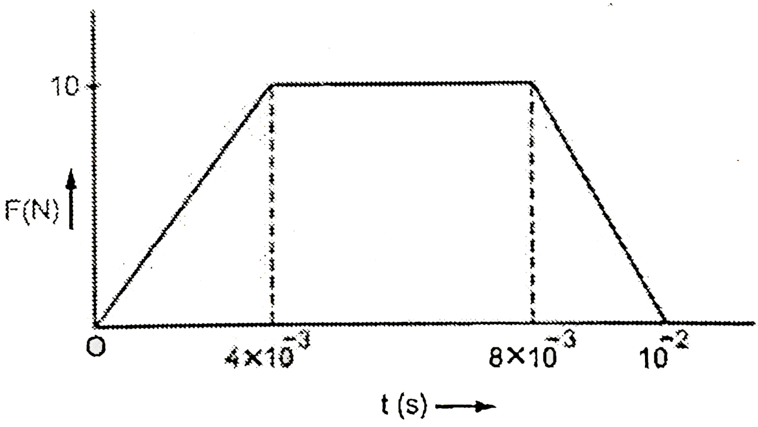
C. $T_1 = \sqrt{5}mg$

D. $T_2 = \sqrt{2}mg$

Answer: A::B::C::D

Watch Video Solution

62. A particle of mas 70g, moving at $50cm/s$is acted upon by a variable force opposite to its direction of motion. The force F is shown as a function of time t.



A. Its speed will be $50 cm / s$ after the force stops acting

B. Its direction of motion will reverse

C. Its average acceleration will be $1 m / s^2$ during the interval in which the force acts

D. Its average acceleration will be $10 m / s^2$ during the interval in which the force acts.

Answer: A::B

View Text Solution

63. A monkey of mass mkg slides down a light rope attached to a fixed spring balance, with an acceleration a. The reading of the spring balance is W kg. [g = acceleration due to gravity]

A. The force of fricion exerted by the rope on the monkey is $m(g-a)N$

B. $m=\frac{Wg}{g-a}$

C. $m=W\left(1+\frac{a}{g}\right)$

D. The tension in the rope is Wg N

Answer: A::B::D

Watch Video Solution

64. A block of weight W is suspended from a spring balance. The lower surface of the block rests on a weighing mechine. The spring balance reads W_1 and the weighing machine reads $W_2 (W, W_1, W_2$ are in the same unit).

A. $W = W_1 + W_2$ if the system is at rest

B. $W > W_1 + W_2$ if the system moves down with some acceleration

C. $W_1 > W_2$ if the system moves up with some acceleration

D. No relation between W_1 and W_2 can be obtained with the given description of the system

Answer: A::B::D

Watch Video Solution

65. A simple pendulum with a bob of mass m is suspended from the roof of a car moving with a horizontal acceleration a.

A. The string makes an angle of $\tan^{-1}(a/g)$ with the vertical

B. The string makes an angle of $\tan^{-1}\left(1-\frac{a}{g}\right)$ with the vertical

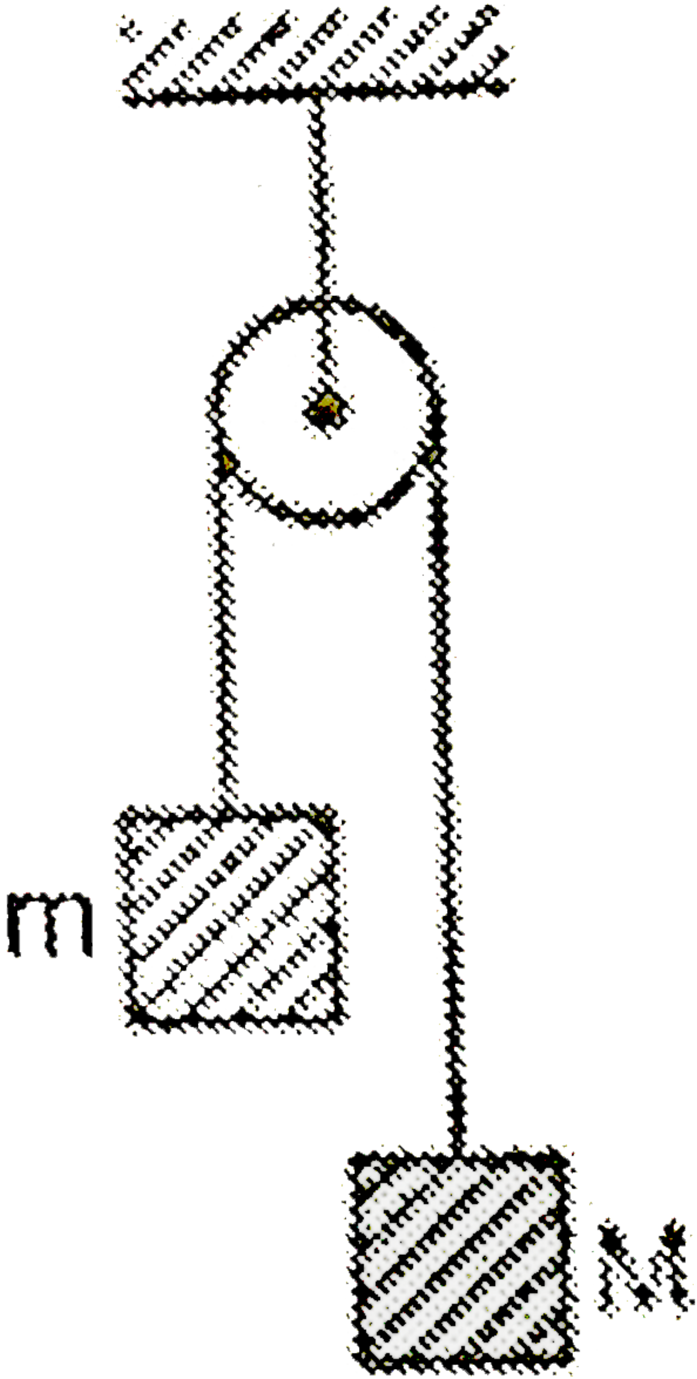
C. The tension in the string is $m\sqrt{a^2+g^2}$

D. The tension in the string is $m\sqrt{g^2 - a^2}$

Answer: A::C

Watch Video Solution

66. Two masses M and $m(M > m)$ are joined by a light string passing over a smooth light pulley.


m
M

A. The acceleration of each block is $\left(\frac{M-m}{M+m}\right)g$

B. The tension in the string is $\frac{2Mmg}{M+m}$

C. The centre of mass of the 'M plus m' system moves down with an acceleration of $g\left(\frac{M-m}{M+m}\right)^2$

D. The tension in the string by which the pulley is attached to the rodd is $(M+m)g$

Answer: A::B::C

View Text Solution

67. An ideal massless spring S can compressed 1.0 m in equilibrium by a force of $100N$. This same spring is placed at the bottom of a friction less inclined plane which makes an angle $\theta = 30^\circ$ with the horizontal. A $10kg$ mass m is released from the rest at top of the inclined plane and is brought to rest momentarily after compressing the spring by $2.0m$. the distance through which the mass moved before coming to rest is.

A. both blocks will move with the same acceleration

B. the string will becomes taut (under tension) again when the blocks acquire the same speed

C. the strang wil become taut again when the blocks cover equal distances

D. at the instant when the straing becomes taut again, there may be some exchange of impluse between the string and blocks

Answer: A::C::D

Watch Video Solution

68. A block of mass of mass 1 kg moves under the influence of external forces on a rough horizontal surface. At some instant it has a speed of 1m/s due east and an acceleration of $1m/s^2$ due north . The force of friction acting on it is F.

A. F acts due west.

B. F acts due south.

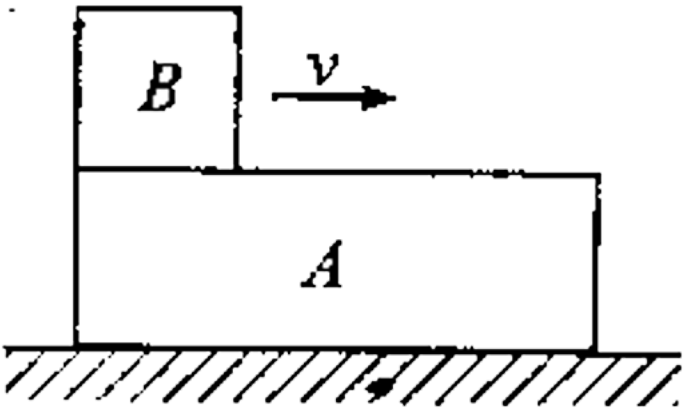
C. F acts in the south-west direction.

D. The magnitude of F cannot be found from the given data.

Answer: A::D

Watch Video Solution

69. A long block A is at rest on a smooth horizontal surface. A small block B, whose mass is half of A, is placed on A at one end and projected along A with some velocity u. The coefficient of friction between the blocks is μ:



A. The blocks will a final common velocity $\frac{u}{3}$.

B. The work done against friction is two-thirds of the initial kinetic energy of B.

C. Before the blocks reach a common velocity, the acceleration of A relative to B is $\frac{2}{3}\mu g$.

D. Brfore the blocks reach a common velocity the acceleration of A relative to B is $\frac{3}{2}\mu g$.

Answer: A::B::D

Watch Video Solution

70. A 10-kg block is placed on a horizontal surface. The coefficient of friction between them is 0.2. A horizontal force P = 15 N first acts on it in the eastward direction. Later, in addition to P a second horizontal force Q = 20 N acts on it in the northward direction.

A. The block will not move when only P acts, but will move when P and Q act.

B. If the block moves, its acceleration will be $0.5m/s^2$.

C. When the block moves, its direction of motion will be $\tan^{-1}(4/3)$ east of north.

D. When both P and Q act, the direction of the force of friction acting on the block will be $\tan^{-1}(3/4)$ west of south.

Answer: A::B::D

Watch Video Solution

71. A block of mass m is placed on a rough horizontal surface. The coeffiicent of friction between them is μ. An external horizontal force is applied to the block and its magnitude is gradually increased. The force exerted by the block on the surface is R.

A. The magnitude of R gradually increase.

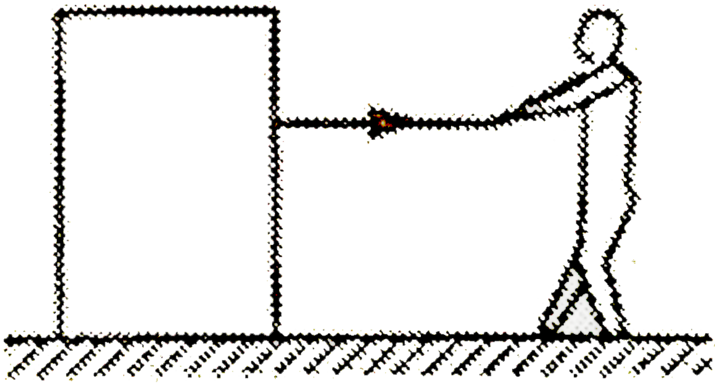
B. $R \leq mg\sqrt{\mu^2 + 1}$.

C. The angle made by R with the vertical will gradually increase.

D. The angle made by R with the vertical $\leq \tan^{-1}\mu$.

Answer: A::B::C::D

Watch Video Solution

72.  A man pulls a block heavier than himself with a lioght rope. The coefficient if friction is the same between the man and the ground, and between the block and the ground.

A. The block will not move unless the man also moves.

B. The man can move even when the block is stationary.

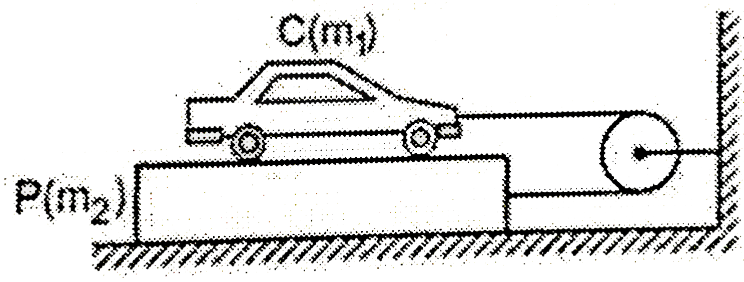
C. If both move, the acceleration of the man is greater than the acceleration of the block.

D. None of the above assertions is correct.

Answer: A::B::C

Watch Video Solution

73. A car of mass m_1 rests on a plank P of mass m_2. The plank rests on a smooth floor. The string and pulley are ideal. The car starts and moves towards the pulley with acceleration.



A. If $m_1 > m_2$, the string will remain under tension.

B. If $m_1 < m_2$, the string will become slack.

C. If $m_1 = m_2$, the string will have no tension, and C and P will have accelerations of equal magnitude.

D. C and P will have acceleration of equal magnitude if $m_1 \geq m_2$.

Answer: A::B::C::D

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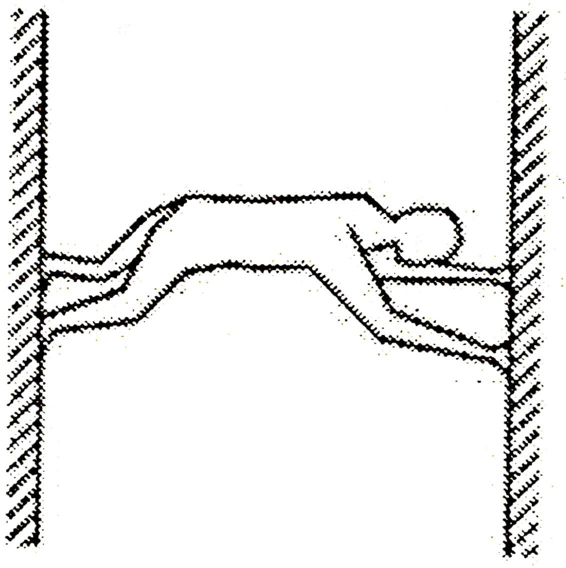


74.

A man tries to remain in equilibrium by pushing with his hands and feet against two parallel walls. For equilibrium,

A. he must exert equal forces on the walls

B. the forces of friction at the two walls must be equal

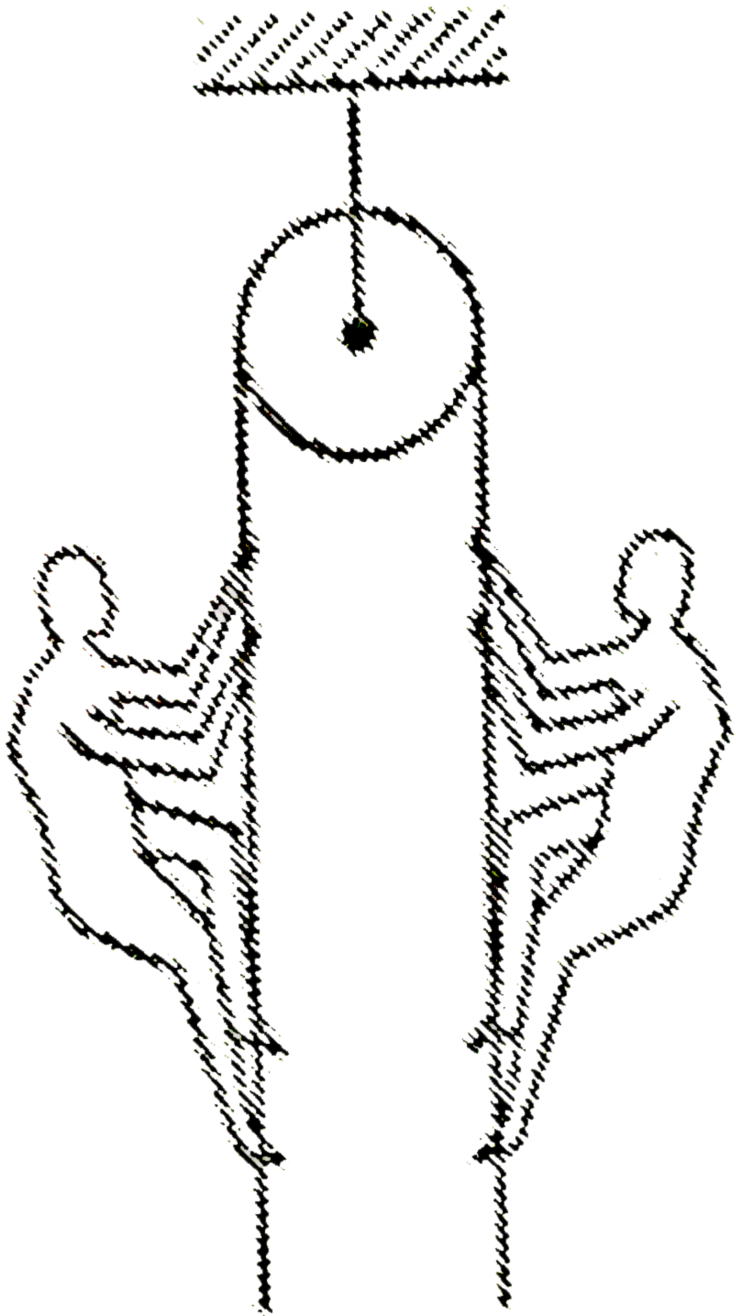
C. friction must be present on both walls

D. the coefficents of friction must be the same between both walls and the man

Answer: A::C

Watch Video Solution

75. Two men of unequal masses hold on to the two sections of a light rope passing over a smooth light pulley. Which of the following are possible ?



A. The lighter man is stationary while the hevier man slides with some acceleration.

B. The heavier man is stationary while the lighter man climbs with some acceleration.

C. The two men slide with the same acceleration in the same direction.

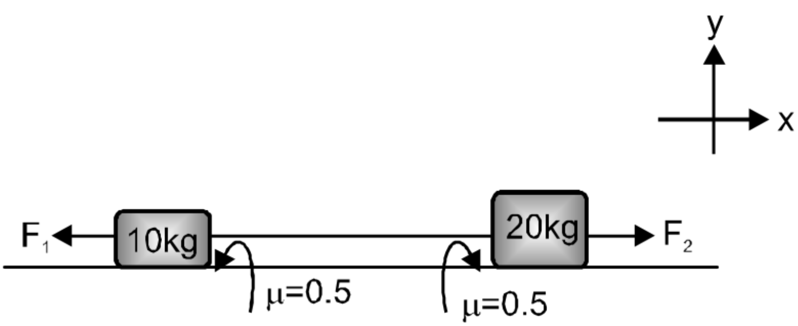
D. The two men slide with accelerations of the same magnitude in opposite directions.

Answer: A::B::D

Watch Video Solution

76. Initially both blocks are at rest on a horizontal surface and string is just tight. At t=0, two constant horizontal force F_1 and F_2 start acting on blocks as shown. f_1 and f_2 are frication foces acting on $10kg$ and $20kg$ block (co-efficient of frication between and ground are 0.5). Values of F_1 and F_2 are given column-I. Then match magnitudes of f_1, f_2 and direction of $\vec{f_1}$ with corresponding values of F_1 and F_2 given in column-I

$\left[g = 10m / s^2\right]$.



A. for $P < F_0, T = 0$

B. for $F_0 < P < 2F_0, T = P - F_0$

C. for $P > 2F_0, T = P/2$

D. none of the above

Answer: A::B::C

Watch Video Solution

77. An object is given a quick push up an inclined plane. It slides up and then comes back down. It is known that the ratio of the ascent time (t_{up}) to the descent time (t_{dawn}) is equal to the coefficient of kinetic friction (μ). Find the angle θ that the inclined plane makes with the horizontal. Also find the range of μ for which the situation described is possible. Assume, that the coefficient of static and kinetic friction are equal.

A. $t_1 > t_2$

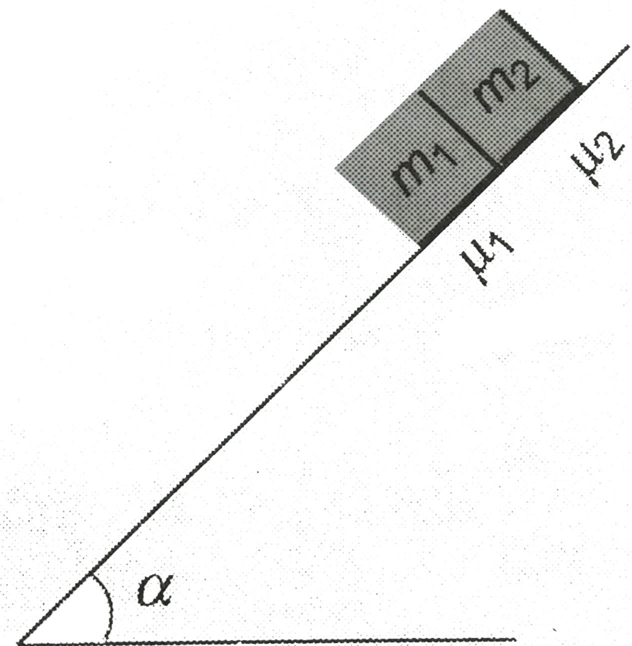
B. $t_1 < t_2$

C. The retardation of the block while moving up is $g(\sin\theta + \mu\cos\theta)$.

D. The acceleration of the block while down is $g(\sin\theta - \mu\cos\theta)$.

Answer: B::C::D

78. Two blocks are in contect moving on an inclined plane of inclination α with the horizontal. The masses of the blocks are equal to m_1 and m_2 and the coefficients of friction between the inclined plane and the blocks are equal to μ_1 and $\mu_2 (\mu_1 > \mu_2)$ respectively. Find (a) common acceleration of the blocks and (b) the contact force between the blocks.



A. If $\mu_1 > \mu_2$, the blocks will always remain in contact.

B. If $\mu_1 < \mu_2$, the blocks will slide down with different accelerations.

C. If $\mu_1 > \mu_2$, the blocks will have a common acceleration $\frac{1}{2}(\mu_1 - \mu_2)g\sin\theta$.

D. If $\mu_1 < \mu_2$, the blocks will have a common acceleration $\frac{\mu_1\mu_2 g}{\mu_1 + \mu_2}\sin\theta$.

Answer: A::B

Watch Video Solution

79. A ball of mass m is attached to the lower end of a light vertical spring of force constant K. The upper end of the spring is fixed. The ball is released from rest with the spring at its normal (unstretched) length, and comed to rest again after descending through a distance x.

A. $x = mg/k$

B. $x = 2mg/k$

C. The ball will have no acceleration at the position where it has descended through x/2.

D. The ball will have an upward acceleration equal to g at its lowermost position.

Answer: B::C::D

Watch Video Solution

Type 2

1. An observer moves with a constant speed along the line joining two stationary objects. He will obserbe that the two objects

A. have the same speed

B. have the same velocity

C. move in the same direction

D. move in opposite direction

Answer: A::B::C

Watch Video Solution

2. Which of the following statements are true for a moving body ?

A. If its speed changes, its velocity must change and it must have some acceleration

B. If its velocity changes, its speed must change and it must have some acceleration.

C. If its velocity changes, its speed may or may not change, and it must have some acceleration.

D. If its speed changes but direction of motion does not change, its velocity may remain constant

Answer: A::C

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3. Let v and a denote the velocity and acceleration respectively of a body.

A. a can be nonzero when v = 0

B. a must be zero when v = 0

C. a may be zero when $v \neq 0$

D. The direction of a must have some correlation with the direction of v.

Answer: A::C

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4. Let $\overrightarrow{v}$ and $\overrightarrow{a}$ denote the velocity and acceleration respectively of a body in one-dimensional motion.

A. $\left|\overrightarrow{v}\right|$ must decrease when $\overrightarrow{a} < 0$

B. Speed must increase when $\overrightarrow{a} > 0$

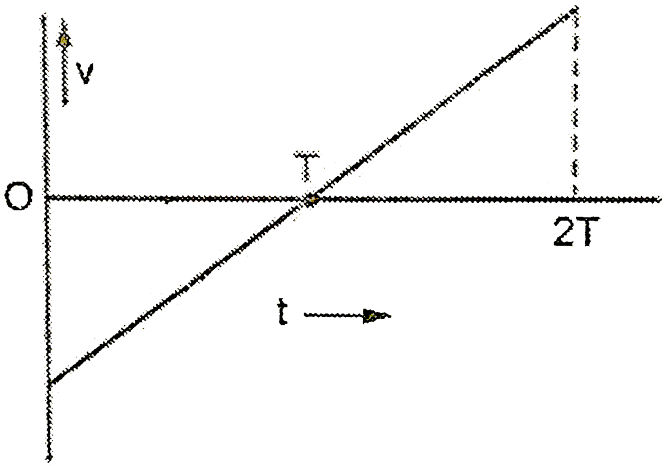
C. Speed will increase when both $\overrightarrow{v}$ and $\overrightarrow{a}$ are < 0

D. Speed will decrease when $\overrightarrow{v} < 0$ and $\overrightarrow{a} > 0$

Answer: C::D

Watch Video Solution

5. The figure shows the velocity (v) of a particle ploted against time (t).



A. The particle changes its direction of motion at some point

B. The acceleration of the particle remains constant

C. The displacement of the particle is zero

D. The initial and final speeds of the particle are the same.

Answer: A::B::C::D

Watch Video Solution

6. A particle of mass m moves on the $x - a\xi s$ as follows : it starts from rest at $t = 0$, from the point $x = 0$, and comes to rest at $t = l$ at the point $x = 1$. No other information is available about its motion at intermediate times $(0 < t < l)$. If α denotes the instantaneous accelartion of the particle , then :

A. α cannot remain positive for all t in the interval $o \le t \le 1$

B. $|\alpha|$ cannot exceed 2 at any point in its path

C. $|\alpha|$ must be ≥ 4 at some point or points in its path

D. α must change sign during the motion, but no other assertion can be made with the information given

Answer: A::C

Watch Video Solution

7. The displacement (x) of particle depends on time (t) as

$x = \alpha t^2 - \beta t^3$.

A. The particle will return to its starting point after time α / β

B. The particle will come to rest after time $2\alpha / 3\beta$

C. The initial velocity of the particle was zero but its initial acceleration was not zero

D. No net force will act on the particle at $t = \alpha / 3\beta$

Answer: A::B::C::D

Watch Video Solution

8. A particle moves with an intial velocity v_0 and retardation αv, where v is its velocity at any time t.

A. The particle will cover a total distance v_0 / α

B. The particle will come to rest after a time $1 / \alpha$

C. The particle will continue to move for a very long time

D. The velocity of the particle will become $v_0 / 2$ after a time $1 / \alpha$

Answer: A::C

View Text Solution

9. A particle starts from the origin of coordinates at time $t = 0$ and moves in the xy plane with a constant acceleration α in the y-direction. Its equation of motion is $y = \beta x^2$. Its velocity component in the x-directon is

A. variable

B. $\sqrt{\frac{2\alpha}{\beta}}$

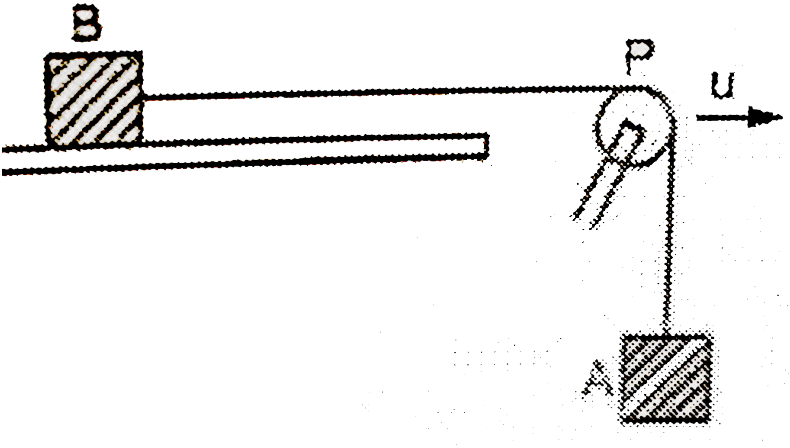
C. $\frac{\alpha}{2\beta}$

D. $\sqrt{\frac{\alpha}{2\beta}}$

Answer: D

Watch Video Solution

10. In the figure, the pulley P moves to the right with a constant speed u. The downward speed of A is v_A, and the speed of B to the right is v_B.



A. $v_B = v_A$

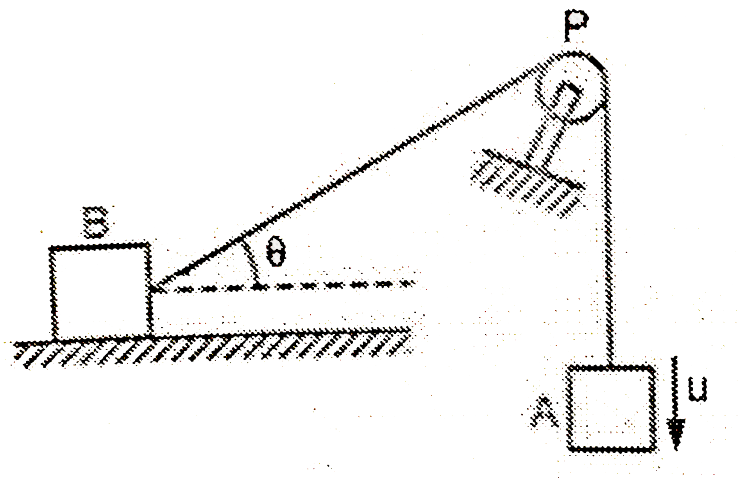
B. $v_B = u + v_A$

C. $v_B + u = v_A$

D. The two blocks have accelerations of the same magnitude.

Answer: B::D

Watch Video Solution



11.

In the figure, the blocks are of equal mass. The pulley is fixed. In the position shown, A moves down with a speed u, and $v_B =$ the speed of B.

A. B will never lose contact with the ground

B. The downward acceleration of A is equal in magnitude to the horizontal acceleration of B

C. $v_B = u \cos \theta$

D. $u_B = u / \cos \theta$

Answer: A::D

Watch Video Solution

12. Two paricles A and B start simultaneously from the same point and move in a horizontal plane. A has an initial velocity u_1 due east and acceleration a_1 due north. B has an intial velocity u_2 due north and acceleration a_2 due east.

A. Their paths must intersect at some point

B. They must collide at some point

C. They will collide only if $a_1u_1 = a_2u_2$

D. If $u_1 > u_2$ and $a_1 < a_2$, the particle will have the same speed at some point of time

Answer: A::C::D

Watch Video Solution

13. Two particles are projected from the same point with the same speed at different angles θ_1 and θ_2 to the horizontal. If their respective times of flights are T_1 and T_2 and horizontal ranges are same then

a) $\theta_1 + \theta_2 = 90^\circ$,

b)$T_1 = T_2 \tan\theta_1$

c.$T_1 = T_2 \tan\theta_2$,

d) $T_1 \sin\theta_2 = T_2 \sin\theta_1$

A. $\theta_1 + \theta_2 = 90^\circ$

B. $\dfrac{t_1}{t_2} = \tan\theta_1$

C. $\dfrac{t_1}{t_2} = \tan\theta_2$

D. $\dfrac{t_1}{\sin\theta_1} = \dfrac{t_2}{\sin\theta_2}$

Answer: A::B::D

Watch Video Solution

14. A cart moves with a constant speed along a horizontal circular path. From the cart, a particle is thrown up vertically with respect to the cart.

A. The particle will land somewhere on the circular path

B. The particle will land outside the circular path

C. The particle will follow an elliptical path

D. The particle will follow a parabolic path

Answer: B::D

Watch Video Solution

15. A man on a moving cart, facing the direction of motion, thrown a ball staright up with respect to himself.

A. The ball will always return to him

B. The ball will never return to him

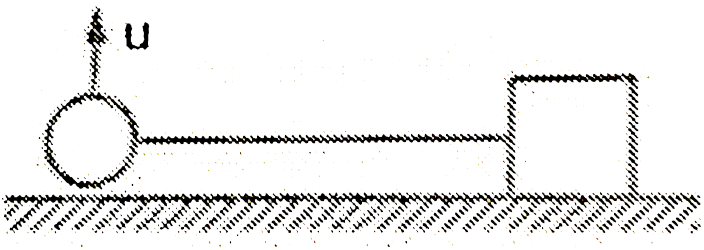
C. The ball will return to him if the cart moves with a constant velocity

D. The ball will fall behind him if the cart moves with some acceleration.

Answer: C::D

Watch Video Solution

16. A small ball is connected to a block by a light string of length l. Both are initially on the ground. There is sufficient friction on the ground to prevent the block from slipping. The ball is projected vertically up with a velocity u, where $2gl < u^2 < 3gl$. The centre of mass of the block + ball' system is C.



A. C will move along a circle

B. C will move along a parabola

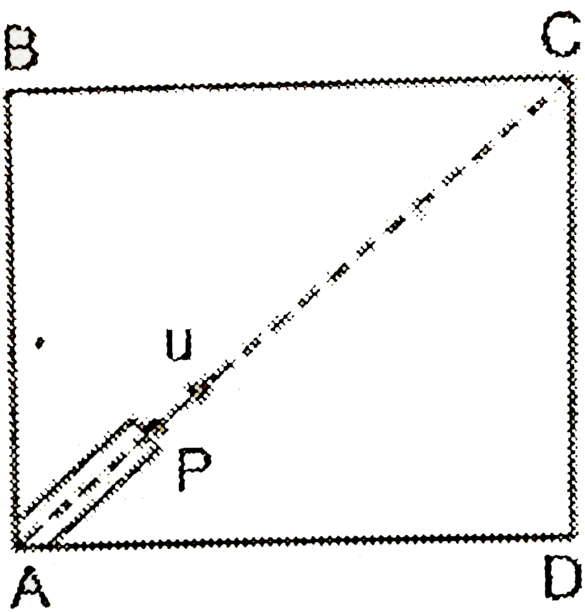
C. C will move along a straight line

D. The horizontal component of the velocity of the ball will first increase and then decrease.

Answer: A::D

Watch Video Solution

17.



A large rectangular box ABCD falls vertically with an acceleration a. a toy gun fixed at A and aimed towards C fired a particle P.

A. P will hit C if $a = g$

B. P will hit the roof BC if $a > g$

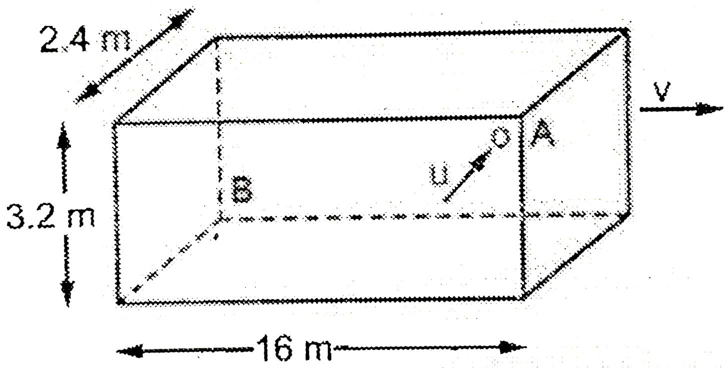
C. P will hit the wall CD or the floor AD if $a < g$

D. May be either (a),(b) or (c), depending on the speed of projection of P.

Answer: A::B::C

Watch Video Solution

18.



A railway compartment is 16m long, 2.4 m wide and 3.2 m high. It is moving with a velocity v. A particle moving horizontally with a speed u, perpendicular to the direction of v, enters through a hole at an upper corner A and strikes the diagonally opposite corner B. Assume $g = 10m/s^2$.

A. $v = 20m/s$

B. $u - 3m/s$

C. To an observer inside the compartment, the path of the particle is a parabola

D. To a stationary observer outside the compartment, the path of the particle is a parabola.

Answer: A::B::D

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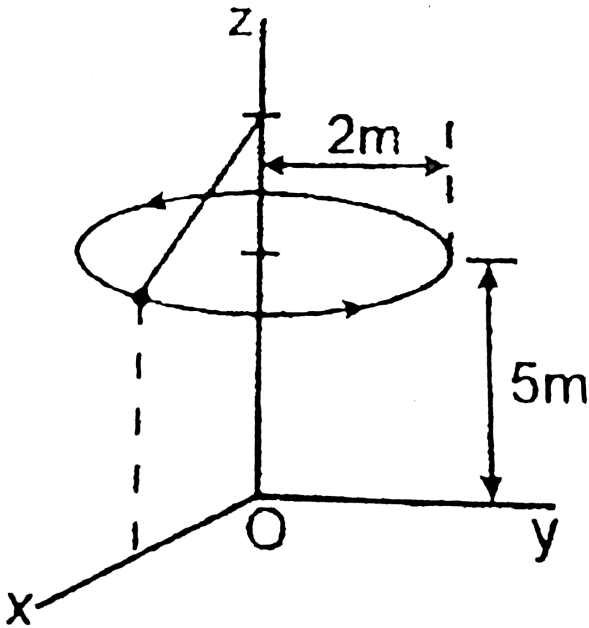

19.

The upper end of the string of a simple pendulum is fixed to a vertical z-axis and set in motion such that the bob moves along a horizontal circular path of radius 2 m. parallel to the xy plane, 5 m above te origin. The bob has a speed of $3m / s$. the string breaks when the bob is vertically above the x-axis and it lands on the xy plane at a point (x,y)

A. $x = 2m$

B. $x > 2m$

C. $y = 3m$

D. $y = 5m$

Answer: B::D

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20. Two shells are fired from a cannot with a speed u each, at angles of α and β respectively to the horizontal. The time interval between the shots is T. they collide in mid-air after time t from the first shot. Which of the following conditions must be satisfied ?

A. $\alpha > \beta$

B. $t \cos \alpha = (t - T) \cos \beta$

C. $(t - T) \cos \alpha = t \cos \beta$

D.

$$(u \sin \alpha)t - \frac{1}{2}gt^2 = (u \sin \beta)(t - T) - \frac{1}{2}g(t - T)^2$$

Answer: A::B::D

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21. A man who can swim at a speed v relative to the water wants to cross a river of width d, flowing with a speed u. The point opposite him across the river is P.

A. The minimum time in which he can cross the river is $\frac{d}{v}$

B. He can reach the point P in time $\frac{d}{v}$

C. He can reach the point P in time $\frac{d}{\sqrt{v^2 - u^2}}$

D. He cannot reach P if $u > v$

Answer: A::C::D

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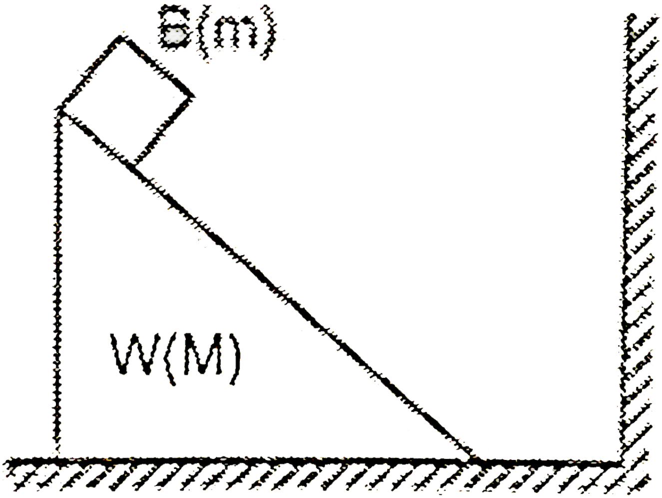
22. 

In the figure, the block B of mass m starts from rest at the top of a wedge W of mass M. All surfaces are without friction. W can slide on the ground. B slides down onto the ground, moves along it with a speed v, has an elastic collision with the wall, and climbs back two W.

A. B will reach the top of W again

B. From the beginning, till the collision with the wall, the centre of mass of B plus W' does not move horizontally.

C. After the collision the centre of mass of B plus W' moves with the velocity $\frac{2mv}{m+M}$

D. When B reaches its highest position on W, the speed of W is $\frac{2mv}{m+W}$

Answer: B::C::D

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Revision Exercise

1. Take the z-axis as vertical and the xy plance as horizontal .A particle A is projected at $4\sqrt{2}$ m/s at an angle of 45° to the horizotal , in the xz plane .Particle B is projected at 5 m/s at an angle $\theta = \tan^{-1}(4/3)$ to the y-axis , in th yz plance . which of the following is not correct for the velocity of B With respect to A?

A. Its initial magnitude is 5 m /s.

B. Its magnitude will change with time

C. it lies in the xy plane.

D. It will initially make an angle $(\theta + \pi/2)$ with the positive x-axis.

Answer: B

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2. Two particles moving initially in the same direction undergo a one- dimensional , elastic collision . Their relative velocities before and after the collision are $\overrightarrow{v_1}$ and $\overrightarrow{v_2}$. Which of the following is not correct?

A. $\left|\overrightarrow{v_1}\right| = \left|\overrightarrow{v_2}\right|$

B. $\overrightarrow{v}_1 = -\overrightarrow{v}_2$ only if the two are of equal mass.

C. $\overrightarrow{v}_1 . \overrightarrow{v}_2 = -\left|\overrightarrow{v}_1\right|^2$

D. $\left|\overrightarrow{v_2} . \overrightarrow{v_1}\right| = \left|\overrightarrow{v_2}\right|^2$

Answer: B

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3. A particle of mass m moving with kinetic energy K, makes a head - on elastic collision with a stationary particle of mass ηm. The maximum potential energy stored in the system during the collision is

A. $nE/(n+1)$

B. $(n+1)E/n$

C. $(n-1)E/n$

D. E/n

Answer: A

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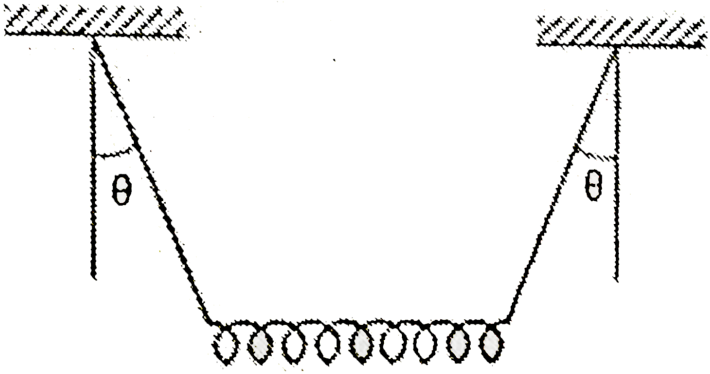
4. 

Aspring of weight W and force constant k is suspended in a horizontal position by two light strings attached to its two ends. Each string makes and angle θ with the vertical .The extension of the sporing is

A. $(W/4k)\tan\theta$

B. $(W/2k)\tan\theta$

C. $(W/4k)\sin\theta$

D. 0

Answer: B

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5. A man balances himself in a horizontal position by pushing his hands and feet against two parallel walls . (see figure of Q.no). His centre of mass lies midway between the wall s . The coefficients of friction aat the walls are equal . Which of the following is not correct ?

A. He exerts equal forces on the walls .

B. He exerts only horizontal forces on the walls.

C. The forces of friction at the walls are equal,

D. The forces exerted by the walls on him are not horizontal.

Answer: B

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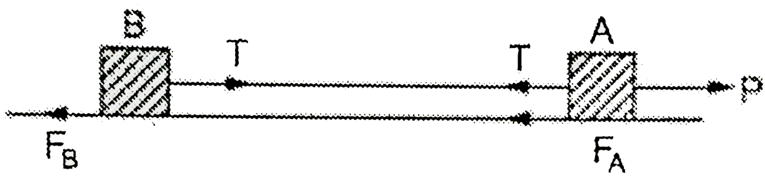
6. 

Two blocks A and b are placed on a table and joined by a string . The limitaing frition for both blocks is F .The tension in the string is T. the forces of friction acting on the blocks are F_A and F_b An external horizontal force $P = 3F/2$ acts on A, directed aways from B.

A. $F_A = F_B = T = 3F/4$

B. $F_A = F/2, F_B = F, T = F$

C. $F_A = F_B = 3F/4, T = 0$

D. $F_A = f, F_B = T = F/2$

Answer: D

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7. A train of length 200m switches on its heat when it starts moving wioth accelertion $0.5m/s^{-2}$ Some time later , its tail light is switched on .An observer on the ground notices that the two events occur at the same place .The time interval between the two enents is

A. $10\sqrt{2}S$

B. 20S

C. $20\sqrt{2}s$

D. 40S

Answer: C

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8. A stick is thrown in the air and lands at some distance from the thrower . The centre of mass of the stick will move along a parabolic path

A. In all cases

B. only iif the stick is uniform

C. only if the stick does not have any rotational motion

D. Only If the centre of mass of the stick lies at some point on it and not outside it

Answer: A

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9. A Car stats from rest and moves on a surface on which the coeffcient with distance ,x The car moves with the maximum possible accelertion The kintic energy E of the x car will be proportional to

A. x^{-2}

B. x^{-1}

C. x

D. x^2

Answer: D

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10. A unifrom chain of mass m hannges from a light pulley ,with unequal lenghts hanging from the two sides of the pulley .The force exerted by the moving chain on the pulley is

A. mg

B. $> mg$

C. $< mg$

D. May be any these depending on the time elapsed

Answer: C

View Text Solution

11. A ball of mass m is dropped onto a floor from a certain height. The collision is perfectly elastic and the ball rebounds to the same height and again falls. Find the averge force exerted by the ball on the floor during a long time interval.

A. mg

B. $2mg$

C. $3mg$

D. proportional to m and h

Answer: A

Watch Video Solution

12. An insect of mass m is initially at one end of a stick of length L and mass M, which rests on a smooth floor. The coefficient of friction between the insect and the stick is k. The minimum time in which the insect can reach the other end of the stick is t. Then t^2 is equal to

A. $2L / kg$

B. $2Lm / kg(M + m)$

C. 2LM//kg(M+m)`

D. $2Lm / kgM$

Answer: C

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13. Three ships A, B and C are in motion. The motion of A as seen by B is with speed v towards north-east . The motion. Of B as seen by C is with speed v towards the north-west. Then as seen by A, C will be moving towards

A. north

B. south

C. east

D. west

Answer: B

Watch Video Solution

14. A point moving along the x-direction starts from rest at x=0 and comes to rest at x=1 after 1 s Its accelertion at any point is denoted by α Which of following is not correct ?

A. α must change sign during the motion .

B. $|\alpha|$ge 4 units st some or all points during the motion.

C. It is not possible to specify an uppwer limit for $|\alpha|$ from the given data.

D. $|\alpha|$ connot be less that 1/2 during the motion.

Answer: D

View Text Solution

15. A man of mass m stands on a long flat car of mass M , moving with velocity V.If he now begins to run with velocity u, with respect to the car , in the same direction as V, the the velocity of the car will be

A. $V - mu/M$

B. $V - mu/(m + M)$

C. $V + mu/(m + m)$

D. $V - u(M - m)/(M + m)$

Answer: B

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16. A small body b starts from rest at the hightest point A of a large fixed sphere , with centre C ,and slides down with a small but constant speed , then ,the coefficent of friction between B and the sphere ,at any point P on the surface of the sphere such that $\angle ACP = \theta,$ must be equal to

A. $\sin\theta$

B. $\cos\theta$

C. $\tan\theta$

D. $|\cos\theta - \sin\theta|$

Answer: C

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17. A spring of force constant K rests on a smooth floor, with one end fixed to a wall. A block of mass m hits the free end of the spring with velocity v. The maximum force exerted by the spring on the wall is

A. $v\sqrt{(mk)}$

B. $mv\sqrt{k}$

C. $m\sqrt{(vk)}$

D. $k\sqrt{(mv)}$

Answer: A

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18. A variable force F acts on a body which is free to move. The displacement of the body is proportional to t^3, where t = time. The power delivered by F to the body will be proportional to

A. t

B. t^2

C. t^3

D. t^4

Answer: C

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19. A cannon shell 1 and 2 km away from the cannon. A second shell, fired identically, breaks into two equal parts at the highest point. One part falls vertically. How far from the cannon will the other land?

A. 2 km

B. 3 km

C. 4 km

D. 5 km

Answer: B

Watch Video Solution

20. A unifrom heavy chain is placed on a table with a part of it hanging over the edge. It just begins to slide when this part is one-third of its length. The coefficient of friction between the table and the chain is

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

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

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

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

Answer: A

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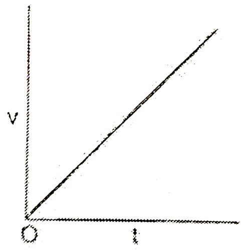
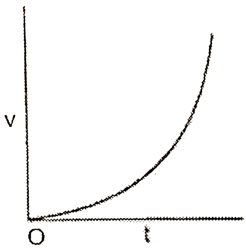
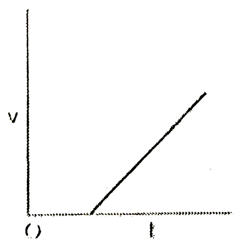
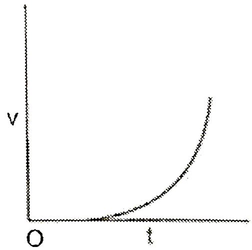
21. A block rests on a rough floor. A horizontal force which increases linearly with time (t), begins to act on the block at $t = 0$. Its velocity (v) is plotted against t. Which of the given graphs is correct?

A. 

B. 

C. 

D. 

Answer: D

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22. A particle moving with velocity V changes its direction of motion by an angle θ without change in speed. Which of the following Statement is not correct?

A. The magnitude of the change in its velocity is 2V $\sin\left(\frac{\theta}{2}\right)$.

B. The change in the magnitude of its velocity is zero.

C. The change in its velocity makes an angle $\frac{\pi}{2} + \frac{\theta}{2}$ with its initial direction of motion.

D. The change in velocity is equal to the negative of the resultant of the initial and final velocities.

Answer: D

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23. A frame of reference F_2 moves with velocity $\overrightarrow{v}$ with respect to another frame F_1. When an object is observed from both frames, its velocity is found to be $\overrightarrow{v_1}$ in F_1 and $\overrightarrow{v_2}$ is equal to

A. $\overrightarrow{v_1} + \overrightarrow{v}$

B. $\overrightarrow{v_1} - \overrightarrow{v}$

C. $\overrightarrow{v} - \overrightarrow{v_1}$

D. $\left|\overrightarrow{v_1} - \overrightarrow{v}\right| \frac{\overrightarrow{v_1}}{\left|\overrightarrow{v_1}\right|}$

Answer: B

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24. Two bodies of masses m and M are attached to the two ends of a light string passing over a fixed ideal pulley $(M > > m)$. When the bodies are in motion, the tension in the string is approximately

A. $(M - m)g$

B. mg

C. 2mg

D. $(m / M)mg$

Answer: C

View Text Solution

25. A particle starts from the origin of coordinates at time t = 0 and moves in the xy plane with a constant acceleration α in the y-direction. Its equation of motion is $y = \beta x^2$. Its velocity component in the x-direction is

A. variable

B. $\sqrt{\left(\frac{2a}{b}\right)}$

C. $\frac{a}{2b}$

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

Answer: D

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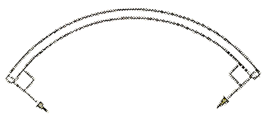
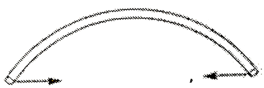
26. A man holds a thin sticks at its two ends and bends it in an arc, like a bow without a string. Which of the following figures correctly show the directions of the forces exerted by him on the stick? (Neglect gravity)

A. 

B. 

C. 

D. 

Answer: C

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