1) A block of weight 99 N moves on a horizontal surface with constant speed by a force of 40 N. The value of the coefficient of friction μ is:

a) 0.53
b) 0.17
c) 0.64
d) 0.40

---

2) A particle moving with initial velocity $v_e = -0.5i + 3j$ (m/s), and constant acceleration $a = -5i + 6j$ (m/s^2). The y–component of final velocity v_y at t=3s is:

a) 21 m/s
b) – 28 m/s
c) 84 m/s
d) – 47 m/s

---

3) A body of 55 kg running in a circular path of R = 3 m at a velocity of 6 m/s. The centripetal force:

a) 660 N
b) 110 N
c) 330 N
d) 165 N

---

4) A certain force is applied to a mass of m_1 = 3kg with acceleration of 3 m/s^2. The same force is applied to another mass m_2 and accelerated it by 3 m/s^2. The mass of the second object is:

a) 14.0 kg
b) 3.0 kg
c) 2.0 kg
d) 6.2 kg

---

5) A particle moves in the xy plane. In which situation of the following a_x and a_y are both constant:

a) $V = (4\ t^3 - 2)\ i + (3)\ j$
b) $V = (-3\ t)\ i + (t^2 - 1)\ j$
c) $V = (2\ t^2)\ i + (4\ t + 3)\ j$
d) $V = (10\ t)\ i + (9\ t + 1)\ j$

---

6) A 40 kg box moves over a frictionless floor along the x-axis. The magnitude of the normal force on the box is:

a) 40 N
b) 9.8 N
c) 39.2 N
d) 392 N

---

7) A 810 N person is standing in an elevator. If the normal force on the person is 580 N, the person is:

a) Stationary
b) Moving up with a constant speed
c) Accelerating upward
d) Accelerating downward

---

8) A ball is thrown with an initial speed 15.6 m/s. The maximum range of the ball is:

a) 152.9 m
b) 24.8 m
c) 15.6 m
d) 42.6 m

---

9) A ball is fired horizontal from the top of a table. At t = 0.25 s, the horizontal distance from table to the point that the ball reach the ground is 0.58 m. The ball's initial velocity is:

a) 17.3 m/s
b) 11.5 m/a
c) 2.3 m/s
d) 6.2 m/s

---

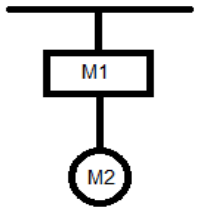
10) A body of mass 10 kg at a point where g = 9.8 m/s^2. Its weight at a point where g = 0 is:

a) 0
b) 9.8 N
c) 98 N
d) 10 N

---

11) Two blocks are suspended by a rope. If M_1 = 10 kg and M_2 = 15 kg, the tension in the top rope is:

a) 49.0 N
b) 245.0 N
c) 98.0 N
d) 147.0 N



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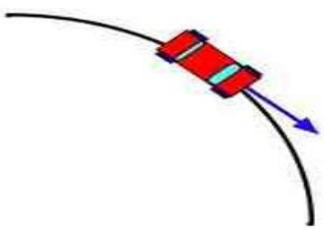
12) A 1800 kg car is moving on a circular road as shown in the figure. If the radius of circular road is 379.2 m, and the coefficient of friction between the tires and the road is 0.7, the speed of the car is:



a) 26 m/s
b) 51 m/s
c) 37 m/s
d) 62 m/s

13) A body is rotated in a horizontal circle of radius 2.3 m. If the centripetal acceleration has a magnitude of 7.0 m/s^2, the body's speed is:

a) 4 m/s
b) 7 m/s
c) 21 m/s
d) 10 m/s

---

14) Three force $F_1 = 3i - 4j$, $F_2 = -3i + 4j$ and $F_3 = -8j$ acting on a body, the value of $F_{net.x}$ and $F_{net.y}$ are:

a) $F_{net.x} = -7$ N and $F_{net.y} = 8$ N
b) $F_{net.x} = 9$ N and $F_{net.y} = 11$ N
c) $F_{net.x} = 0$ and $F_{net.y} = -8$ N
d) $F_{net.x} = 6$ N and $F_{net.y} = -7$ N

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15) The gravitational force of earth acting on a 15 kg is:

a) 115 N
b) 9.8 N
c) 147.0 N
d) 15 N

---

16) A ball is thrown with initial velocity $V_0 = 38$ m/s at an angle $\theta_0 = 60^0$ above the horizontal. The x component of the initial velocity (V_{0x}) is:

a) 19.0 m/s
b) 65 m/s
c) 50 m/s
d) 46m/s

17) At the maximum height in projectile motion, the horizontal component of the acceleration is:

a) $a_x > -9.8\ m/s^2$
b) $a_x = a_y$
c) $a_x = -9.8\ m/s^2$
d) $a_x = 0$

---

18) Two boxes slides on a rough horizontal surface, where $m_1 = 12$ kg and $m_2 = 16$ kg with constant speed. Which statement is true:

a) $f_{k1} = f_{k2}$
b) $f_{k1} > f_{k2}$
c) $f_{k1} = f_{k2} = 0$
d) $f_{k1} < f_{k2}$

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19) The position vector for a particle is initially r = 14i – 5j + k and then later is r = 5i – 5j + 6k, all in meters. The particle's displacement vector is:

a) –9i + 5k
b) 9i – 10j – 5k
c) –9i – 5k
d) –9i – 10j – 5k

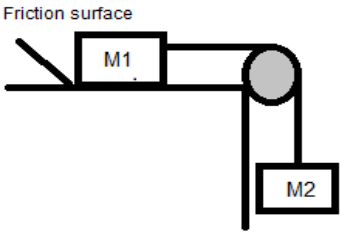
---

20) The coefficient of static friction between a block and the surface is 0.2. If the maximum horizontal force that can be applied to the block before it slides is 49 N, the block's mass is:

a) 25 kg
b) 69 kg
c) 70 kg
d) 20 kg

21) In the figure, two boxes of mass m_1 = 62 kg and m_2 = 19.4 kg are connected to each other by a massless cord. If m_2 descends with constant velocity, the magnitude of the frictional force between the surface and m_1 is:

a) 19.4 N
b) 190 N
c) 62 N
d) 608 N



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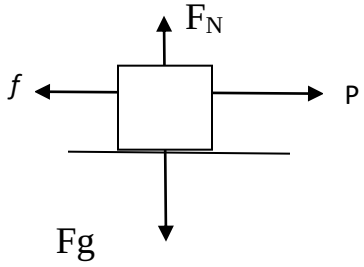
22) A boy pulls a 58 N box along a friction horizontal floor by a force P as shown in the figure. The frictional force between box and floor is f = 29 N. If the box does not move, which of the following is ture?

a) P > 29 N and F_N = 58 N
b) P < 29 N and F_N = 58 N
c) P = 29 N and F_N < 58 N
d) P = 29 N and F_N = 58 N



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23) A projectile launched at an angle of 30^0 to the horizontal with a speed of 20 m/s. The maximum height of the projectile is:

a) 7.1 m
b) 5.1 m
c) 6.1 m
d) 4.1m

---

24) A horizontal force of 98 N acts on a 50 kg box lying on the floor but the box does not move. The magnitude of static frictional force (f_s) is:

a) 490 N
b) 98 N
c) 9.9 N
d) 50 N

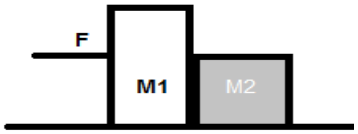
25) A plane enters a horizontal circular turn with v_1 = (200i + 600j) m/s and 23 s later leave the turn with v_1 = (200i + 600j) m/s. The period of the plane is:

a) 600 s
b) 46 s
c) 200 s
d) 23 s

---

26) From the figure, if m_1 = 10 kg m_2 = 40 kg, the force acting to acceleration the two bodies by 2 m/s^2 equals

a) 100 N
b) 80 N
c) 66 N
d) 410N



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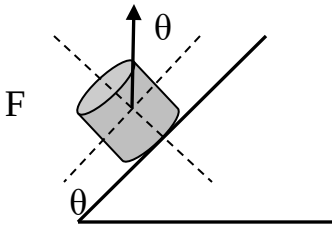
27) A box of mass m = 62 kg is pushed up at constant speed over the frictionless inclined plane of angle θ = 42^o by an applied force F as shown in the figure. The magnitude of applied force F is:

a) 46.1 N
b) 547.1 N
c) 607.6 N
d) 406.6 N



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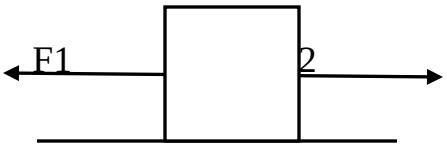
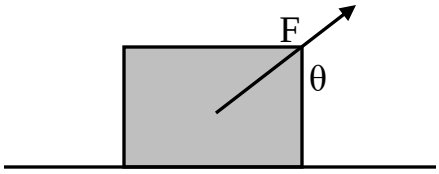
28) In the figure, If F_1 = 21 N and F_2 = 8 N, the net force on the block is:

a) 29 N
b) –29 N
c) 13 N
d) –13 N



29) In the figure, a 10 kg block moves over a frictionless floor along the x axis pushed by a force F = 96 N directed θ = 20° above + x–axis. The magnitude of the block's acceleration is:

a) 15.4 m/s^2
b) 38.9 m/s^2
c) 23.4 m/s^2
d) 9.0 m/s^2



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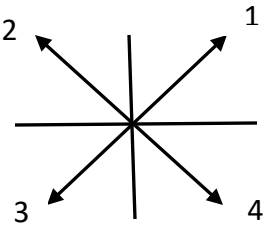
30) A particle initially has v = 7i + 2j (m/s) and then 2 s later has v = –2i + 5j (m/s). The average acceleration (a_{avg}) is:

a) –0.3i + 7j
b) i + 2j
c) 0.4i + 5j
d) –4.5i + 1.5j

---

31) Two force F_3 = 3i – 4j and F_4 = 5i + 6j acting on a body, from the free body diagram the vector that represent F_3 and F_4 are:

a) F_3 is vector 3, F_4 is vector 1
b) F_3 is vector 1, F_4 is vector 3
c) F_3 is vector 2, F_4 is vector 4
d) F_3 is vector 4, F_4 is vector 1



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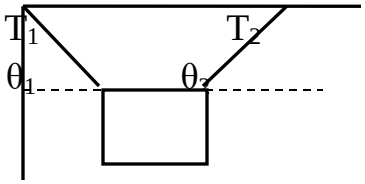
32) A block of mass m = 10 kg is hanging by two ropes as shown in the figure. If θ_1 = 30° and θ_2 = 45°, by using Newton's laws, the y-component of net force ($F_{net.y}$) on the block is:

a) $T_1 \sin 45 + T_2 \sin 30 - mg = 0$
b) $T_1 \sin 30 + T_2 \sin 45 - mg = 0$
c) $T_1 \sin 30 + T_2 \sin 45 - mg = m\, a_y$
d) $T_1 \sin 45 + T_2 \sin 30 - mg = m\, a_y$



33) The components of a car's position as a function of time are given by

$x = 5t^2 - 14$, $y = -t^3 - 4$. The velocity components are:

a) $V_x = 10t - 14$ and $v_y = -3t^2 - 4$
b) $V_x = 10t$ and $v_y = -3t^2$
c) $V_x = 10t^2$ and $v_y = -3t^2$
d) $V_x = 10t - 14$ and $v_y = -3t^2$