Exam 1-031

Q1 An empty fuel tank of a car needs 50 liters of gasoline to fill up. Find the volume of the fuel tank in m**3. (1 milliliter = 1 cm**3)

A1: 0.050
A2: 50 000
A3: 50
A4: 500
A5: 0.50

Q2 Fig. 1 shows a graph of position versus time for a particle moving along the x axis. What is the total distance traveled by the particle in 15 s?

A1: 12.5 m
A2: 7.5 m
A3: 10 m
A4: 5.0 m
A5: 22.5 m

Q3 An object starts from rest at the origin and moves along the x-axis with a constant acceleration of 5.0 m/s**2. Find its average velocity as it goes from x = 0 m to x = 10 m.

A1: 5.0 m/s
A2: 10 m/s
A3: 17 m/s
A4: 3.0 m/s
A5: 8.0 m/s

Q4 Starting at time t = 0, an object moves along a straight line with a velocity in m/s given by v = 72 - 2 t**2, where t is in seconds. Find its acceleration when it stops momentarily.

A1: -24 m/s**2
A2: 0 m/s**2
A3: -4.0 m/s**2
A4: -9.8 m/s**2
A5: -4.9 m/s**2

Q5 A stone is thrown vertically upward with an initial speed of 15 m/s. What is its speed at a height of 10 m from its release point?

A1: 5.4 m/s
A2: 0 m/s
A3: It will not reach the height of 10 m.
A4: 9.8 m/s
A5: 12 m/s

Q6 The angle between the two vectors A = 2 i + 4 j and B = 4 i - 2 j is:

A1: 90 degrees
A2: 27 degrees
A3: 39 degrees
A4: 180 degrees
A5: 0 degrees

Q7 As shown in Fig. 3, a block moves down on a 45-degree inclined plane of 2.5 m length, then horizontally for another 2.5 m, and then falls down vertically a height of 2.5 m. Find the magnitude and direction of the resultant displacement vector of the block.

A1: 6.0 m and 45 degrees below horizontal axis
A2: 3.5 m and 30 degrees below horizontal axis
A3: 6.0 m and 30 degrees below horizontal axis
A4: 3.5 m and 45 degrees below horizontal axis
A5: 5.5 m and 60 degrees below horizontal axis

Q8 Given the vectors A = 3 j + 6 k , B = 15 i + 21 k. Find the magnitude of vector C that satisfies equation 2A + 3C - B = 0.

A1: 6.16
A2: 5.48
A3: 18.5
A4: 6.71
A5: 8.60

Q9 At t=0, a particle moving in the xy plane with a constant acceleration of a =(2i + 4j) m/s**2 has a velocity Vo=(-4j) m/s at the origin. Find the speed of the particle at t=3 s.

A1: 10 m/s
A2: 0 m/s
A3: 4 m/s
A4: 24 m/s
A5: 20 m/s

Q10 A ball is projected from the ground into the air with velocity V_o. At a height of 10.0 m the velocity is observed to be V = 8.5 i + 9.1 j in m/s. Find V_o.

A1: (8.5 i + 16.7 j) m/s
A2: (16.7 i + 9.1 j) m/s
A3: (8.5 i + 9.1 j) m/s
A4: (2.5 i + 3.1 j) m/s
A5: (6.2 i + 1.1 j) m/s

Q11 Rain is falling vertically at constant speed of 6.0 m/s. At what angle from the vertical does the rain appear to be falling as viewed by the driver of a car traveling on a straight, level road with a speed of 8.0 m/s?

A1: 53 degrees
A2: 37 degrees
A3: 49 degrees
A4: 41 degrees
A5: 0 degree

Q12 The speed of a particle moving in uniform circular motion is doubled while the radius of the path of the particle is increased by a factor of 4. The new centripetal force needed will be:

A1: the same as before
A2: half as great as before
A3: twice as great as before
A4: 1/4 of its original value
A5: four times as great as before

Q13 A ball is thrown horizontally with speed V_o from the edge of a cliff 35 m high. The ball strikes the ground at a point 80 m from the base of the cliff. Find Vo.

A1: 30 m/s
A2: 9.8 m/s
A3: 2.5 m/s
A4: 22 m/s
A5: 45 m/s

Q14 As shown in Fig. 7, a 25-kg box is pushed across a frictionless horizontal floor with a force of 20 N, directed at an angle of 20 degrees below the horizontal. The magnitude of the acceleration of the box is:

A1: 0.75 m/s**2
A2: 0.27 m/s**2
A3: 17 m/s**2
A4: 21 m/s**2
A5: 0.82 m/s**2

Q15 An object of mass M = 10 kg moving on frictionless horizontal surface is subjected to two applied forces as shown in Fig. 2. In which situation is the object accelerating to the right?

A1: (d)
A2: (a)
A3: (c)
A4: (b)
A5: (e)

Q16 Two blocks A (MA = 4 kg)and B (MB = 20 kg) are in contact with each other and are placed on a horizontal frictionless surface. A 36-N constant force is applied to A as shown in Fig. 4. The magnitude of the force exerted on A by B is:

A1: 30 N
A2: 0 N
A3: 36 N
A4: 15 N
A5: 3.6 N

Q17 Two masses m1 = 2kg, m2 = 4 kg are connected by a light string that passes over a frictionless and mass less pulley (see Fig. 5). Find the magnitude of the acceleration of the masses.

A1: 3.27 m/s**2
A2: 2.15 m/s**2
A3: 10.5 m/s**2
A4: 0.75 m/s**2
A5: 1.23 m/s**2

Q18 A stone, of mass m, is attached to a strong string and rotates in a vertical circle of radius R. At the bottom of the path the tension in the string is 3 times the weight of the stone. The speed of the stone at this point is given by:

A1: Sqrt(2gR).
A2: 2*Sqrt(gR)
A3: 2*gR
A4: Sqrt(3gR)
A5: Sqrt(gR/2)

Q19 A block attached to a string, rotates counter-clockwise in a circle on a smooth horizontal surface. The string breaks at point P (Fig.6). What path will the block follow?

A1: path B
A2: path A
A3: path C
A4: path D
A5: path E

Q20 A box slides down a 30 degree incline with an acceleration = 3.2 m/s**2. Find the coefficient of kinetic friction between the box and the incline.

A1: 0.20
A2: 0.25
A3: 0.15
A4: 0.30
A5: 0.62

FIGURE-1

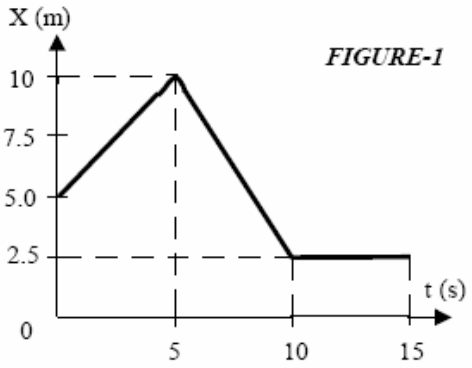

FIGURE-3

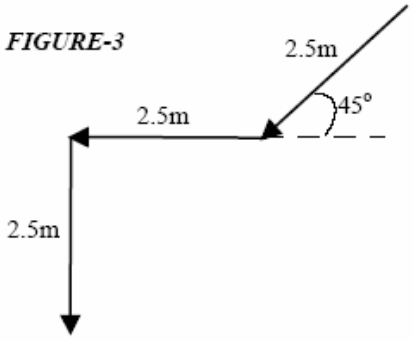

FIGURE-2

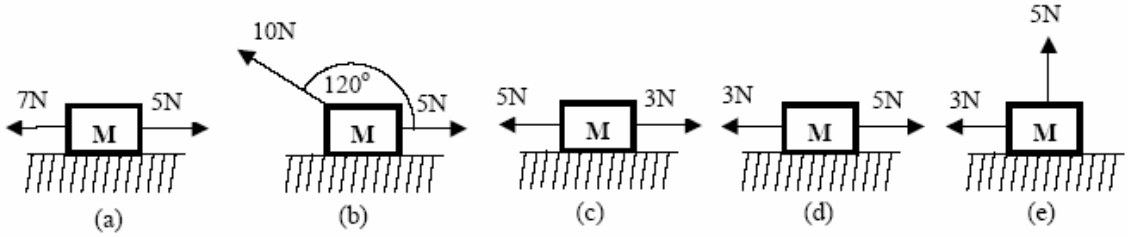

FIGURE-4

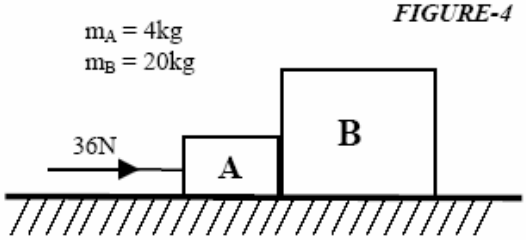

FIGURE-5

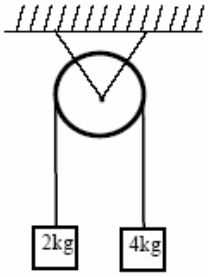

FIGURE-6

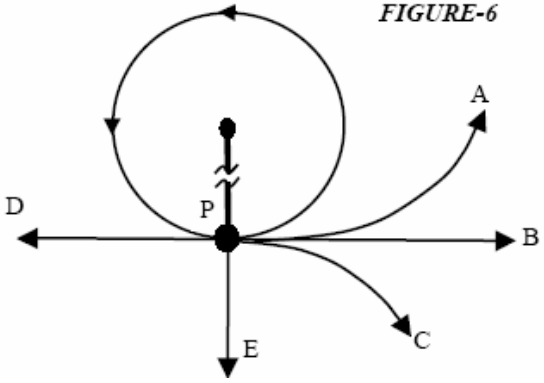

FIGURE-7