

- Q1 Q0 Which of the following is NOT a unit vector?
 Q0
 A1 $(1/2)(i + j)$
 A2 vector $a / |a|$
 A3 $j \times i$
 A4 $(1/\sqrt{3})(i + j + k)$
 A5 $0.6j + 0.8k$
 Q0
- Q2 Q0 What is the angle between the two vectors $A = (i - 2j + 2k)$
 Q0 and $B = (-2i + j + 2k)$?
 Q0
 A1 90 degrees
 A2 30 degrees
 A3 45 degrees
 A4 60 degrees
 A5 0 degrees
 Q0
- Q3 Q0 A student makes the journey from KFUPM to a Super Market and
 Q0 then to Khobar City Center and finally to Exhibition Center.
 Q0 The magnitude and the direction of each of these
 Q0 displacements are indicated in Fig. 1.
 Q0 Give the resultant displacement from KFUPM to the
 Q0 Exhibition Center in unit vector notation.
 Q0
 A1 $(6.2i + 5.8j)$ km
 A2 $(-0.5i + 12.1j)$ km
 A3 $(5.2i + 5.8j)$ km
 A4 $(13.2i + 12.1j)$ km
 A5 $(9.1i + 8.7j)$ km
 Q0
- Q4 Q0 Dimension of an atom is often measured in a unit called
 Q0 Angstrom which is equal to 0.1 nm. 1 mm is equal to:
 Q0 $(1 \text{ nm} = 10^{(-9)} \text{ m})$
 Q0
 A1 10 000 000 Angstrom
 A2 10 000 Angstrom
 A3 100 000 Angstrom
 A4 1 000 000 Angstrom
 A5 20 000 Angstrom
 Q0
- Q5 Q0 A student remembers that it takes roughly 8.4 minutes for
 Q0 the sun's light to reach the earth. Using this information and
 Q0 the fact that the speed of light is $(3.0 \times 10^{(8)}) \text{ m/s}$, estimate
 Q0 the distance to the sun in km.
 Q0
 A1 $1.50 \times 10^{(8)}$ km
 A2 $3.60 \times 10^{(9)}$ km
 A3 $1.50 \times 10^{(6)}$ km
 A4 $2.50 \times 10^{(7)}$ km
 A5 $2.00 \times 10^{(4)}$ km
 Q0
- Q6 Q0 A car travels in a straight road with a velocity of $v_1 = 15 \text{ m/s}$
 Q0 for half the distance between two cities and with a velocity
 Q0 $v_2 = 30 \text{ m/s}$ for the other half. What is the average velocity of
 Q0 the car for the entire trip?
 Q0
 A1 20.0 m/s
 A2 22.5 m/s
 A3 25.0 m/s
 A4 18.5 m/s
 A5 24.0 m/s

PHYS101 - FIRST MAJOR EXAM – FIGURES
Term-022

FIGURE-1

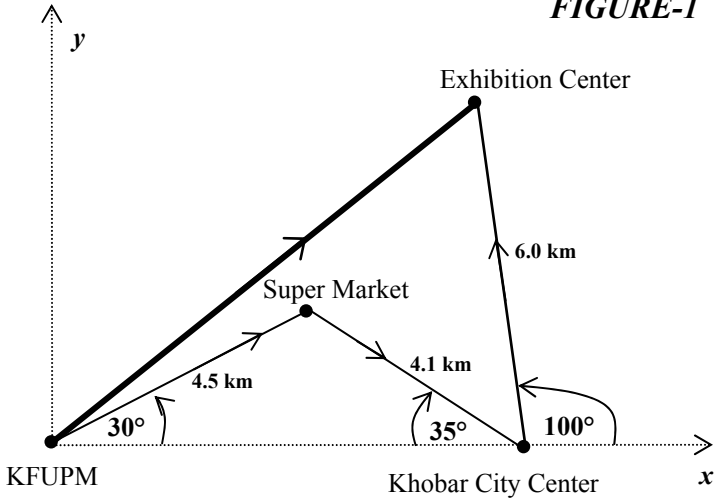


FIGURE-2

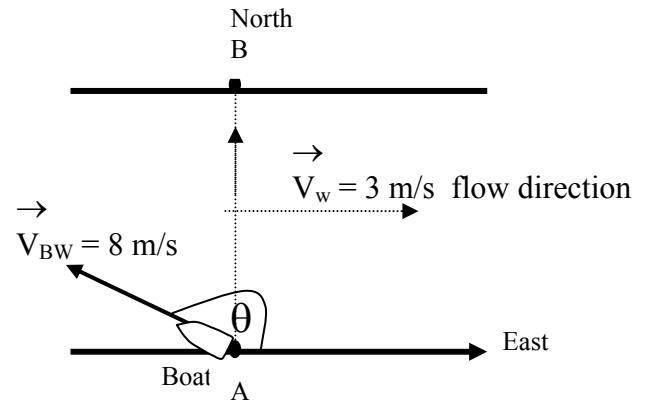


FIGURE-3

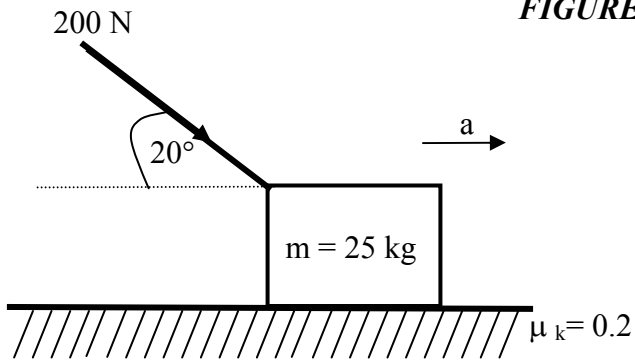


FIGURE-4

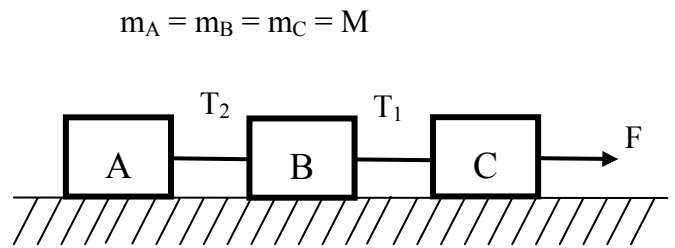


FIGURE-5

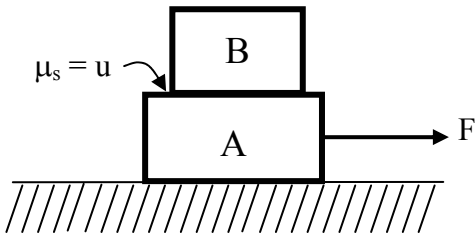


FIGURE-6

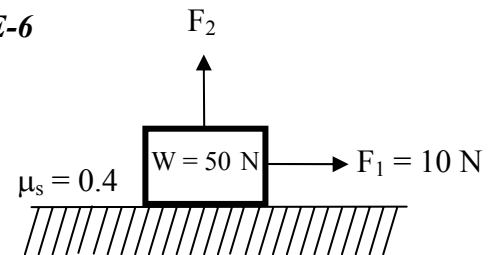
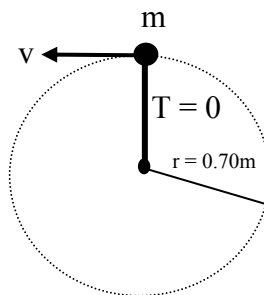


FIGURE-7



- Q0
- Q7 Q0 An object moving along the x axis has a position given by
 Q0 $x = (3t - t^3)$ m, where t is measured in s. What is the
 Q0 acceleration of the object when its velocity is zero?
 Q0
- A1 -6.0 m/s^2
 A2 Zero
 A3 4.0 m/s^2
 A4 -3.5 m/s^2
 A5 3.5 m/s^2
 Q0
- Q8 Q0 A particle moving with a constant acceleration has a velocity
 Q0 of 10 cm/s when its position is $x_0 = 10$ cm. Its position 4.0 s
 Q0 later is $x = -14$ cm. What is the acceleration of the particle?
 Q0
- A1 -8.0 cm/s^2
 A2 -5.5 cm/s^2
 A3 5.5 cm/s^2
 A4 8.4 cm/s^2
 A5 -2.0 cm/s^2
 Q0
- Q9 Q0 A stone is thrown vertically upward such that it has a speed
 Q0 of 9.0 m/s when it reaches one half of its maximum height
 Q0 above the launch point. Determine the maximum height.
 Q0
- A1 8.3 m
 A2 2.8 m
 A3 5.3 m
 A4 6.5 m
 A5 17 m
 Q0
- Q10 Q0 At $t=0$, a particle leaves the origin with a velocity of 9.0
 Q0 m/s in the positive y direction and moves in the xy plane
 Q0 with a constant acceleration $a = (2.0 \mathbf{i} - 4.0 \mathbf{j}) \text{ m/s}^2$. At the
 Q0 instant the x-coordinate of the particle is 16 m, what is the
 Q0 velocity of the particle?
 Q0
- A1 $v = (8\mathbf{i} - 7\mathbf{j}) \text{ m/s}$
 A2 $v = (8\mathbf{i} + 25\mathbf{j}) \text{ m/s}$
 A3 $v = (4\mathbf{i} - 7\mathbf{j}) \text{ m/s}$
 A4 $v = (4\mathbf{i} + 5\mathbf{j}) \text{ m/s}$
 A5 $v = (4\mathbf{i} - 25\mathbf{j}) \text{ m/s}$
 Q0
- Q11 Q0 A ball is hit at ground level. After 3.0 s the ball is
 Q0 observed to reach its maximum height above the ground level
 Q0 at a horizontal distance of 30 m from where it been hit. What
 Q0 is the initial speed of ball?
 Q0
- A1 31 m/s
 A2 25 m/s
 A3 35 m/s
 A4 23 m/s
 A5 10 m/s
 Q0
- Q12 Q0 A wheel has a 15 m radius and completes five turns about its
 Q0 axis every minute at constant rate. What is the magnitude of
 Q0 the acceleration of a point on the rim of the wheel?
 Q0
- A1 4.1 m/s^2
 A2 5.7 m/s^2
 A3 14 m/s^2

A4 19 m/s**2

A5 1.0 m/s**2

Q0

Q13Q0 A wide river has a uniform flow speed of 3.0 m/s toward the east. A boat with a speed of 8.0 m/s relative to the water leaves point (A) and heads in such a way that it crosses to a point (B) (see Fig.2).

Q0 In what direction relative to east must the boat be pointed?

Q0

A1 112 degrees

A2 68 degrees

A3 100 degrees

A4 80 degrees

A5 65 degrees

Q0

Q14Q0 A 25-kg box is pushed across a rough horizontal floor with a force of 200 N, directed 20 degrees below the horizontal (Fig.3). The coefficient of kinetic friction between the box and the floor is 0.2. The acceleration of the box is:

Q0

A1 5.0 m/s**2

A2 5.6 m/s**2

A3 1.8 m/s**2

A4 7.0 m/s**2

A5 4.7 m/s**2

Q0

Q15Q0 A 700-kg elevator accelerates downward at 3.8 m/s**2. The tension force of the cable on the elevator is:

Q0

A1 4.2 kN, up

A2 2.1 kN, down

A3 2.1 kN, up

A4 4.8 kN, down

A5 9.0 kN, up

Q0

Q16Q0 When a 40-N force, parallel to the incline and directed up the incline, is applied to a crate on a frictionless incline that is 30 degrees above the horizontal, the acceleration of the crate is 2.0 m/s**2, down the incline. The mass of the crate is:

Q0

A1 14 kg

A2 4.1 kg

A3 5.8 kg

A4 10 kg

A5 6.2 kg

Q0

Q17Q0 Three blocks (A,B,C), each having mass M, are connected by strings as shown in Fig.4. Block C is pulled to the right by a force F that causes the entire system to accelerate.

Q0 Neglecting friction, the tension T1 between blocks B and C is:

Q0

A1 2F/3

A2 zero

A3 F/2

A4 F/3

A5 F

Q0

Q18Q0 Block A, with mass mA, is initially at rest on a frictionless horizontal floor. Block B, with mass mB, is initially at rest on the top surface of A (Fig.5). The coefficient of static

Q0 friction between the two blocks is μ . Block A is pulled
Q0 with a force such that it begins to slide out from under B
Q0 when its acceleration reaches:

Q0

A1 $\mu \cdot g$

A2 g

A3 $m_B \cdot \mu \cdot g$

A4 $(m_A/m_B) \cdot \mu \cdot g$

A5 $(m_B/m_A) \cdot \mu \cdot g$

Q0

Q19Q0 A box with a weight of 50 N rests on a horizontal surface. A
Q0 person pulls horizontally on it with a force of $F_1=10$ N and
Q0 it does not move. To start it moving, a second person pulls
Q0 vertically upward on the box (Fig. 6) with a force F_2 . If the
Q0 coefficient of static friction is 0.4, what is the smallest
Q0 F_2 for which the box moves?

Q0

A1 25 N

A2 10 N

A3 14 N

A4 4 N

A5 35 N

Q0

Q20Q0 The iron ball shown in Fig. 7 is being swung in a vertical
Q0 circle at the end of a 0.70-m string. What is the speed the
Q0 ball can have at top of the circle for the tension in the
Q0 string to be zero at that point?

Q0

A1 2.6 m/s

A2 1.3 m/s

A3 3.9 m/s

A4 6.9 m/s

A5 9.8 m/s