```
Q1 Q0 Which of the following is NOT a unit vector?
   Q0
   A1   (1/2) (i + j)
   A2   vector a / |a|
   A3   j x i
   A4   (1/sqrt(3)) (i + j + k)
   A5   0.6 j + 0.8 k
   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   (6.2 i+5.8 j)   km
   A2   (-0.5 i+12.1 j) km
   A3   (5.2 i+5.8 j)   km
   A4   (13.2 i+12.1 j) km
   A5   (9.1 i+8.7 j)   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 nm = 10**(-9) 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 x10**8) m/s, estimate
   Q0 the distance to the sun in km.
   Q0
   A1 1.50 x 10**8  km
   A2 3.60 x 10**9  km
   A3 1.50 x 10**6  km
   A4 2.50 x 10**7  km
   A5 2.00 x 10**4  km
   Q0
Q6 Q0 A car travels in a straight road with a velocity of v1=15 m/s
   Q0 for half the distance between two cities and with a velocity
   Q0 v2=30 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
   Q0
Q7 Q0 An object moving along the x axis has a position given by
   Q0 x = (3 t - t**3) m, where t is measured in s. What is the
```

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   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 x0 =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
Q10Q0 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 i-4.0 j) 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 = (8i - 7j)  m/s
   A2   v = (8i + 25j) m/s
   A3   v = (4i - 7j)  m/s
   A4   v = (4i + 5j)  m/s
   A5   v = (4i - 25j) m/s
   Q0
Q11Q0 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
Q12Q0 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
   Q0 east. A boat with a speed of 8.0 m/s relative to the water
   Q0 leaves point (A) and heads in such a way that it crosses to
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   Q0 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
   Q0 force of 200 N, directed 20 degrees below the horizontal
   Q0 (Fig.3). The coefficient of kinetic friction between the box
   Q0 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
   Q0 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
   Q0 the incline, is applied to a crate on a frictionless incline
   Q0 that is 30 degrees above the horizontal, the acceleration of
   Q0 the crate is 2.0 m/s**2, down the incline. The mass of the
   Q0 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
   Q0 strings as shown in Fig.4. Block C is pulled to the right by
   Q0 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
   Q0 horizontal floor. Block B, with mass mB, is initially at rest
   Q0 on the top surface of A (Fig.5). The coefficient of static
   Q0 friction between the two blocks is (u). 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   u . g
   A2   g
```

```
    A3   mB . u . g
    A4   (mA/mB) . u . g
    A5   (mB/mA) . u . 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 F1=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 F2. If the
    Q0 coefficient of static friction is 0.4, what is the smallest
    Q0 F2 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
```

PHYS101 - FIRST MAJOR EXAM – FIGURES
Term-022

FIGURE-1

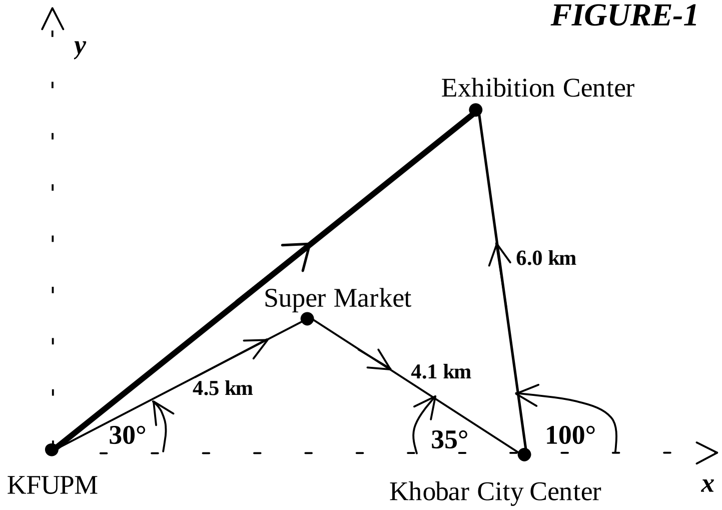

FIGURE-2

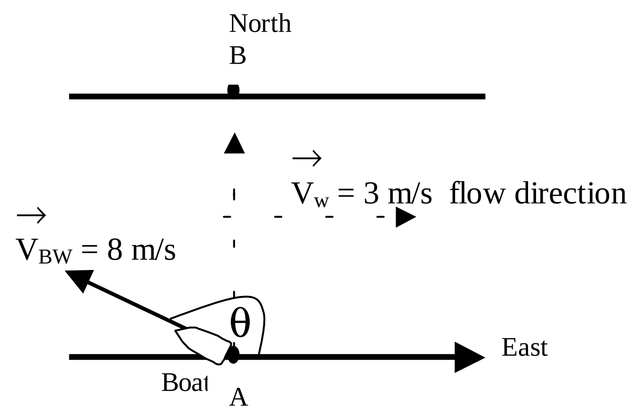

FIGURE-3

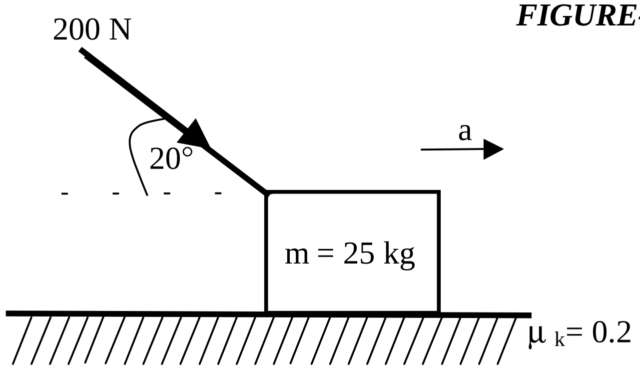

FIGURE-4

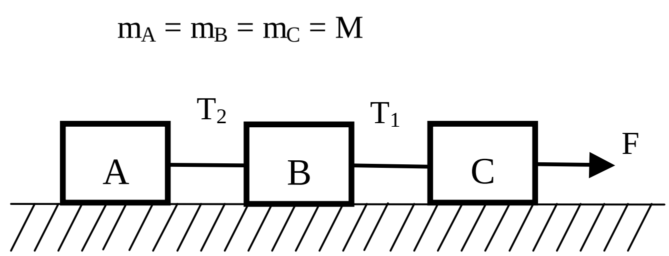

FIGURE-5

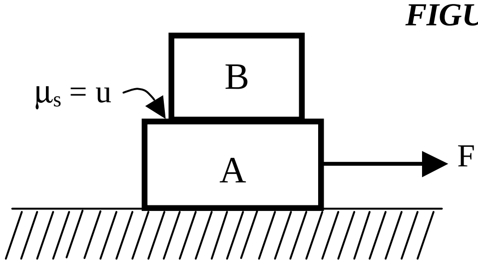

FIGURE-6

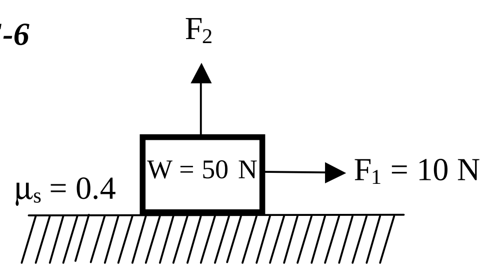

FIGURE-7