First major exam term 991

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Q1 Q0 The position (x) of a particle moving along the x-axis
ch Q0 depends on time (t) according to the equation:
1. Q0             x = a*t**2 - b*t**3
   Q0 where: x is in meters and t is in seconds. What would
   Q0 be the dimensions of b?
   Q0
   A1 L/T**3
   A2 L*T**3
   A3 L/T**2
   A4 1
   A5 1/T**3
   Q0
Q2 Q0 How many molecules of water are there in a cup
ch Q0 containing 250 cm**3 of water?
1. Q0 Molecular mass of H2O = 18 g/mole
   Q0 Density of water      = 1.0 g/cm**3
   Q0 Avogadro s number     = 6.02 * 10**23 molecules/mole
   Q0
   A1 8.4 * 10**24
   A2 6.0 * 10**23
   A3 1.9 * 10**26
   A4 3.7 * 10**28
   A5 2.5 * 10**3
   Q0
Q3 Q0 Using the fact that the speed of light in space
ch Q0 is about 3.00 * 10**8 m/s, determine how many miles
1. Q0 light will travel in one hour.
   Q0 (1 mile = 1.61 km)
   Q0
   A1 6.71*10**8 miles
   A2 2.50*10**6 miles
   A3 5.40*10**9 miles
   A4 8.32*10**3 miles
   A5 4.83*10**2 miles
   Q0
Q4 Q0 A particle moves with a constant speed along the
ch Q0 circumference of a circle of radius 5 m. It completes
2. Q0 one revolution every 20 s. What is the magnitude
   Q0 of its average velocity during the first 5 s?
   Q0 Assume that at t = 0, the particle is on +x-ais
   Q0 (see figure 1).
   Q0
   A1 sqrt(2)     m/s
   A2 1/sqrt(2)   m/s
   A3 1.57        m/s
   A4 zero        m/s
   A5 2.54        m/s
   Q0
Q5 Q0 A particle moves along the x-axis according to the
ch Q0 equation:
2. Q0       x = 50*t + 10*t**2
   Q0 where x is in m and t is in s. Calculate the
   Q0 instantaneous velocity of the particle at t = 3s.
   Q0
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   A1 110        m/s
   A2 50         m/s
   A3 20         m/s
   A4 240        m/s
   A5 90         m/s
   Q0
Q6 Q0 A baloon carrying a package is ascending
ch Q0 (going vertically upward) at the rate of 12 m/s.
2. Q0 When it is 80 m above the ground the package is
   Q0 released. How long does it take the package
   Q0 to reach the ground?
   Q0
   A1 5.4   s
   A2 4.0   s
   A3 8.9   s
   A4 3.1   s
   A5 1.5   s
   Q0
Q7 Q0 If vector A = 28 i + 11 j and vector B
ch Q0 (magnitude of B = 25) as shown in figure 2, what
3. Q0 is the magnitude of the sum of these two vectors?
   Q0
   A1 32
   A2 35
   A3 39
   A4 45
   A5 23
   Q0
Q8 Q0 Vector A = -6 i + 14 j. Find vector  B
ch Q0 whose magnitude is twice that of A and
3. Q0 is opposite in direction to A.
   Q0
   A1 12 i - 28 j
   A2 -6 i + 14 j
   A3 3  i - 7  j
   A4 -  i +    j
   A5 18 i - 12 j
   Q0
Q9 Q0 If vector A = 6 i - 7 j and vector B
ch Q0 = -12 i + 10 j, what angle does vector
3. Q0  C = 2*A - B make with +x-axis measured
   Q0 counterclockwise.
   Q0
   A1 315 deg
   A2 45  deg
   A3 135 deg
   A4 90  deg
   A5 225 deg
   Q0
Q10Q0 A particle moves in the x-y plane with a constant
ch Q0 acceleration given by a = (-4 j) m/s**2. At t=0 its
4. Q0 position is (10 i) m and its velocity is
   Q0 (-2 i + 8 j) m/s. What is the distance from the
   Q0 origin to the particle at t=2 s?
   Q0
   A1 10  m
   A2 14  m
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A3 6.4 m
A4 2.7 m
A5 8.9 m
Q0

Q11Q0 A ball is thrown horizontally from the top of
ch Q0 a building 100 m high. The ball strikes the ground
4. Q0 at a point 65 m from the base of the building
Q0 (see figure 3). What is the speed of the ball just
Q0 before it strikes the ground?
Q0
A1 47 m/s
A2 33 m/s
A3 29 m/s
A4 56 m/s
A5 73 m/s
Q0

Q12Q0 A rock is projected from ground level as shown in
ch Q0 figure 4. Four seconds later the rock is observed
4. Q0 to srtike the top of a 10-m tall fence that is
Q0 a horizontal distance of 75 m from the point of
Q0 projection. Determine the speed (v0) with which
Q0 the rock was projected.
Q0
A1 29 m/s
A2 26 m/s
A3 15 m/s
A4 10 m/s
A5 18 m/s
Q0

Q13Q0 A 140-m wide river flows with a uniform speed of
ch Q0 4.0 m/s toward the east. Starting from a point on
4. Q0 the north bank it takes 20 s for a boat to cross the
Q0 river with constant speed to a point directly across
Q0 on the south bank. What is the speed of the boat
Q0 relative to the water?
Q0
A1 8.1 m/s
A2 9.5 m/s
A3 5.7 m/s
A4 7.0 m/s
A5 10. m/s
Q0

Q14Q0 In figure 5, if P = 6.0 N, what is the magnitude of
ch Q0 the force exerted by block (2) on block (1)?
5. Q0 Assume the surface is frictionless.
Q0
A1 4.8 N
A2 6.4 N
A3 7.2 N
A4 5.6 N
A5 1.2 N
Q0

Q15Q0 A 3.0 kg block is pushed across a horizontal surface
ch Q0 by a force F = 20 N as shown in figure 6. If the
5. Q0 coefficient of kinetic friction between the block and
Q0 the surface is 0.30, and Theta = 30 deg, what is the
Q0 magnitude of the acceleration of the block?

Q0
A1 1.8 m/s**2
A2 2.1 m/s**2
A3 3.3 m/s**2
A4 1.1 m/s**2
A5 5.8 m/s**2
Q0
Q16Q0 A 2.0 kg object has a velocity of (4 i) m/s at t=0.
ch Q0 A constant resultant force of (2 i + 4 j) N then
5. Q0 acts on the object for 3.0 s. What is the magnitude
Q0 of the velocity of the object at the end of the 3 s
Q0 interval?
Q0
A1 9.2 m/s
A2 6.3 m/s
A3 8.2 m/s
A4 7.2 m/s
A5 12 m/s
Q0
Q17Q0 Two masses M and 3M are connected by a light cord
ch Q0 as shown in figure 7. The coefficient of kinetic
5. Q0 friction between the surface and the 3M block is
Q0 0.20, and the coefficient of kinetic friction
Q0 between the surface and the M block is 0.30.
Q0 If F = 14 N and M = 1.0 kg, what is the magnitude
Q0 of the acceleration of either block?
Q0
A1 1.3 m/s**2
A2 2.0 m/s**2
A3 1.5 m/s**2
A4 1.8 m/s**2
A5 3.5 m/s**2
Q0
Q18Q0 An object (attached to the end of a string) swings
ch Q0 in a vertical circle of radius R = 1.2 m
6. Q0 (see figure 8). At an instant when theta = 30 deg,
Q0 the speed of the object is 5.0 m/s. Find the
Q0 magnitude of the total acceleration of the object.
Q0
A1 22.5 m/s**2
A2 18.6 m/s**2
A3 31.8 m/s**2
A4 12.0 m/s**2
A5 44.4 m/s**2
Q0
Q19Q0 On a rainy day the coefficient of friction between
ch Q0 the tires of a car and a level circular track is
6. Q0 reduced to half its usual value. The ratio of the
Q0 maximum safe speed on a rainy day for rounding the
Q0 circular track to its usual value (when it is not
Q0 raining) is
Q0
A1 0.71
A2 0.25
A3 0.50
A4 0.29
A5 1.0

Q0
Q20Q0 Which of the following statements is TRUE
6. Q0
A1 Radial acceleration is due to the change in the
A1 direction of the velocity.
A2 Tangential acceleration is due to the change in
A2 the direction of the velocity.
A3 A projectile is fired at an angle 45 deg, the
A3 acceleration is zero at the maximum height.
A4 A projectile is fired at an angle 45 deg, the
A4 velocity is zero at the maximum height.
A5 The action and reaction forces always act on the
A5 same object.

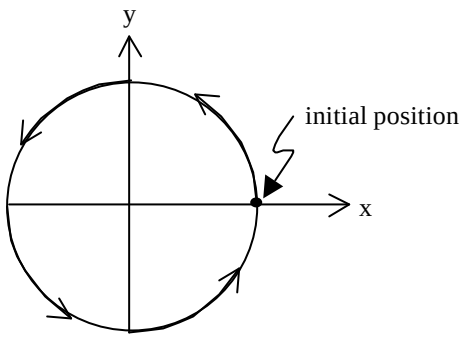

Figure 1

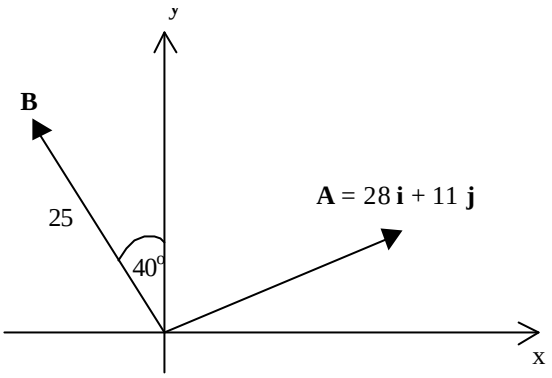

Figure 2

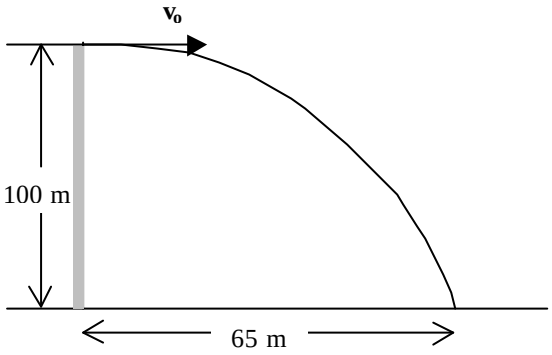

Figure 3

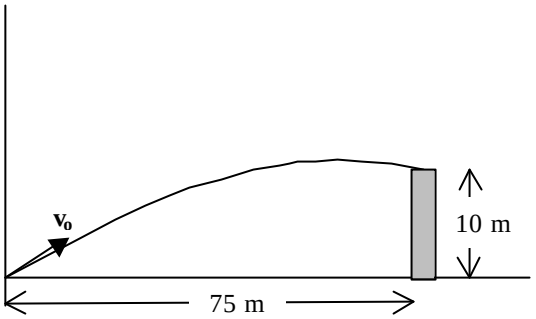

Figure 4

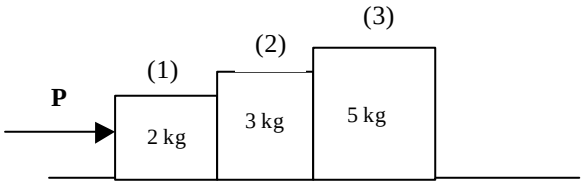

Figure 5

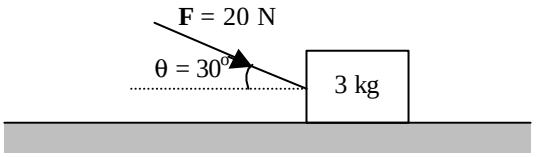

Figure 6

Figure 7

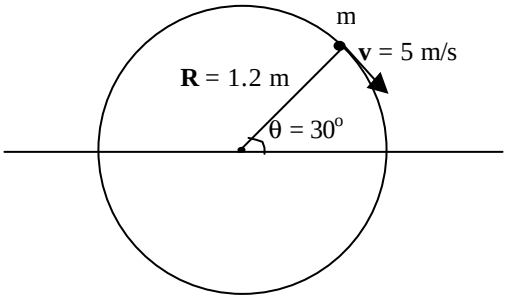

Figure 8