EXAM 1 – 041

```
Q1 Q0 1 shake = 10**-8 seconds. Find out how many
   Q0 nano seconds (ns) are there in 1 shake.
   Q0 (1 nano = 10**(-9))
   Q0
   A1 10    ns
   A2 0.01  ns
   A3 100   ns
   A4 0.001 ns
   A5 0.1   ns
   Q0
Q2 Q0 A drop of oil (mass = 0.90 milligram and density = 918
   Q0 kg/m**3) spreads out on a surface and forms a circular
   Q0 thin film of radius = 41.8 cm and thickness h
   Q0 (see Fig 8). Find h in nano meter (nm).
   Q0 (1 nano = 10**(-9))
   Q0
   A1 1.8     nm
   A2 0.00060 nm
   A3 0.15    nm
   A4 0.60    nm
   A5 0.030   nm
   Q0
Q3 Q0 A man runs on a straight road for 8.0 km at a speed
   Q0 of 8.0 km/h.  He then continues in the same direction
   Q0 for another 6.0 km at a speed of 12 km/h.  What is his
   Q0 average speed during this 14 km run?
   Q0
   A1 9.3   km/h
   A2 10    km/h
   A3 4.0   km/h
   A4 11    km/h
   A5 1.5   km/h
   Q0
Q4 Q0 A stone is thrown vertically upward with an initial
   Q0 speed of 10 m/s.  What is its speed when it returns
   Q0 to a height of 3.83 m above its starting point?
   Q0
   A1 5.0 m/s
   A2 6.0 m/s
   A3 4.0 m/s
   A4 8.0 m/s
   A5 9.8 m/s
   Q0
Q5 Q0 A particle moves along the x axis. Its position from
   Q0 its starting point as a function of time t is given in
   Q0 Fig 2.  What is the total distance that this particle
   Q0 travels from t=0 to t=6.0 s?
   Q0
   A1 12  m
   A2 4.0 m
   A3 7.0 m
   A4 10  m
   A5 zero
   Q0
Q6 Q0 A particle starts from Xo = 10 m at time to = 0. Its
   Q0 velocity (v) as a function of time (t) is as shown in
   Q0 Fig 1. Find the position (X) of the particle at time
   Q0 t = 3.0 s.
   Q0
```

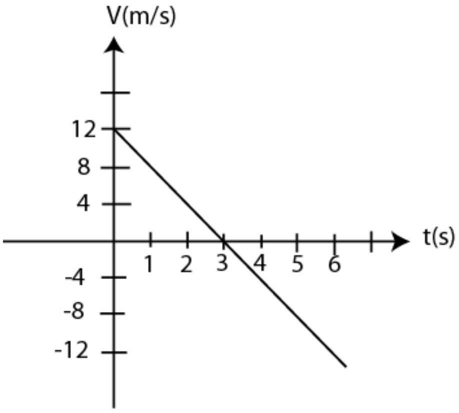

Figure 1

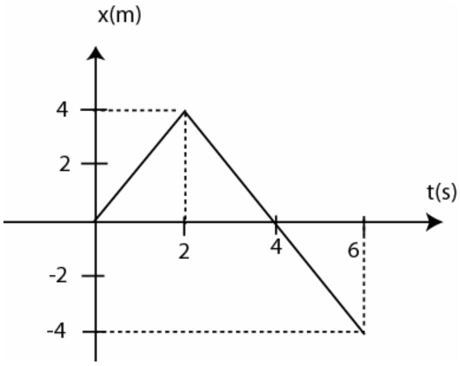

Figure 2

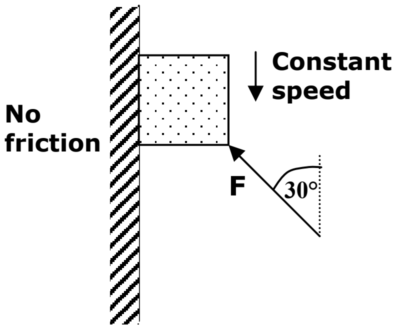

Figure 3

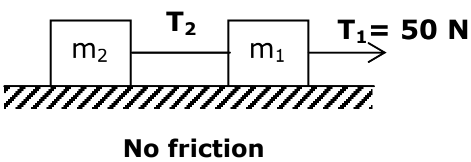

Figure 4

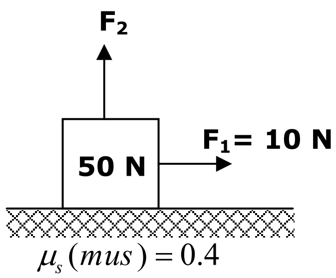

Figure 5

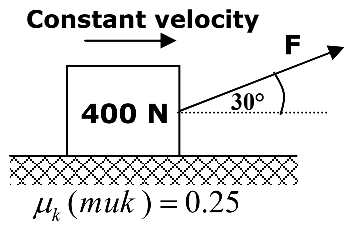

Figure 6

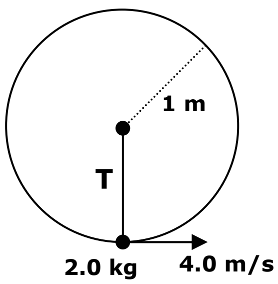

Figure 7

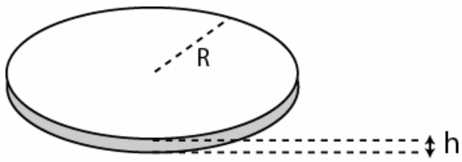

Figure 8

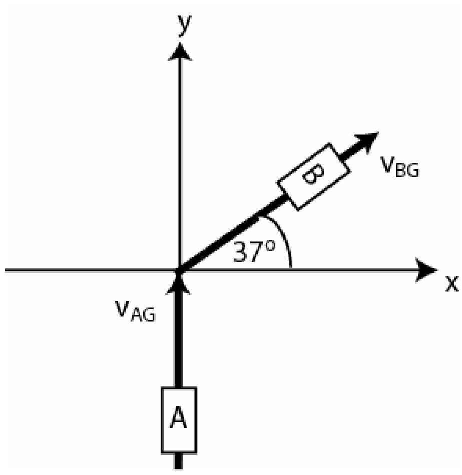

Figure 9

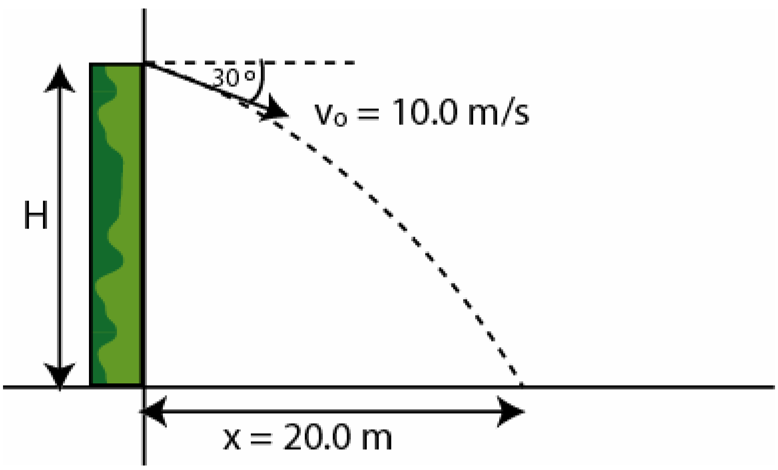

Figure 10

A1 28 m
A2 10 m
A3 36 m
A4 46 m
A5 9.0 m
Q0
Q7 Q0 Two vectors are given as: A = -3.0 i + 5.0 j + 4.0 k and
Q0 B = 4.0 i + 5.0 j + 3.0 k, where i,j and k are the unit
Q0 vectors in the positive x, y and z directions.
Q0 Find the angle between the vectors A and B.
Q0
A1 60 degrees
A2 45 degrees
A3 30 degrees
A4 90 degrees
A5 0 degree
Q0
Q8 Q0 In the cross product F = v x B, take v = 2.0 i,
Q0 F = 6.0 j and the x-component of vector B equals zero.
Q0 What then is B in unit-vector notation?
Q0
A1 -3.0 k
A2 3.0 k
A3 2.0 j + 6.0 k
A4 2.0 j - 6.0 k
A5 -2.0 j + 6.0 k
Q0
Q9 Q0 Two displacement vectors A and B have equal magnitudes of
Q0 10 m. Vector A is along the +y axis and vector B makes
Q0 45 degrees counterclockwise with +x axis. Find the vector
Q0 C such that B + C = 2A .
Q0
A1 C = -7 i + 13 j
A2 C = -7 i + 3 j
A3 C = 7 i + 13 j
A4 C = 7 i + 3 j
A5 C = 7 i + 27 j
Q0
Q10Q0 Car A travels with velocity (30 j) m/s (relative to
Q0 the ground) and car B travels with speed of 50 m/s in
Q0 a direction making an angle of 37 degrees with +x axis
Q0 (relative to the ground) (see Fig 9). What is the velocity
Q0 of car A relative to car B ?
Q0
A1 (-40i)   m/s
A2 (40i+30j) m/s
A3 (-40i-60j) m/s
A4 (40i)   m/s
A5 (-40i-30j) m/s
Q0
Q11Q0 A projectile is thrown from a height H with
Q0 a speed of 10.0 m/s at an angle of 30 degrees
Q0 below horizontal as shown in Fig 10. Find H ,
Q0 if the horizontal distance x = 20.0 m .
Q0
A1 37.7 m
A2 98.0 m
A3 49.0 m
A4 20.0 m
A5 67.8 m
Q0

```
Q12Q0 A stone is tied to the end of a string and is rotated
   Q0 with constant speed around a horizontal circle of
   Q0 radius 1.0 m. If the magnitude of its acceleration is
   Q0 225 m/s**2, What is the period (T) of the motion?
   Q0
   A1 0.42  s
   A2 1.0   s
   A3 0.028 s
   A4 5.0   s
   A5 2.0   s
   Q0
Q13Q0 At t=0, a particle leaves the origin with a velocity
   Q0 of vo = (4i + 2j) m/s. After 20.0 s its velocity is
   Q0    v  = (20i - 4j) m/s.  Find its acceleration
   Q0 (assumed constant).
   Q0
   A1 (0.8i - 0.3j) m/s**2
   A2 (0.5i + 0.4j) m/s**2
   A3 (0.3i - 0.7j) m/s**2
   A4 (0.7i + 0.7j) m/s**2
   A5     0         m/s**2
   Q0
Q14Q0 A 2.0 kg box slides down a frictionless vertical
   Q0 wall while you push on it with a force F at a 30 degrees
   Q0 angle with the vertical (see Fig 3). What is the magnitude
   Q0 of the normal force of the wall on the box if it is to
   Q0 slide down at a constant speed?
   Q0
   A1 11.3 N
   A2 5.67 N
   A3 15.6 N
   A4 2.56 N
   A5 zero N
   Q0
Q15Q0 The weight of an astronaut on Earth is 800 N. What is
   Q0 his weight on planet Mars, where g = 3.76 m/s**2?
   Q0
   A1 307 N
   A2 213 N
   A3 930 N
   A4 135 N
   A5 800 N
   Q0
Q16Q0 A 20.0 kg block is resting on a frictionless horizontal
   Q0 table. A horizontal string pulls the block. If the
   Q0 tension in the string is 20.0 N, what is the speed
   Q0 of the block after moving 2.0 m?
   Q0
   A1 2.0 m/s
   A2 4.0 m/s
   A3 1.0 m/s
   A4 3.0 m/s
   A5 5.0 m/s
   Q0
Q17Q0 Two masses m1 (= 2.0 kg) and m2 (= 3.0 kg) are
   Q0 connected as shown in Fig 4. Find the tension T2
   Q0 if the tension T1 = 50.0 N.
   Q0
   A1 30.0 N
   A2 50.0 N
   A3 20.0 N
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   A4 10.0 N
   A5 zero
   Q0
Q18Q0 A box with a weight of 50 N rests on a rough horizontal
   Q0 surface (mus = 0.4). Two forces F1 (=10 N) and F2 act on the
   Q0 box as shown in Fig 5. What is the smallest vertical force
   Q0 F2 for which the box just starts sliding horizontally?
   Q0
   A1 25  N
   A2 10  N
   A3 14  N
   A4 5.0 N
   A5 35  N
   Q0
Q19Q0 A 400-N block is pushed along a rough  horizontal surface
   Q0 (muk = 0.25) by an applied force F as shown in Fig 6. The
   Q0 block moves at constant velocity. The magnitude of F is :
   Q0
   A1 101 N
   A2 152 N
   A3  83 N
   A4 294 N
   A5 405 N
   Q0
Q20Q0 One end of a 1.0-m long string is fixed, the other end is
   Q0 attached to a 2.0-kg stone. The stone swings in a vertical
   Q0 circle, passing the lowest point at 4.0 m/s (see Fig 7).
   Q0 The tension force (T) of the string at this point is:
   Q0
   A1 52 N
   A2 12 N
   A3 20 N
   A4 32 N
   A5  0 N
```