Class IB$_1$

Physics

Friday November 15 2024

Test 2

Total: / 24 marks

Name : _____

Problem 1 **[13 marks]**

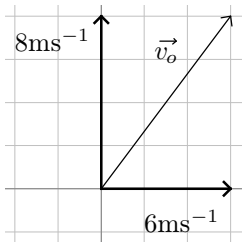


figure 1

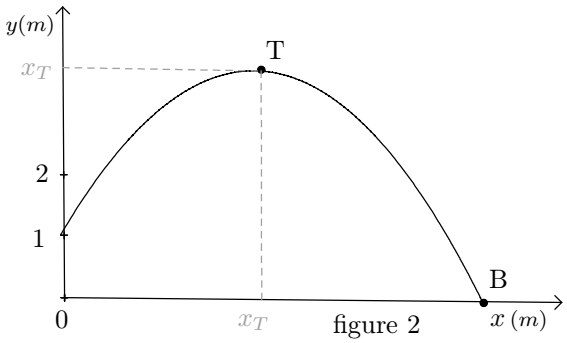


figure 2

For this question you can consider the magnitude of g equal to 10ms^{-2}

At $t = 0$, a ball is trown obliquely from from position $x_o = 0$ and $y_0 = 1m$,

with a velocity $\vec{v_o}$ as show in figure 1. figure 2 shows the path of the ball.

1) Give the two components (v_{ox} and v_{oy}) of $\vec{v_o}$

2) What can you said about the *horizontal* component of the velocity during the travel of the ball ?

3) Give the values of *horizontal* component and of *vertical* component of the velocity at the top T.

4) What is the *time* for reaching the top ?

5) What is the *position* of the ball *at the top* (you have to find both x and y of position T.

6) What is the *time* required to fall from position T to the final position B ?

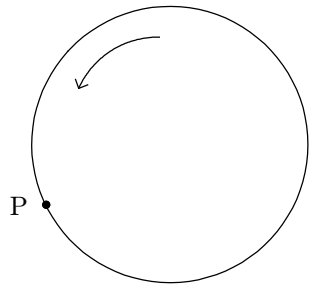
7) What is the *position* of B ?

Problem 1 **[11 marks]**

An object moves in a horizontal circular path with a radius of 0.8 m at a constant speed of 2.5 m/s.

1) What is the magnitude of the object's acceleration?

2) What is the direction of the object's acceleration when it a a position P on the figure below ?



3) Show the velocity of the turning object when it is at position P.

4) What is the *angular velocity* of this object ?

5) What is the relation between the *angular velocity* and the angle $\Delta\theta$ moved in a time Δt ?

6) i) What is the *period* of rotation of this object ?

ii) How many time it will take for this object to complete 7 turns (rotations) ?

iii) Suppose the object is a P at time $t_0 = 5s$

Where it would be at time t=8s ?