Only two questions must be answered.

PHYS 215-Mechanics I – Quiz 5 - Group A

2019-2020 Dec 19, 2019

Full Name: KEY

(The quiz is over 2 marks. Choose 2 questions and answer.)

Question 1-

The table below shows the changes in the velocity of a moving object with respect to time.

Time(s)	Velocity (m/s)
t_0 0	v_0 40
t_1 1	v_1 40
t_2 2	v_2 40
t_3 3	v_3 50
t_4 4	v_4 60
t_5 5	v_5 70

$a_1 = \frac{\Delta v}{\Delta t} = \frac{v_1 - v_0}{t_1 - t_0} = \frac{40-40}{1-0} = 0$

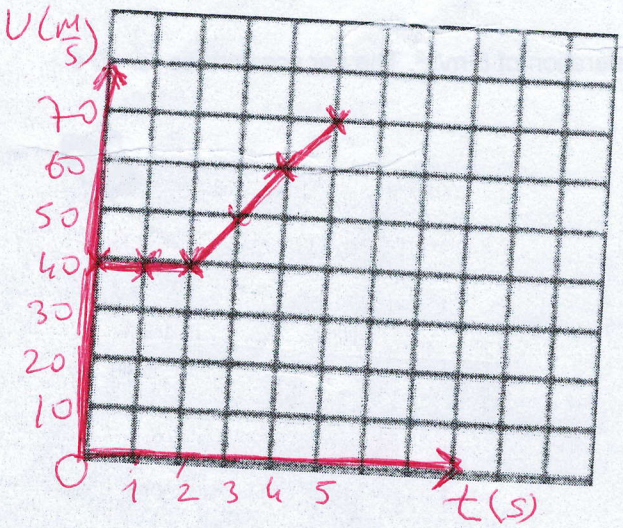
$a_2 = \frac{v_2 - v_1}{t_2 - t_1} = \frac{40-40}{2-1} = 0$

$a_3 = \frac{v_3 - v_2}{t_3 - t_2} = \frac{50-40}{3-2} = 10 \frac{m}{s}$

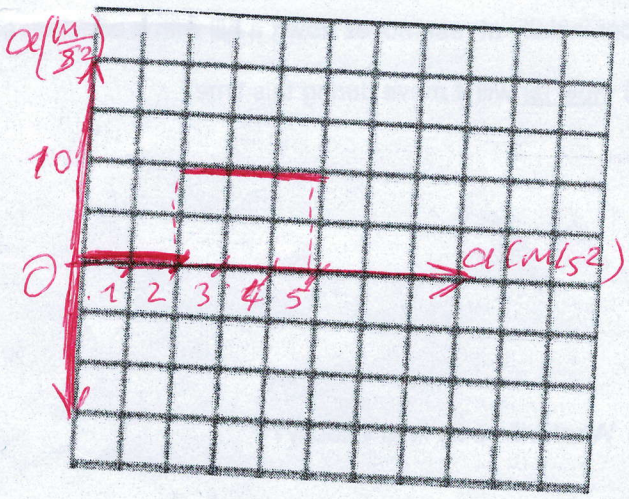
$a_4 = \frac{v_4 - v_3}{t_4 - t_3} = \frac{60-50}{4-3} = 10 \frac{m}{s}$

$a_5 = \frac{v_5 - v_4}{t_5 - t_4} = \frac{70-60}{5-4} = 10 \frac{m}{s}$

a. Plot the velocity - time graph of the motion.



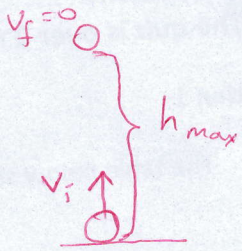
b. Plot the acceleration - time graph of the motion.



Question 2

A ball thrown upward with 50 m/s, (take, g= -10m/s²)

a) Find the time to reach the highest point for the ball?



At the highest point v_{final} will be zero.

$v_i = 50\ m/s \quad v_f = 0 \quad g = -10\ m/s^2 \quad t = ?$

Equation:

$v_f = v_i + gt \Rightarrow 0 = 50 + (-10) \cdot t$

$0 = 50 + -10 \cdot t$

$-50 = -10 \cdot t$

$\boxed{t = 5\ s}$

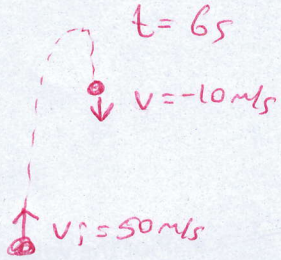
b) Find the velocity of the ball after 6 seconds?

$v_f = ? \quad v_i = 50\ m/s \quad t = 6\ s \quad g = -10\ m/s^2$

$v_f = v_i + gt$

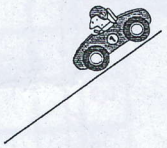
$v_f = 50 + (-10) \cdot 6 = 50 - 60 = -10\ m/s$

$\boxed{v_f = -10\ m/s}$



Question 3

A car initially at rest moves down a hill with a constant acceleration of 5 m/s². The car accelerates for 10 s.



a) How far will it move during this time?

$v_i = 0 \quad a = 5\ m/s^2 \quad t = 10\ s \quad \Delta x = ?$

$\Delta x = v_{ix} \cdot t + \frac{1}{2} a t^2$

$\Delta x = 0 \cdot t + \frac{1}{2} 5 \cdot 10^2$

$\boxed{\Delta x = 250\ m}$

b) What will be its final velocity?

$v_f = v_i + at \quad v_i = 0 \quad v_f = ? \quad a = 5\ m/s \quad t = 10\ s$

$v_f = 0 + 5 \cdot 10 = 50\ m/s$