

Only two questions must be answered.

# Mechanics I – Quiz 5 - Group B

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	$v_0$ 60
$t_1$ 1	$v_1$ 60
$t_2$ 2	$v_2$ 60
$t_3$ 3	$v_3$ 50
$t_4$ 4	$v_4$ 40
$t_5$ 5	$v_5$ 30

$$a = \frac{\Delta v}{\Delta t}$$

$$a_1 = \frac{v_2 - v_0}{t_2 - t_0}$$

$$a_1 = \frac{60 - 60}{1 - 0} = 0 \text{ m/s}^2$$

$$a_2 = \frac{60 - 60}{2 - 1} = 0 \text{ m/s}^2$$

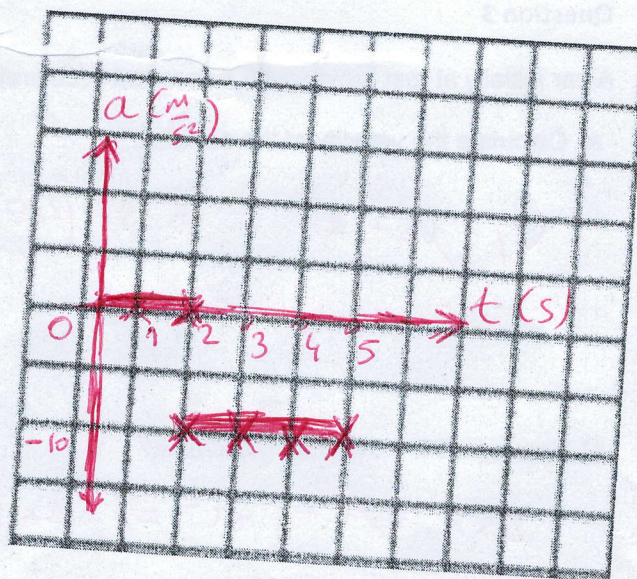
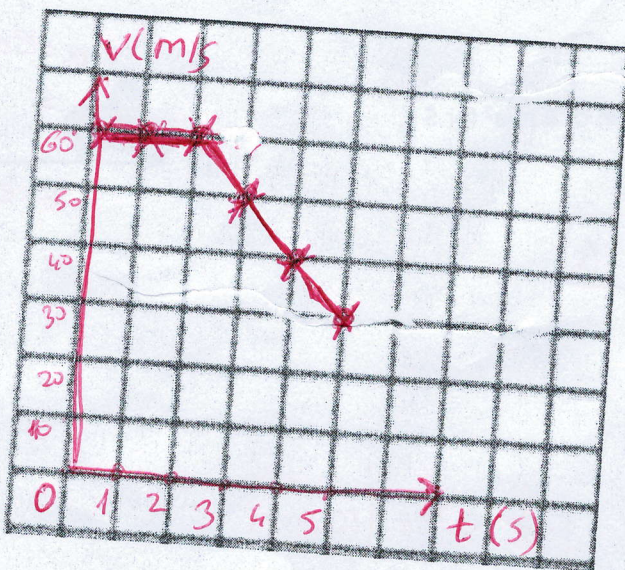
$$a_3 = \frac{50 - 60}{3 - 2} = -10 \text{ m/s}^2$$

$$a_4 = \frac{40 - 50}{4 - 3} = -10 \text{ m/s}^2$$

$$a_5 = \frac{30 - 40}{5 - 4} = -10 \text{ m/s}^2$$

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

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



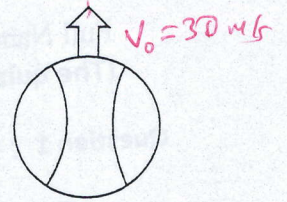


Question 2

A ball thrown upward with 30 m/s, (take,  $g = -10 \text{ m/s}^2$ )

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

$$V_f = 0$$
$$V_f = V_0 + gt$$
$$0 = 30 + (-10) \cdot t$$
$$t = \frac{-30}{-10} = 3 \text{ s}$$



b) Find the velocity of the ball after 5 seconds?

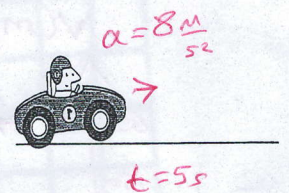
$$V_f = V_0 + gt$$
$$V_f = 30 + (-10) \cdot 5 = -20 \text{ m/s}$$

Question 3

A car initially at rest moves with a constant acceleration of  $8 \text{ m/s}^2$  for 5 s,

a) Calculate the velocity of the car after 5s.

$$V_f = v_0 + at = 0 + 8 \cdot 5 = 40 \text{ m/s}$$



b) How far will it move during this time?

$$\Delta x = v_0 t + \frac{1}{2} at^2 \Rightarrow \Delta x = \frac{1}{2} \cdot 8 \cdot 5^2 = 100 \text{ m}$$