

Mechanics I – Quiz 4 - Group C

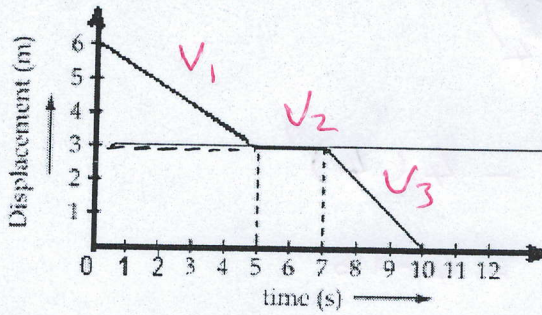
2019-2020

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Full Name: **KEY**

(The quiz is over 2 marks)

1. Plot the velocity-time graph for the given displacement-time graph.

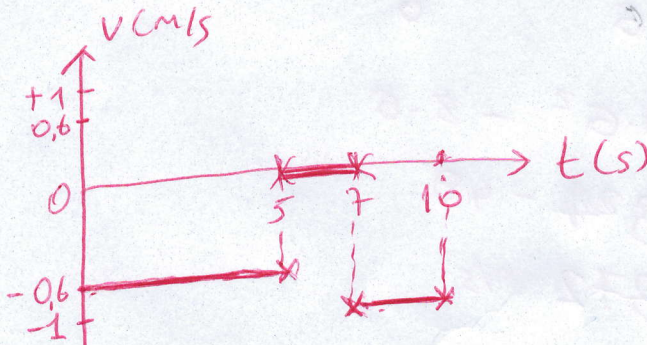


Answers

$$V_1 = \frac{\Delta x_1}{\Delta t_1} = \frac{3-6}{5-0} = \frac{-3}{5} = -0.6 \frac{\text{m}}{\text{s}}$$

$$V_2 = \frac{\Delta x_2}{\Delta t_2} = \frac{3-3}{7-5} = \frac{0}{2} = 0$$

$$V_3 = \frac{\Delta x_3}{\Delta t_3} = \frac{0-3}{10-7} = \frac{-3}{3} = -1 \frac{\text{m}}{\text{s}}$$



2. The position of a particle moving on an x axis is given by $x = 6 - 3t^3 - 4t^2$

with x in meters and t in seconds.

A. What is the position of the particle at $t = 4$ seconds?

B. Find the velocity at $t = 6$ s.

$$A. \quad t \rightarrow 4 \quad x = 6 - 3t^3 - 4t^2$$

$\uparrow \quad \quad \uparrow$
 $4 \quad \quad 4$

$$x = 6 - 3(4)^3 - 4(4)^2$$

$$x = 6 - 3 \cdot 64 - 4 \cdot 16$$

$$= 6 - 192 - 64$$

$$= -250 \text{ m}$$

$$B. \quad V = \frac{dx}{dt} \quad V = \frac{d(6 - 3t^3 - 4t^2)}{dt}$$

$$V = -3(3)t^2 - 4(2)t$$

$$V = -9t^2 - 8t$$

$\uparrow \quad \quad \uparrow$
 $6 \quad \quad 6$

$$t \rightarrow 6$$

$$V = -9 \cdot 6^2 - 8 \cdot 6$$

$$= -324 - 48$$

$$= -372 \text{ m/s}$$