

# Mechanics I – Quiz 4 - Group D

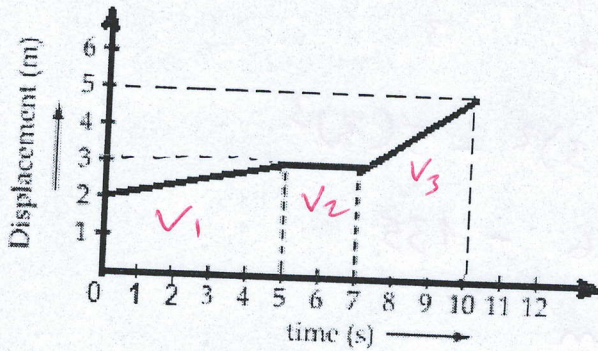
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Full Name: ..... **KEY** .....

(The quiz is over 2 marks)

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



Answers

$$V_1 = \frac{\Delta x_1}{\Delta t_1} = \frac{3-2}{5-0} = \frac{1}{5} = \underline{\underline{0,2 \text{ m/s}}}$$

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

$$V_3 = \frac{\Delta x_3}{\Delta t_3} = \frac{5-3}{10-7} = \frac{2}{3} = \underline{\underline{0,67 \frac{\text{m}}{\text{s}}}}$$



2. The position of a particle moving on an x axis is given by  $x = 5 - 4t^2 - 5t^3$  with x in meters and t in seconds.

A. What is the position of the particle at  $t = 3$  seconds?

B. Find the velocity at  $t = 5$  s.

$$\text{A. } t \rightarrow 3 \quad x = 5 - 4 \underset{\substack{\uparrow \\ 3}}{t^2} - 5 \underset{\substack{\uparrow \\ 3}}{t^3}$$

$$\begin{aligned} x &= 5 - 4(3)^2 - 5(3)^3 \\ &= 5 - 36 - 135 \\ &= -166 \text{ m} \end{aligned}$$

$$\text{B. } v = \frac{dx}{dt} = \frac{d(5 - 4t^2 - 5t^3)}{dt}$$

$$v = -4(2) \cdot \underset{\substack{\uparrow \\ 5}}{t} - 5(3) \cdot \underset{\substack{\uparrow \\ 5}}{t^2}$$

$$\begin{aligned} v &= -4(2)(5) - 5(3)(5)^2 \\ &= -40 - 375 \\ &= -415 \text{ m/s} \end{aligned}$$