

Name:

Sec.# (7) ---Quiz (2), Ch#2

S.N:

ID# :

Phys 101 ( Term 032)-( F. Enaya)

Show your steps clearly for full credit.

Q. An object moving along the x axis has a position given by:  $x = (3 t - t^3)$ , where x is measured in (m) and t in (s).

a. Find the average velocity of the object during the first 4 seconds.

First: find  $x_1$  at  $t = 0$ s and  $x_2$  at  $t = 4$  s, using the given equation for x.

$$x_1 = 0, \quad x_2 = -52$$

$$v_{\text{avg}} = (\Delta x) / (\Delta t) = (-52 - 0) / (4) = -13 \text{ m/s}$$

b. What is the acceleration of the object when its velocity is zero?

Instantaneous acceleration :  $a = d^2x/dt^2 = -6 t$ .

Now :  $v = dx/dt = 3 - 3 t^2$ , to find ( t ) when  $v = 0$ .  $\Rightarrow 3 - 3 t^2 = 0$

$\Rightarrow t = \pm 1$  s .( neglecting negative answer for t), substitute in (a):

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$$\Rightarrow a = -6 ( 1 ) = - 6 \text{ m/s}^2 .$$