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Department: **Computer Engineering**

Course: **Engineering Mechanics ii (ENG234)**

Question (1)

V= (4t-3t^2)

Find the position

ds= vdt

$$\int_0^s ds = \int_0^t (4t - 3t^2)dt$$

ds = $\int_0^4 (4t - 3t^2)dt$

s=(4\5t^2 – 3/3t^3)

=$2(4)^2$- 4^3- (0) – (0)

= -32

= 32←

Question (2)

V = (0.5t^2 -8t)

Find = ? t = 2sec

To get the acceleration derivate Velocity

A = $\frac{d}{dt} 0.5t^3 - 8t)$

= (1.5t^2 -8)

A = 1.5(2^2) – 8

= $2m/s^2$

Question (3)

(1) A= $(4t^2 - 2)$

V= $\int (4t^2 - 2)dt$

V= $\frac{4}{3}$t^3 – 2t + c1

(2) S = $\int \frac{4}{3}t^3 - 2t + c1)dt$

S=$\frac{1}{3}t^4$-$\frac{2}{2}t^2 + c1 + c2$

- The position from the Velocity function integration of v with respect to time (t).

At t=0, s = -2 and c2 = -2

At t=2, s= -20 and c1 = -9.70

At t=4

Then: S(4) =$\frac{1}{3}(4)^4$- $4^2 + (-2)(4) + (-9.7)$

= 28.7m

Question (4)

- Since the velocity express the position of the function.

Time can be express as dt= $\frac{dv}{v}$

It can also as dt = $\frac{dv}{q}$

- Equating eqn(1) and (2)

$\frac{ds}{v} = \frac{dv}{q}$

- We can express acceleration as

A=$\frac{Vdv}{ds}$

Velocity = (20 – $0.05^2)dv$ can be written as

Dv = -2.005mds

Dv = -0.1ds

Replace v by 20-$0.05^2$and dv by -0.1ds in

A =$\frac{(20-0.05s^2)*(0,1s)ds}{ds}$

A= 2s$+\ 0.005s^3$

In order to determine the acceleration at s =15 we need to replace the valve of the expression a=2s+$0.005s^3$

$$A_{(s=15)} = 2.15 + 0.0005 \times 15^3$$

= -13.125m/s^2

Since motion is positive to the right acceleration vector is direction to the left.

$$\boldsymbol{a_{(s=15)} = 13.125m/s^2} \leftarrow$$