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DEPT: CIVIL ENGINEERING

MATRIC NO: (6/ENUG03/02)

CARRY OVER STUDENT STILL ON 6 MONTHS IT

① $V = \frac{ds}{dt}$

$S = 0.5t^3 \text{ m}$

$\frac{ds}{dt} = V = 3(0.5)t^2$

$V = 1.5t^2 \text{ ms}$

at $t = 6 \text{ s}$

$V = 1.5(6)^2$

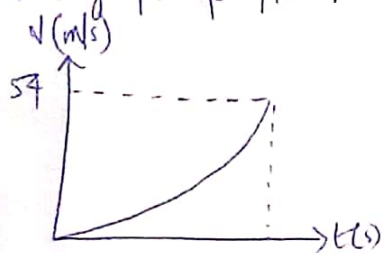
$V = 36 \times 1.5 = 54 \text{ m/s}$

at $S = 108 \text{ m}$

$\frac{ds}{dt} = 0 \text{ m/s}$

\therefore after 4s $V_s = 0 \text{ m/s}$

v-t graph for fig-9



② Q Fig-10

$V = (-4t + 80) \text{ m/s}$

$S = \int V dt = \frac{-4t^2}{2} + 80t$

$S = (-2t^2 + 80t) \text{ m/s}$

$\frac{dv}{dt} = a$

$V = (-4t + 80) \text{ m/s}$

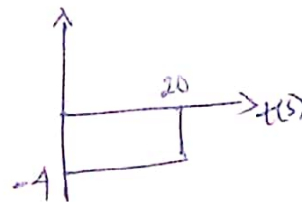
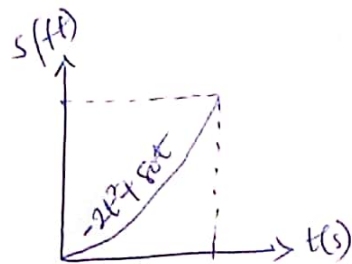
$a = \frac{dv}{dt} = -4 \text{ m/s}^2$

$S = -2t^2 + 80t$

@ $t = 20$

$S = -20(20) + 80(20)$

$= -800 + 1600 = 800 \text{ m}$



③

$a_{avg} = \frac{v}{t}$

$a = \frac{dv}{ds}$

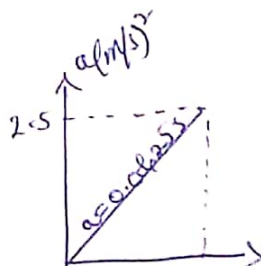
$a = (0.25 \text{ s}) \left[\frac{dv}{ds} (0.25 \text{ s}) \right]$

$a = 0.25 \times 0.25$

$a = 0.625 \text{ s}$

$a @ S = 40 = 0.625(40)$

$a = 25 \text{ m/s}^2$



④

for $0 \leq t \leq 5 \text{ s}$

$S = 3t^2$

$\frac{ds}{dt} = V = 6t \text{ m/s}$

at $t = 5 \text{ s}$

$V = 6(5) = 30 \text{ m/s}$

for $5 \text{ s} < t \leq 10 \text{ s}$

$V = \frac{\Delta s}{\Delta t} = \frac{(27.5 \text{ m} - 7.5 \text{ m})}{(10 - 5) \text{ s}} = 30 \text{ m/s}$

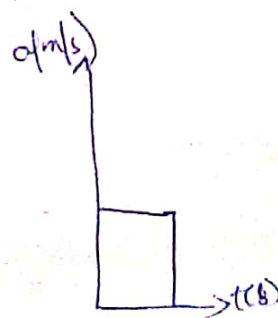
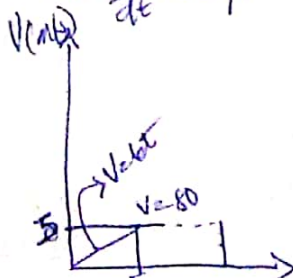
for a-t graph

$0 \leq t \leq 5 \text{ s}, V = 6t \text{ m/s}$

$a = \frac{dv}{dt} = 6 \text{ m/s}^2$

$5 \leq t \leq 10 \text{ s}, V = 30 \text{ m/s}$

$a = \frac{dv}{dt} = 0 \text{ m/s}^2$



5) 20 m/s^2 for 5 s and then decelerates $\odot 10 \text{ m/s}^2$

also $dv = a dt$

$\odot v = 0$ and $t = 0$

$\Rightarrow 0 \leq t < 5 \text{ s}$

$\odot = 20 \text{ m/s}^2$

$$\int_0^v dv = \int_0^t 20 dt \quad \therefore v = 20t$$

When $t = 5 \text{ s}$,

$$v = 20(5) = 100 \text{ m/s}$$

$5 \text{ s} \leq t \leq 15 \text{ s}$

$$\int_{100 \text{ m/s}}^v dv = \int_{5 \text{ s}}^t (-10) dt$$

$$v = (-10t + 50) + 100 \text{ m/s}$$

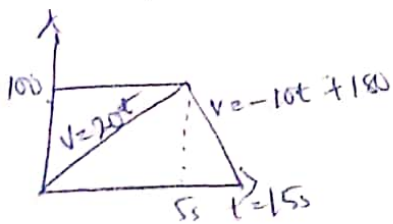
$$v = -10t + 150 \text{ m/s}$$

$$0 = A_1 + A_2 = Av$$

$$0 = (20 \text{ m/s}^2)5 + (-10)(15 - 5)$$

$$0 = 100 + [-10t + 50]$$

$$t' = \frac{-150}{-10} = 15 \text{ s}$$



6) $\Rightarrow 0 \leq t < 15 \text{ s}$

$$v = 30t \text{ m/s}$$

$$\int_0^s ds = \int_0^t 30t dt$$

$$s = 15t^2 \text{ m}$$

$$\text{When } t = 5 \text{ s, } s = 15(5)^2$$

$$= 375 \text{ m}$$

$5 \text{ s} \leq t \leq 15 \text{ s}$

$$v = (-15t + 225)$$

$$\int_{375}^s ds = \int_{5 \text{ s}}^t (-15t + 225) dt$$

$$s - 375 = \frac{-15t^2}{2} + 225t$$

$$[-187.5 + 1125]$$

$$8 - 375 = -7.5t^2 + 225t + 187.5 - 1125 \quad [P$$

$$375]$$

$$\therefore s = (-7.5t^2 + 225t - 562.5) \text{ m}$$

When $t = 15 \text{ s}$, the position total distance

$$s = -7.5(15)^2 + 225(15) - 562.5$$

$$s = -1687.5 + 3375 - 562.5$$

$$s = 1125 \text{ m}$$

