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18/ENG07/010
PETROLEUM ENGINEERING

(1)

Question 1

1.

3

$$v = \frac{ds}{dt}$$

$$v = 1 \cdot 5t^2$$

at $t = 6s$

$$v = 1 \cdot 5 \times 6^2$$

$$= 1 \cdot 5 \times 36$$

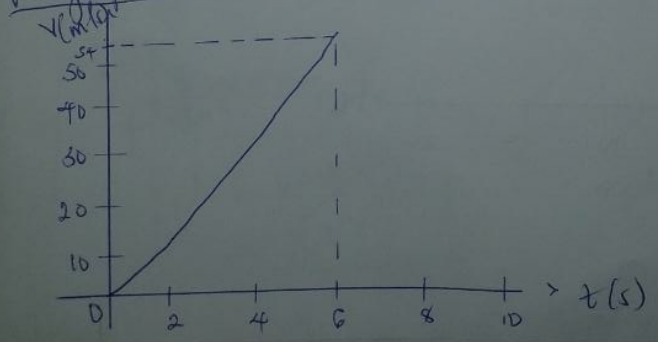
$$v = 54 \text{ m/s}$$

from $t = 6s - 10s$

$\therefore S = 108$

$v = 0$

v-t graph



dt

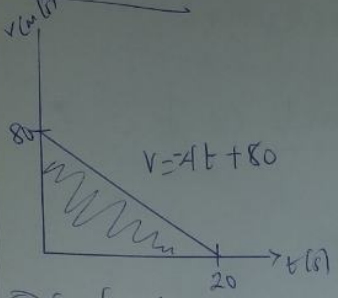
Question 3

v(m/s)

ORPODA JESSICA

Question 2

2.



① $S = \int v\,dt$

$S = \int (-4t - 80)$

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

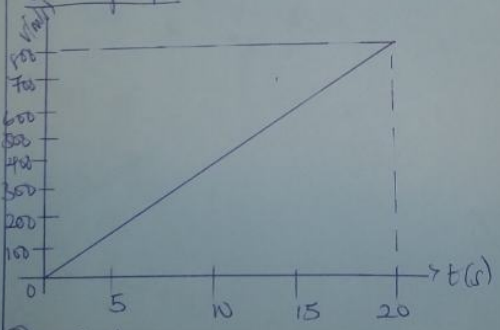
at $t = 20s$

$S = -2(20)^2 + 80(20)$

$S = 1600m - 800m$

$= 800m$

S-t graph



② Acceleration

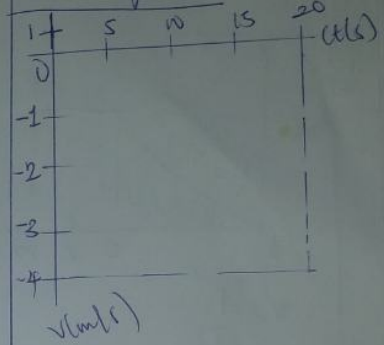
$a = \frac{dv}{dt}$

$a = -4m/s^2$

at $t = 20s$

$a = -4m/s^2$

a-t graph

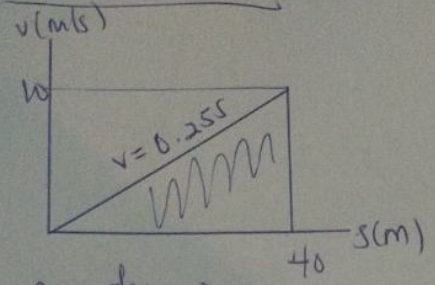


(2)

Quest:-

Question 3

3.



$a = \frac{dv}{ds}(v)$

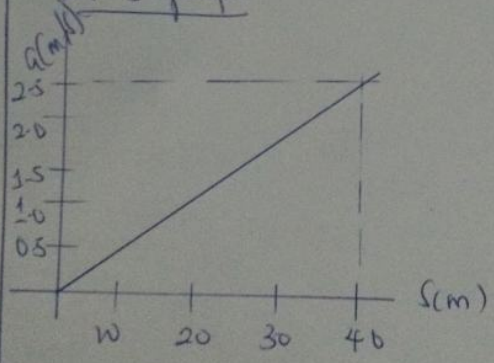
$v = 0.25s$

$a = 10 \times \frac{d(0.25s)}{ds}$

$a = 10 \times 0.25$

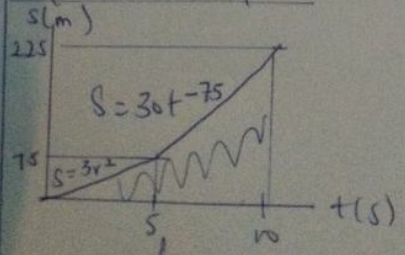
$a = 2.5 m/s^2$

a-s graph



Question 4

4.



$v = \frac{ds}{dt}$

(i) $V = 6t$

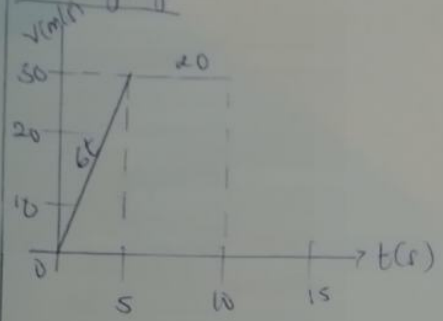
$V = 6 \times 5$

$V = 30 m/s$

at $t = 10s$

$V = 30 m/s$

V-t graph



(ii) $a = \frac{dv}{dt}$

at $t = 5s$

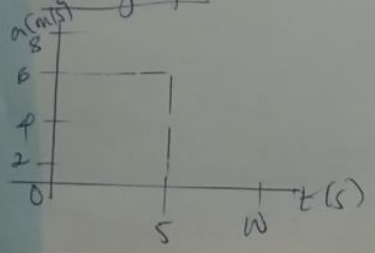
$a = 6 m/s^2$

at $t = 10s$

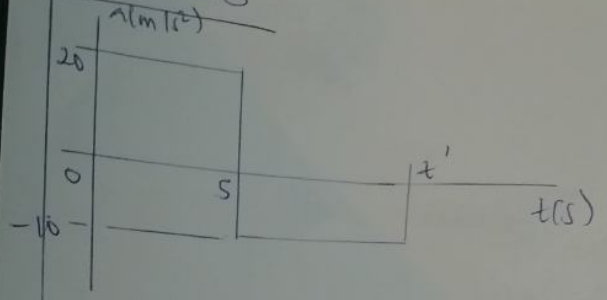
$a = 0 m/s^2$

(4)

a-t graph



Question 5



(a) $v = \int a\,dt$

$v = \int 20\,dt$

$v = 20t$

at $t = 5s$

$v = 20 \times 5$

$v = 100 m/s$

$5s \le t$

$\int dv = \int -10\,dt$

$v - 100 = -10t' + 105$

$v - 100 = -10t' + 50$

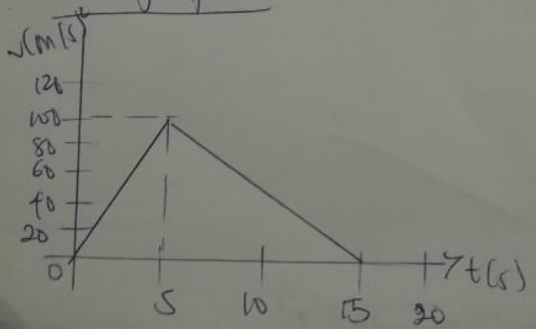
at t', $v = 0$

$0 - 100 = -10t + 50$

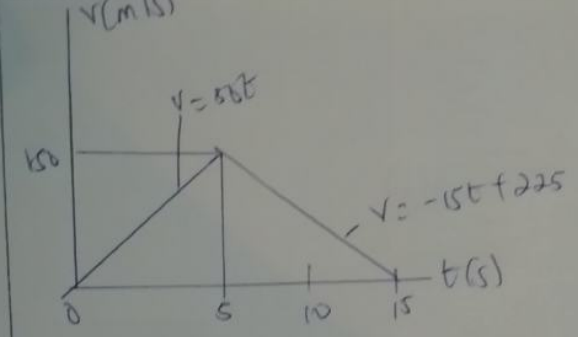
$10t' = 150$

$t' = 15s$

v-t graph



Question 6



$0 \leq t \leq 15s$

$v = 30t$

$\int_0^s ds = \int_0^5 30t$

$s = 15t^2 \Big|_0^5$

$s = 15(5)^2 - 15(0)^2$

$s = 375m$

$5s \leq t \leq 15s$

$v = -15t + 225$

$\int_{375}^{s} = \int (-15t + 225)\,dt$

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

$s - 375 = \left[\frac{-15(15)^2}{2} + 225(15)\right] - \left[\frac{-15(5)^2}{2} + 225(5)^2\right]$

$s - 375 = (-1687.5 + 3375) - (-187.5 + 1125)$

$s - 375 = 1687.5 - 987.5$

$s = 1125m$

s-t graph