Q1.

$S$

$t=0$

$s=0$

$s = \frac{6t^2}{2} - \frac{2t^3}{3} + c \Rightarrow s = 3t^2 - \frac{2t^3}{3}$

$c = 0$

$V$ $\quad V = 6t - 2t^2$

$a$

---

Find $t$ when $V = 0$

$0 = 6t - 2t^2$

$0 = t(6 - 2t)$

$t = 0$ or $t = 3$

Find $s$ when $t = 3$

$s = 3(3)^2 - \frac{2(3)^3}{3}$

$s = \underline{9 \text{ m}}$

Q2.

S

V

$t = 0$

$v = 2$

$v = \frac{3t^2}{2} + 5t + c \Rightarrow v = \frac{3t^2}{2} + 5t + 2$

$c = 2$

a

$a = 3t + 5$

---

Find T when $v = 6$

$$6 = \frac{3t^2}{2} + 5t + 2$$

x2

$$12 = 3t^2 + 10t + 4$$

$$0 = 3t^2 + 10t - 8$$

$$t = -4 \text{ or } t = \frac{2}{3}$$

$$\therefore t = \frac{2}{3}$$

Q3.

S

V

$t=0$

$v=6$

$v = 5t - \frac{2t^2}{2} + C \Rightarrow v = 5t - t^2 + 6$

$c = 6$

a $\quad a = 5 - 2t$

---

Find $t$ when $v = 0$

$0 = 5t - t^2 + 6$

$t^2 - 5t - 6 = 0$

$t = 6$ or $t = -1$

$\therefore t = 6$

Q4.

a) $0 \leq t \leq 6$

S $\quad s = \frac{10t^2}{2} - \frac{2t^3}{3} + c \Rightarrow s = 5t^2 - \frac{2t^3}{3}$

$t = 0$, $s = 0$ $\quad c = 0$

V $\quad v = 10t - 2t^2$

a

---

Find s when $t = 6$

$$s = 5(6)^2 - \frac{2(6)^3}{3}$$

$$s = \underline{36\,m}$$

Q4.

b) $t > 6$

S

$t = 6$

$S = 36$

$S = \frac{-432t^{-1}}{-1} + c \Rightarrow S = \frac{432}{t} - 36$

$c = -36$

V $\quad V = -432t^{-2}$

a

---

Find S when $t = 10$

$S = \frac{432}{10} - 36 = \underline{7.2m}$

Q5.

$S$ $\quad S = \frac{8t^2}{2} - \frac{t^3}{3} + C \Rightarrow S = 4t^2 - \frac{t^3}{3}$

$t = 0$, $S = 0$ $\quad C = 0$

$V$ $\quad V = 8t - t^2$

$a$ $\quad a = 8 - 2t$

---

a) Find $t$ when $a = 0$

$$0 = 8 - 2t$$

$$2t = 8$$

$$t = 4$$

$$V = 8(4) - (4)^2$$

$$V = \underline{16 \text{ ms}^{-1}}$$

b) Find $t$ when $S = 0$

$$0 = 4t^2 - \frac{t^3}{3}$$

$$0 = t^2\left(4 - \frac{t}{3}\right)$$

$t = 0$ or $12$ $\quad \therefore$ $T = \underline{12 \text{ sec}}$

Q6.

S

$v = 0$

$t = 1$

$s = \frac{2t^3}{3} - \frac{8t^2}{2} + 6t + c \Rightarrow s = \frac{2t^3}{3} - 4t^2 + 6t - \frac{8}{3}$

$c = -\frac{8}{3}$

V

$t = 0$

$v = 6$

$v = \frac{4t^2}{2} - 8t + c \Rightarrow v = 2t^2 - 8t + 6$

$c = 6$

a

$a = 4t - 8$

---

a) $v = 2t^2 - 8t + 6$

b) $t = 3$

$s = \frac{2(3)^3}{3} - 4(3)^2 + 6(3) - \frac{8}{3} = -\frac{8}{3}$

$t = 1$

$s = \frac{2(1)^3}{3} - 4(1)^2 + 6(1) - \frac{8}{3} = 0$

$\therefore$ Distance $= \underline{\underline{\frac{8}{3}\ m}}$