

5 APP MATHS HW

SOLUTIONS

① \uparrow

$$u = 14$$
$$a = -9.8$$
$$s = ?$$
$$v = 0$$

$$v^2 = u^2 + 2as$$

$$0 = 14^2 + 2(-9.8)s$$

$$19.6s = 196$$

$$\boxed{s = 10 \text{ m}}$$

$$t = ?$$

$$v = u + at$$

$$0 = 14 - 9.8t$$

$$t = \frac{14}{9.8} = 1.43$$

$$\therefore \text{Total time} = 2 \times 1.43 = \boxed{2.86 \text{ seconds}}$$

② \uparrow

$$u = 24.5$$
$$s = 19.6$$
$$a = -9.8$$
$$t = ?$$

$$s = ut + \frac{1}{2}at^2$$

$$19.6 = 24.5t - 4.9t^2$$

$$4.9t^2 - 24.5t + 19.6 = 0$$

$$\therefore t^2 - 5t + 4 = 0$$

$$\therefore (t - 4)(t - 1) = 0$$

$$\boxed{t = 4 \text{ seconds}} \text{ or } \boxed{t = 1 \text{ seconds}}$$

\uparrow
2nd time

\uparrow
1st time

$$\therefore 4 - 1 = \boxed{3 \text{ seconds}} \text{ above } 19.6 \text{ m}$$

③ \uparrow $u = 14$
 $a = -9.8$
 $t = 1$
 $s = ?$

$$s = ut + \frac{1}{2}at^2$$

$$= 14(1) + \frac{1}{2}(-9.8)(1)^2$$

$$= \boxed{9.1 \text{ m}}$$

\uparrow $u = 14$
 $a = -9.8$
 $t = 2$
 $s = ?$

$$s = ut + \frac{1}{2}at^2$$

$$= 14(2) + \frac{1}{2}(-9.8)(2)^2$$

$$= \boxed{8.4 \text{ m}}$$

Time to max height :

\uparrow $u = 14$
 $v = 0$
 $a = -9.8$
 $t = ?$

$$v = u + at$$

$$0 = 14 - 9.8t$$

$$t = 1.43 \text{ sec}$$

\uparrow max height :

$u = 14$
 $v = 0$
 $a = -9.8$
 $s = ?$

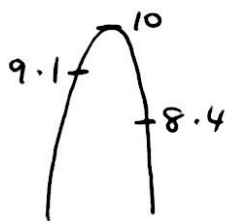
$$v^2 = u^2 + 2as$$

$$0 = 14^2 + 2(-9.8)s$$

$$19.6s = 196$$

$$s = 10 \text{ m}$$

\therefore Distance travelled in 2nd second :



$$(10 - 9.1) + (10 - 8.4)$$

$$= 0.9 + 1.6$$

$$= \boxed{2.5 \text{ m}}$$