

1 a With what velocity will the ball strike the ground?

Ans $10\sqrt{11}$ m/s.

b How long does it take the ball to strike the ground?

Ans 4.3 seconds.

2 i The height of the bridge from water level.

Ans $t = 5$ s, $a = -10$ m/s², $u = 0$

$$s = ut + \frac{1}{2}at^2 = 122.5 \text{ m.}$$

ii The distance covered by stone in the last second.

Ans s when $t = 5$ s, $s = 122.5$ m.

s when $t = 4$ s, $s = 78.4$ m.

$$s \text{ in last second} = 122.5 - 78.4 = 44.1 \text{ m.}$$

3 A tennis ball is struck with a racket, firing it straight upward at 22 m/s. After how much time will it be falling at 15 m/s?

Ans $u = 22$ m/s, $a = -10$ m/s², $v = 0$

$$v = u + at \Rightarrow t = 2.2 \text{ s.}$$

Now, $u = 0$, $a = -10$ m/s², $v = -15$ m/s.

$$\Rightarrow v = u + at \Rightarrow t = 1.5 \text{ s.}$$

$$\text{Total Time taken} = 1.5 + 2.2 = 3.7 \text{ s.}$$