Full Name: …….. **Date: 16 November 2024**

Short Assessment

Time Allowed: 20 minutes **Total Marks: 20**

1.

Fig. 3.1 shows the path of a tennis ball after passing over the net.

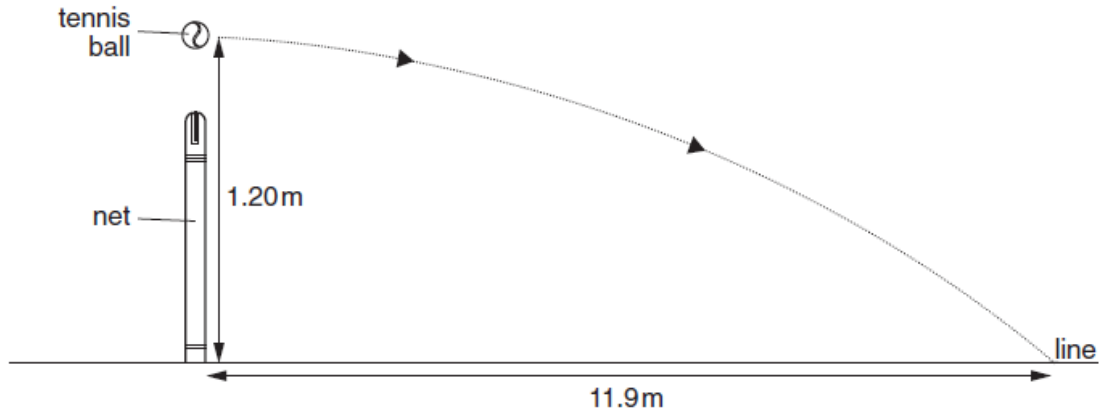

Fig. 3.1

As the ball passes over the net it is travelling horizontally at a height of 1.20 m. The ball strikes the ground on a line 11.9 m from the net.

(a) Assume that there is no air resistance acting on the ball.

(i) Show that the time taken for the ball to reach the line after passing over the net is 0.495 s.

[3]

(ii) At the instant the ball strikes the line calculate

1 the horizontal component of its velocity

horizontal component = ...m s^{-1} [2]

2 the vertical component of its velocity.

vertical component = ...m s^{-1} [2]

(b) The mass of the tennis ball is 6.00 x 10^{-2} kg. Calculate the loss in gravitational potential energy of the ball from the time it passes over the net until it hits the line.

loss in potential energy = ...J [2]

2.

Fig. 1.1 shows the path of a ball that is thrown from point **A** to point **B**. The ball reaches its maximum height at point **H**.

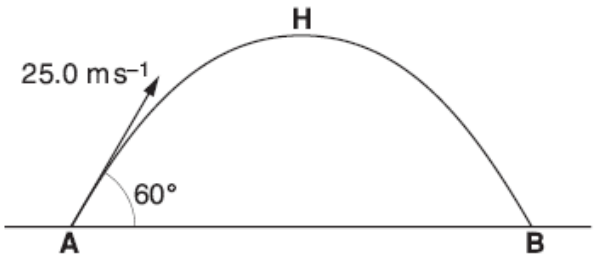

Fig. 1.1

The ball is thrown with an initial velocity of 25.0 m s^{-1} at 60° to the horizontal. Assume that there is no air resistance.

(i) **1** Show that the vertical component of the initial velocity is 21.7 m s^{-1}.

[1]

2 Calculate the time taken for the ball to reach point **H**.

time = ... s [2]

3 Calculate the displacement from **A** to **B**.

displacement = ... m [3]

(ii) For the path of the ball shown in Fig. 1.1, draw sketch graphs, with labelled axes but without numerical values, to show the variation of

1 the vertical component of the ball's velocity against time

[3]

2 the distance travelled along its path against time.

[2]

- End of Test -