1 A ball is thrown from point S, as shown in Fig. 1.1.

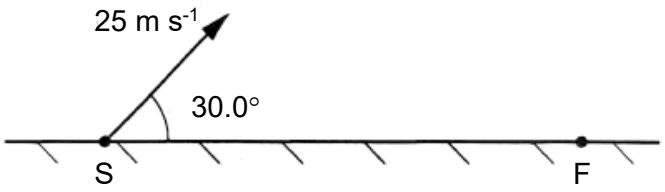

Fig. 1.1

The initial velocity of the ball is 25 m s^{-1} at an angle to the horizontal of 30.0°.

The ball lands at point F. The points S and F are at the same horizontal level.

(a) (i) Calculate the vertical component of the ball's initial velocity.

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

(ii) Show that the maximum height reached by the ball is 8.0 m, assuming air resistance is negligible.

[1]

(iii) The kinetic energy of the ball at S is *K*. Calculate the kinetic energy and the potential energy of the ball in terms of *K* at a height of 8.0 m,

kinetic energy = ……

potential energy = …..…….

[3]

(b) The horizontal distance from S to F is *x*.

On Fig. 1.2, sketch the variation with the horizontal distance of

(i) the potential energy of the ball and label the graph as E_p.

(ii) the kinetic energy of the ball and label the graph as E_k. [3]

Fig. 1.2

[Total: 8 marks]