

- 3 (a) Explain what is meant by *gravitational potential energy* and by *kinetic energy*.

gravitational potential energy:

.....
kinetic energy:

.....
[2]

- (b) A motion sensor is used to measure the velocity of a ball falling vertically towards the ground, as illustrated in Fig. 3.1.

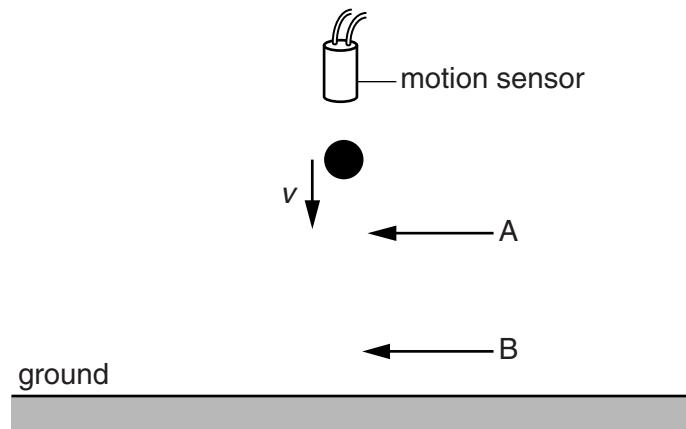


Fig. 3.1

The ball passes through points A and B as it falls. The ball has a mass of 1.5 kg.

The variation with time t of the velocity v of the ball as it falls from A to B is shown in Fig. 3.2.

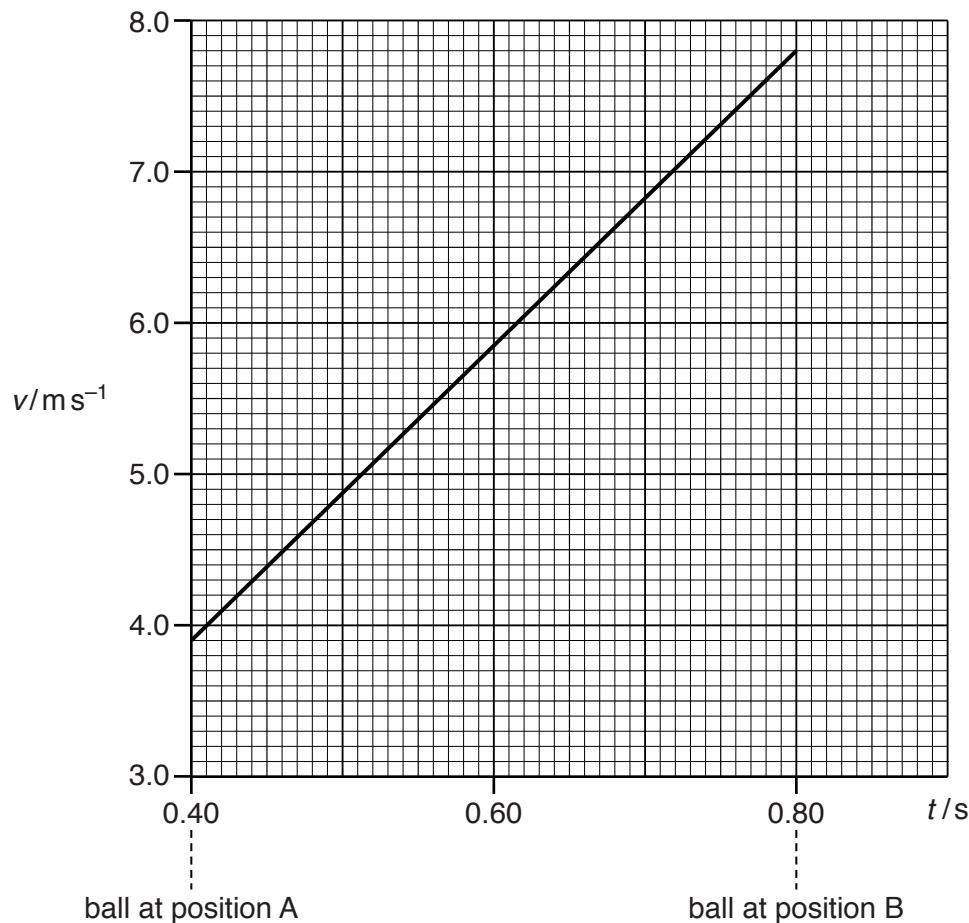


Fig. 3.2

Use Fig. 3.2 to calculate, for the ball falling from A to B,

- (i) the displacement,

$$\text{displacement} = \dots \text{m} [3]$$

- (ii) the acceleration,

$$\text{acceleration} = \dots \text{ms}^{-2} [2]$$

(iii) the change in kinetic energy.

change in kinetic energy = J [3]

- (c) Show that the work done by the gravitational field on the ball in (b) as it moves from A to B is equal to the change in kinetic energy.

[2]

[Total: 12]