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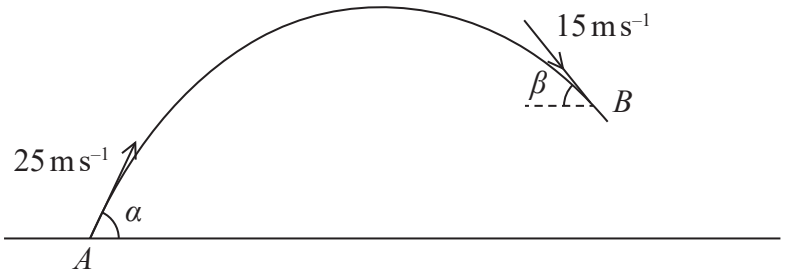


Figure 5

At time $t = 0$ a particle P is projected from a fixed point A on horizontal ground. The particle is projected with speed $25\,\text{m s}^{-1}$ at an angle α to the ground. The particle moves freely under gravity. At time $t = 3$ seconds, P is passing through the point B with speed $15\,\text{m s}^{-1}$ and is moving downwards at an angle β to the horizontal, as shown in Figure 5.

(a) By considering energy, find the height of B above the ground.

(3)

(b) Find the size of angle α.

(3)

(c) Find the size of angle β.

(3)

(d) Find the least speed of P as P travels from A to B.

(2)

As P travels from A to B, the speed, $v\,\text{m s}^{-1}$, of P is such that $v \leqslant 15$ for an interval of T seconds.

(e) Find the value of T.

(3)

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