Daily Question – Applied Mathematics Day 6

Topic : Projectiles

Q8.

[*In this question* **i** and **j** *are unit vectors, with* **i** *horizontal and* **j** *vertically upwards.*]

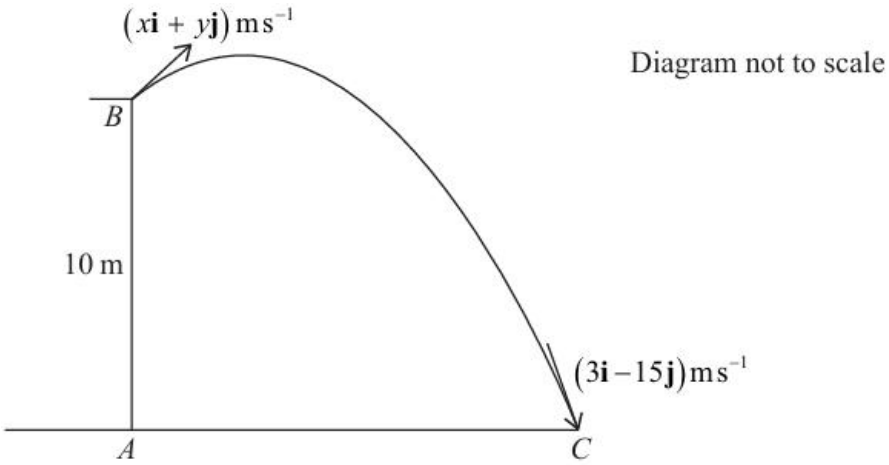

Figure 3

The fixed points *A* and *C* lie on horizontal ground.

The point *B* is vertically above *A*, with *AB* =10m.

At time $t = 0$, a particle *P* is projected from *B* with velocity $(x\mathbf{i} + y\mathbf{j})\,\mathrm{m\,s^{-1}}$, where *x* and *y* are positive.

Particle *P* moves freely under gravity and hits the ground at *C*.

At the instant before *P* hits the ground, the velocity of *P* is $(3\mathbf{i} - 15\mathbf{j})\,\mathrm{m\,s^{-1}}$, as shown in Figure 3.

(a) Find the value of *x* and the value of *y*.

(4)

(b) Find the distance *AC*.

(4)

(Total for Question = 8 marks)