**4.** The point $A$ is 10 m above horizontal ground.
At time $t = 0$, a particle $P$ is projected vertically upwards with speed $5\,\text{m s}^{-1}$ from $A$.
Particle $P$ moves freely under gravity.

(a) Find the greatest height above $A$ reached by $P$.

**(3)**

The point $B$ is on the ground, vertically below $A$.
At time $t = 1$ second, a particle $Q$ is projected vertically upwards with speed $7\,\text{m s}^{-1}$ from $B$.
Particle $Q$ moves freely under gravity.

Particles $P$ and $Q$ collide at time $t = T$ seconds.

(b) Find the value of $T$.

**(4)**

(c) Find the speed of $P$ at the instant immediately before the particles collide.

**(2)**

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

**Question 4 continued**

**Question 4 continued**

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

**Question 4 continued**

**(Total for Question 4 is 9 marks)**