7 Particles P and Q are projected in the same vertical plane from a point O at the top of a cliff. The height of the cliff exceeds $50\,\text{m}$. Both particles move freely under gravity. Particle P is projected with speed $\frac{35}{2}\,\text{m s}^{-1}$ at an angle α above the horizontal, where $\tan\alpha = \frac{4}{3}$. Particle Q is projected with speed $u\,\text{m s}^{-1}$ at an angle β above the horizontal, where $\tan\beta = \frac{1}{2}$. Particle Q is projected one second after the projection of particle P. The particles collide T s after the projection of particle Q.

(a) Write down expressions, in terms of T, for the horizontal displacements of P and Q from O when they collide and hence show that $4uT = 21\sqrt{5}(T+1)$. [4]

(b) Find the value of *T*. [4]

(c) Find the horizontal and vertical displacements of the particles from *O* when they collide. [3]