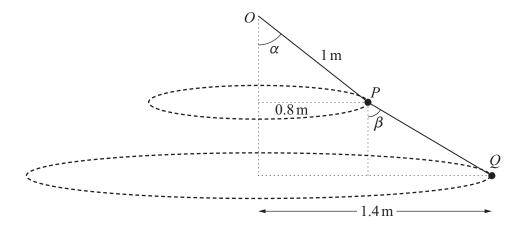A particle P of mass $0.05\,\text{kg}$ is attached to one end of a light inextensible string of length $1\,\text{m}$. The other end of the string is attached to a fixed point O. A particle Q of mass $0.04\,\text{kg}$ is attached to one end of a second light inextensible string. The other end of this string is attached to P.

The particle P moves in a horizontal circle of radius $0.8\,\text{m}$ with angular speed $\omega\,\text{rad s}^{-1}$. The particle Q moves in a horizontal circle of radius $1.4\,\text{m}$ also with angular speed $\omega\,\text{rad s}^{-1}$. The centres of the circles are vertically below O, and O, P and Q are always in the same vertical plane. The strings OP and PQ remain at constant angles α and β respectively to the vertical (see diagram).

(a) Find the tension in the string OP. [3]

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

(b) Find the value of ω. [3]

....

....

....

....

....

....

....

....

....

....

....

....

(c) Find the value of β. [2]

....

....

....

....

....

....

....

....

....