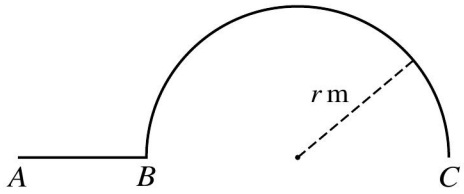

Fig. 1

Fig. 1 shows an object made from a uniform wire of length 0.8 m. The object consists of a straight part AB, and a semicircular part BC such that A, B and C lie in the same straight line. The radius of the semicircle is r m and the centre of mass of the object is 0.1 m from line ABC.

(i) Show that $r = 0.2$. [3]

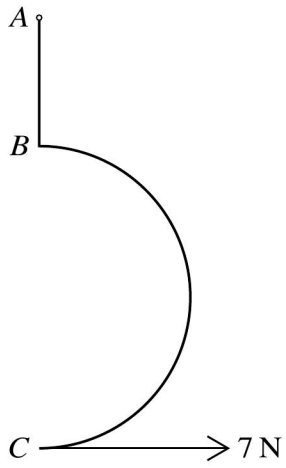

Fig. 2

The object is freely suspended at A and a horizontal force of magnitude 7 N is applied to the object at C so that the object is in equilibrium with ABC vertical (see Fig. 2).

(ii) Calculate the weight of the object. [3]

The 7 N force is removed and the object hangs in equilibrium with ABC at an angle of $\theta°$ with the vertical.

(iii) Find θ. [6]