6.



Figure 3

A washing line $ABCD$ is fixed at the points A and D.

There are two heavy items of clothing hanging on the washing line, one fixed at B and the other fixed at C.

The washing line is modelled as a light inextensible string, the item at B is modelled as a particle of mass 3 kg and the item at C is modelled as a particle of mass M kg.

The section AB makes an angle α with the horizontal, where $\tan \alpha = \frac{3}{4}$, the section BC is horizontal and the section CD makes an angle β with the horizontal, where $\tan \beta = \frac{12}{5}$, as shown in Figure 3.

The system is in equilibrium.

(a) Find the tension in AB.

(4)

(b) Find the tension in BC.

(3)

(c) Find the value of M.

(5)

(Total for Question 6 is 12 marks)