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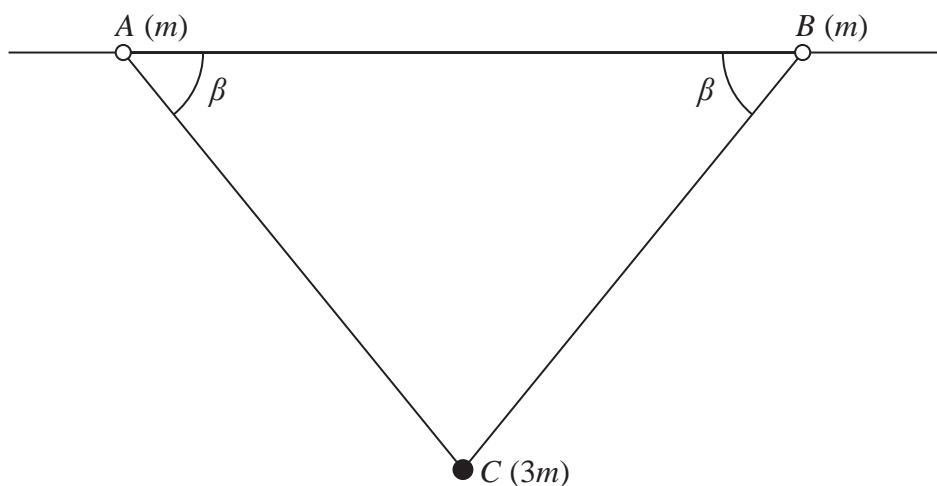


Figure 2

Two identical small rings,  $A$  and  $B$ , each of mass  $m$ , are threaded onto a rough horizontal wire. The rings are connected by a light inextensible string. A particle  $C$  of mass  $3m$  is attached to the midpoint of the string. The particle  $C$  hangs in equilibrium below the wire with angle  $BAC = \beta$ , as shown in Figure 2.

The tension in each of the parts,  $AC$  and  $BC$ , of the string is  $T$

(a) By considering particle  $C$ , find  $T$  in terms of  $m$ ,  $g$  and  $\beta$  (2)

(b) Find, in terms of  $m$  and  $g$ , the magnitude of the normal reaction between the wire and  $A$ . (3)

The coefficient of friction between each ring and the wire is  $\frac{4}{5}$

The two rings,  $A$  and  $B$ , are on the point of sliding along the wire towards each other.

(c) Find the value of  $\tan \beta$  (5)

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### Question 4 continued

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**Q4**

**(Total 10 marks)**



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