

- 5 (a) Explain why a body experiencing a resultant force can move with a uniform speed in a circular path.

[2]

- (b) A small mass m and a heavy mass M are connected to the ends of an inextensible string. The string is threaded through a glass tube as shown in Fig. 5.1. The tube is then held by a student and is whirled so that the mass m rotates with a constant radius r at a frequency of 175 revolutions per minute. Given that $m = 0.30 \text{ kg}$ and $M = 0.90 \text{ kg}$.

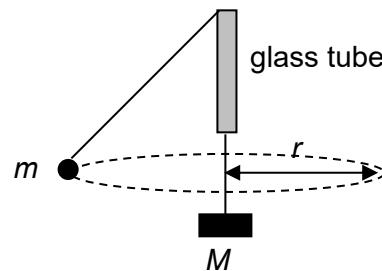


Fig. 5.1

- (i) Show that the resultant force acting on the mass m is 8.3 N.

[2]

(ii) Calculate the radius r of the circle.

radius = m [2]

(iii) Explain why it is impossible for the small mass m to be whirled in such a way that the string attached to it becomes horizontal.

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[1]