

Chapter 8
Short answer question

Fig. 1 shows a flexible track, part of which has been bent into a circle of radius 0.4m. A toy car of mass 0.1 kg runs down the track from A, 'loops the loop' and continues to C. Friction should be ignored throughout this question.

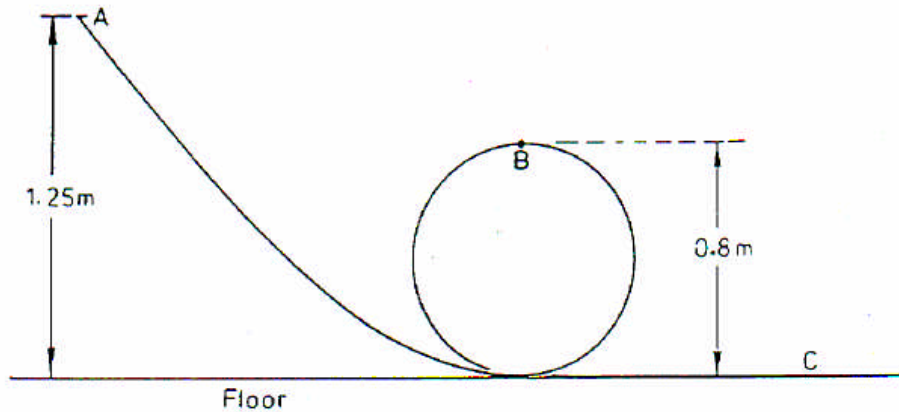


Fig. 1

- (a) Calculate the potential energy lost by the car travelling from A to B.
- (b) Calculate the speed of the car as it passes B.
- (c) What two forces are acting on the car as it passes B?
- (d) These two forces combine to provide the centripetal force at B. In which direction does this force act?

The end of the track is lowered so that the car passes B at a speed of 2 m/s.

- (e) When the car moves at this speed, a small piece of track could be removed and the car would continue in a circle as shown in Fig. 2. Explain this

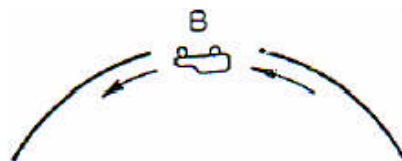


Fig. 2

- (f) The end A is lowered further until it is about 0.7m above the floor. Draw a diagram to show the path taken by the car.
- (g) What is the maximum height at which the end A can be placed so that the car fails to 'loop the loop', but does not come off the track. Explain.