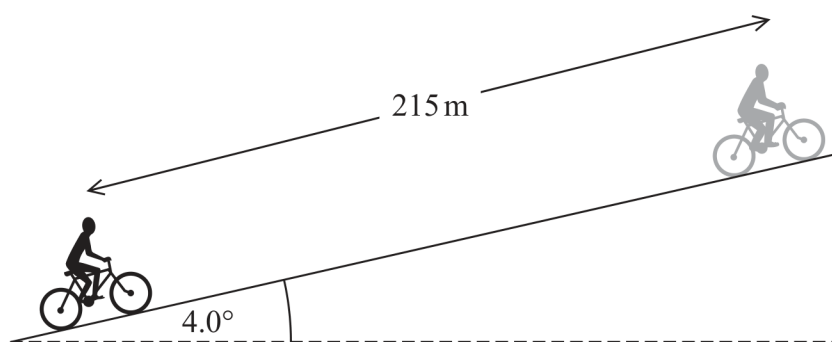


- 19 A cyclist is moving up a slope at a constant speed. The angle of the slope to the horizontal is  $4.0^\circ$ , as shown.



As the cyclist pedals, there is a constant forward force on the bicycle of  $150\text{ N}$ . The cyclist travels  $215\text{ m}$  along the slope.

- (a) Show that the work done by the cyclist is about  $3 \times 10^4\text{ J}$ .

(2)

- (b) The cyclist must do work against the force of gravity and air resistance.

- (i) Calculate the work done by the cyclist against air resistance.

mass of cyclist and bicycle =  $90\text{ kg}$

(4)

Work done against air resistance = .....



- (ii) State one assumption that must be made when calculating the work done against air resistance.

(1)

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- (c) At the top of the slope, the road becomes horizontal. The cyclist continues to pedal with the same force.

Explain how the speed of the cyclist changes as the road becomes horizontal.

(2)

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(Total for Question 19 = 9 marks)