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5. A small ball is projected vertically upwards with speed $29.4\,\text{m}\,\text{s}^{-1}$ from a point A which is 19.6 m above horizontal ground.

The ball is modelled as a particle moving freely under gravity until it hits the ground. It is assumed that the ball does not rebound.

(a) Find the distance travelled by the ball while its speed is less than $14.7\,\text{m}\,\text{s}^{-1}$

(3)

(b) Find the time for which the ball is moving with a speed of more than $29.4\,\text{m}\,\text{s}^{-1}$

(3)

(c) Sketch a speed-time graph for the motion of the ball from the instant when it is projected from A to the instant when it hits the ground. Show clearly where your graph meets the axes.

(3)

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Question 5 continued

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Question 5 continued

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Question 5 continued

Q5

(Total 9 marks)