7. A particle Q moves in a straight line with simple harmonic motion about centre O.

The maximum speed of Q is $12\,\text{m s}^{-1}$

When Q is 2 m from O, the speed of Q is $4\sqrt{5}\,\text{m s}^{-1}$

(a) Find the amplitude of the motion.

(4)

The maximum magnitude of the acceleration of Q is $A\,\text{m s}^{-2}$

(b) Find the value of A.

(1)

(c) Find the length of time, in any one complete oscillation, for which the magnitude of the acceleration of Q is less than $\frac{1}{2}A$.

(4)

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Question 7 continued

Question 7 continued

(Total for Question 7 is 9 marks)

TOTAL FOR PAPER IS 75 MARKS

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