Leave blank

5. A particle P is moving in a plane with constant acceleration.
The velocity, $\mathbf{v}\,\text{m s}^{-1}$, of P at time t seconds is given by

$$\mathbf{v} = (7 - 5t)\mathbf{i} + (12t - 20)\mathbf{j}$$

(a) Find the speed of P when $t = 2$

(3)

(b) Find, to the nearest degree, the size of the angle between the direction of motion of P and the vector $\mathbf{j}$, when $t = 2$

(3)

The constant acceleration of P is $\mathbf{a}\,\text{m s}^{-2}$

(c) Find $\mathbf{a}$ in terms of $\mathbf{i}$ and $\mathbf{j}$

(3)

(d) Find the value of t when P is moving in the direction of the vector $(-5\mathbf{i} + 8\mathbf{j})$

(4)

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Question 5 continued

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Question 5 continued

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Question 5 continued

(Total 13 marks)

Q5