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**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**

**(Total 13 marks)**

**Q5**