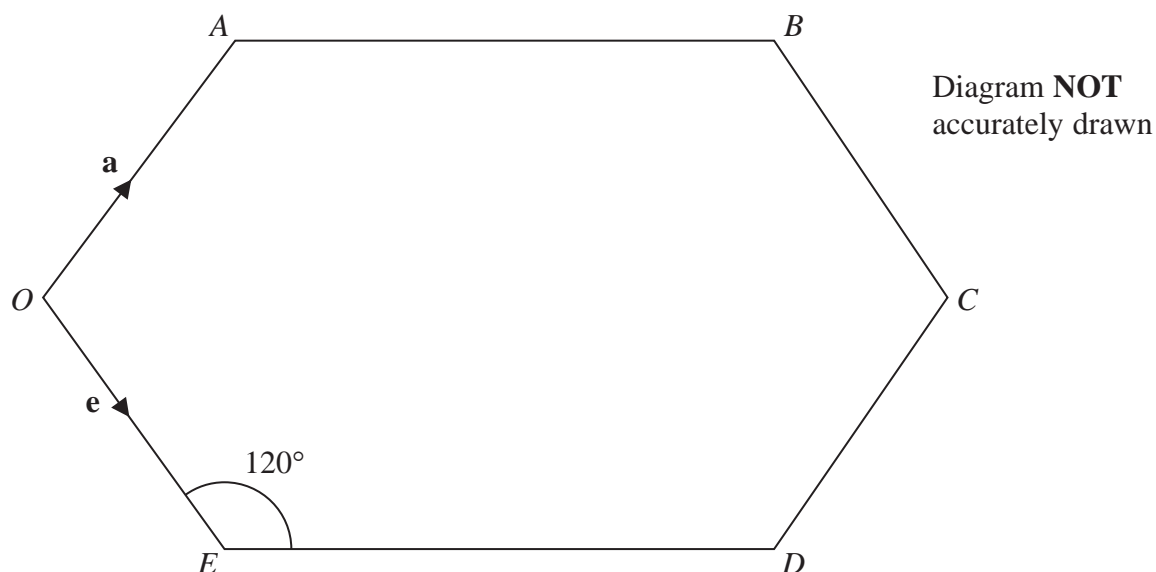**8**

Figure 4

Figure 4 shows a hexagon *OABCDE*. Each internal angle of the hexagon is 120°.

$$OA = OE, \quad AB = ED = 2 \times OA \quad \text{and} \quad OC = 3 \times OA$$

$\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OE} = \mathbf{e}$.

Find as simplified expressions in terms of **a** and **e**

(a) $\overrightarrow{AB}$,

(2)

(b) $\overrightarrow{BE}$.

(2)

The point *P* divides *AB* internally in the ratio $2:3$

(c) Find $\overrightarrow{PC}$ as a simplified expression in terms of **a** and **e**.

(3)

The point *Q* lies on *ED* produced so that the points *P*, *C* and *Q* are collinear.

(d) Find $\overrightarrow{OQ}$ in the form $\lambda\mathbf{a} + \mu\mathbf{e}$, stating the value of λ and the value of μ.

(6)

Question 8 continued

PMT

Question 8 continued

P 4 4 0 2 7 R A 0 2 2 3 2

Question 8 continued

(Total for Question 8 is 13 marks)