

Question	Scheme	Marks	AOs
5(a)	$\pm \overrightarrow{AB} = \pm (7\mathbf{i} + \mathbf{j} + 2\mathbf{k} - (5\mathbf{i} + 3\mathbf{j} - 2\mathbf{k}))$ $\Rightarrow  \overrightarrow{AB}  = \sqrt{2^2 + (-2)^2 + 4^2} \text{ or } \Rightarrow  \overrightarrow{AB} ^2 = 2^2 + (-2)^2 + 4^2$	M1	1.1b
	$ \overrightarrow{AB}  = 2\sqrt{6}$	A1	1.1b
		(2)	
(b)	$\overrightarrow{OD} = \overrightarrow{OC} + \overrightarrow{BA} = 4\mathbf{i} + 8\mathbf{j} - 3\mathbf{k} - 2\mathbf{i} + 2\mathbf{j} - 4\mathbf{k}$	M1	1.1b
	$\overrightarrow{OD} = 2\mathbf{i} + 10\mathbf{j} - 7\mathbf{k}$	A1	1.1b
		(2)	
(c)	$\overrightarrow{OE} = \overrightarrow{OA} + \frac{3}{2}\overrightarrow{AC} \text{ or } \overrightarrow{OE} = \overrightarrow{OC} + \frac{1}{2}\overrightarrow{AC}$	M1	3.1a
	$E \text{ is } (3.5, 10.5, -3.5)$	A1	1.1b
		(2)	

(6 marks)

### Notes

(a)

M1: Subtracts either way round and applies Pythagoras to find  $|\overrightarrow{AB}|$  or  $|\overrightarrow{AB}|^2$

A1: For  $2\sqrt{6}$

(b)

M1: Correct strategy to find the position vector of  $D$

A1: Correct vector

(c)

M1: Interprets the given ratio correctly and then adopts a correct approach to find the coordinates of the point  $E$

A1: Correct coordinates and no other coordinates