

Subject – Math (Standard Level)
Topic - Vector
Year - Nov 2011 – Nov 2017
Paper- 1

Question 2

- (a) (i) evidence of approach (M1)
e.g. $\vec{PO} + \vec{OQ}$, $P - Q$
- $$\vec{PQ} = \begin{pmatrix} 2 \\ 1 \\ -4 \end{pmatrix} \quad \text{A1} \quad \text{N2}$$
- (ii) any correct equation in the form $r = a + sb$ (accept any parameter for s)
where a is $\begin{pmatrix} 2 \\ 4 \\ 8 \end{pmatrix}$ or $\begin{pmatrix} 4 \\ 5 \\ 4 \end{pmatrix}$, and b is a scalar multiple of $\begin{pmatrix} 2 \\ 1 \\ -4 \end{pmatrix}$ A2 N2
- e.g. $r = \begin{pmatrix} 2 \\ 4 \\ 8 \end{pmatrix} + s \begin{pmatrix} 2 \\ 1 \\ -4 \end{pmatrix}$, $r = \begin{pmatrix} 4+2s \\ 5+s \\ 4-4s \end{pmatrix}$, $r = 2i + 4j + 8k + s(2i + j - 4k)$
- Note: Award A1 for the form $a + sb$, A1 for $L = a + sb$, A0 for $r = b + sa$.
- [4 marks]
- (b) (i) choosing correct direction vectors for L_1 and L_2 (A1)(A1)
e.g. $\begin{pmatrix} 2 \\ 1 \\ -4 \end{pmatrix}$, $\begin{pmatrix} 3p \\ 2p \\ 4 \end{pmatrix}$
- evidence of equating scalar product to 0 (M1)
correct calculation of scalar product A1
e.g. $2 \times 3p + 1 \times 2p + (-4) \times 4 = 8p - 16 = 0$
- $p = 2$ A1 N3
- (ii) any correct expression in the form $r = a + sb$ (accept any parameter for r)
where a is $\begin{pmatrix} 10 \\ 6 \\ -40 \end{pmatrix}$, and b is a scalar multiple of $\begin{pmatrix} 6 \\ 4 \\ 4 \end{pmatrix}$ A2 N2
- e.g. $r = \begin{pmatrix} 10 \\ 6 \\ -40 \end{pmatrix} + r \begin{pmatrix} 6 \\ 4 \\ 4 \end{pmatrix}$, $r = \begin{pmatrix} 10+6s \\ 6+4s \\ -40+4s \end{pmatrix}$, $r = 10i + 6j - 40k + s(6i + 4j + 4k)$
- Note: Award A1 for the form $a + sb$, A1 for $L = a + sb$ (unless they have been penalised for $L = a + sb$ in part (a)), A0 for $r = b + sa$.
- [7 marks]

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