Question	Answer	Marks	Guidance
(a)	Obtain $\overrightarrow{OM} = \mathbf{i} + 2\mathbf{j} + 2\mathbf{k}$	B1	
	Use a correct method to find $\overrightarrow{MN}$	M1	e.g. $\overrightarrow{MO} + \overrightarrow{OA} + \overrightarrow{AN}$ or $\overrightarrow{MO} + \overrightarrow{ON}$
	Obtain $\overrightarrow{MN} = \mathbf{i} + \mathbf{j} - 2\mathbf{k}$	A1	Accept any notation.
		3	
(b)	Use a correct method to form an equation for MN	M1	Allow without $\mathbf{r} = \dots$
	Obtain $\mathbf{r} = 2\mathbf{i} + 3\mathbf{j} + \lambda\,(\mathbf{i} + \mathbf{j} - 2\mathbf{k})$	A1 FT	OE e.g. $\mathbf{r} = \mathbf{i} + 2\mathbf{j} + 2\mathbf{k} + \mu\,(\mathbf{i} + \mathbf{j} - 2\mathbf{k})$ Must have $\mathbf{r} = \dots$ Follow *their* answers to part **9(a)**.
		2	
(c)	State $\overrightarrow{OP}$ for a general point P on MN in component form, e.g. $(2 + \lambda,\ 3 + \lambda, -2\lambda)$	B1	
	Equate scalar product of $\overrightarrow{OP}$ and a direction vector for MN to zero and solve for λ	M1	
	Obtain $\lambda = -\dfrac{5}{6}$	A1	OE e.g. $\mu = \frac{1}{6}$
	Obtain $\sqrt{\frac{53}{6}}$ correctly	A1	AG e.g. from $\sqrt{\left(\frac{7}{6}\right)^2 + \left(\frac{13}{6}\right)^2 + \left(\frac{5}{3}\right)^2}$
		4	