<u>Vectors – 2022 A2 June</u>

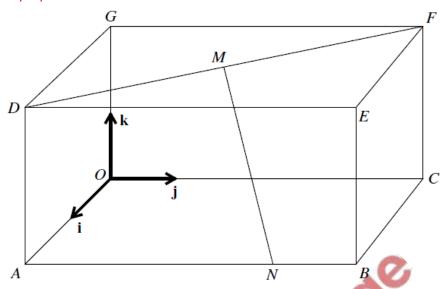
1. March/2022/Paper_9709/32/No.10

equ	ation $\mathbf{r} = \mathbf{i} + 2\mathbf{j} - 3\mathbf{k} + \mu(\mathbf{i} - 3\mathbf{j} - 2\mathbf{k}).$	
(a)	Find a vector equation for the line through A and B .	[3]
		· • • • • • • • • • • • • • • • • • • •
	000	
	A0'0'	
(b)	Find the acute angle between the directions of AB and l , giving your answer in degrees.	[3]

The points A and B have position vectors $2\mathbf{i} + \mathbf{j} + \mathbf{k}$ and $\mathbf{i} - 2\mathbf{j} + 2\mathbf{k}$ respectively. The line l has vector

Show that the line through A and B does not intersect the line l .	[4
.0,	
	• • • • • • • • • • • • • • • • • • • •

2. June/2022/Paper_9709/31/No.9



In the diagram, OABCDEFG is a cuboid in which OA = 2 units, OC = 4 units and OG = 2 units. Unit vectors \mathbf{i} , \mathbf{j} and \mathbf{k} are parallel to OA, OC and OG respectively. The point M is the midpoint of DF. The point N on AB is such that AN = 3NB.

(a)	Express the vectors <i>OM</i> and <i>MN</i> in terms of i , j and k .	[3]
	Co	
(b)	Find a vector equation for the line through M and N .	[2]

	iongui or the perpe	noiculai from O	to the line this	ough M and N is $$	6
				20	
			3	O	
••••		•••••			
) 	
		C			
		-0			
		O			
	A 00				
**					
•••••		•••••	• • • • • • • • • • • • • • • • • • • •		
		•••••			

3. June/2022/Paper_9709/32/No.9

The lines l and m have vector equations

$$\mathbf{r} = -\mathbf{i} + 3\mathbf{j} + 4\mathbf{k} + \lambda(2\mathbf{i} - \mathbf{j} - \mathbf{k})$$
 and $\mathbf{r} = 5\mathbf{i} + 4\mathbf{j} + 3\mathbf{k} + \mu(a\mathbf{i} + b\mathbf{j} + \mathbf{k})$

respectively, where a and b are constants.

Given that l and m intersect, show that $2b - a = 4$.	[4]
)
	<u></u>
<u> </u>	
A00X	
••*	

(D)	Given also that t and m are perpendicular, find the values of a and b .	[4]
(c)	When a and b have these values, find the position vector of the point of intersection of	
	00	[2]

4.	Wit	$\sqrt{2022/\text{Paper}_9709/33/\text{No.9}}$ the respect to the origin O , the point A has position vector given by $\overrightarrow{OA} = \mathbf{i} + 5\mathbf{j} + 6\mathbf{k}$. The line tor equation $\mathbf{r} = 4\mathbf{i} + \mathbf{k} + \lambda(-\mathbf{i} + 2\mathbf{j} + 3\mathbf{k})$.	<i>l</i> has
	(a)	Find in degrees the acute angle between the directions of OA and l .	[3]
		409	
		~8°	
		430	
	(b)	Find the position vector of the foot of the perpendicular from A to l .	[4]

100	
Hence find the position vector of the reflection of A in l .	[2
Hence find the position vector of the reflection of A in l .	[2
Hence find the position vector of the reflection of A in l .	[2
Hence find the position vector of the reflection of A in l .	[2
Hence find the position vector of the reflection of A in l.	