VECTOR ALGEBRA

EE24BTECH11035 - KOTHAPALLI AKHIL

A.FILL IN THE BLANKS

1) Let **A**,**B**,**C** be the vectors of length 3,4,5 respectively .Let **A** be perpendicular to **A**+**B**,**B** to **C**+**A** and **C** to **A**+**B**. The the length of vector **A**+**B**+**C** is (1981-2marks)
2) The unit vector perpendicular to the plane determined by P$(1,-1,2)$,Q$(2,0,1)$ and R$(0,2,1)$ is (1983-1mark)
3) The area of the triangle whose vertices are A$(1,-1,2)$, B$(2,0,-1)$, C$(3,-1,2)$ is (1983-1 mark)
4) A,B,C and D,are four points in a plane with position vectors a,b,c and d respectively such that $(\mathbf{a}-\mathbf{d})(\mathbf{b}-\mathbf{c}) = (\mathbf{b}-\mathbf{d})(\mathbf{c}-\mathbf{a}) = 0$ The point D, then,is the..... of the triangle ABC. (1984-2 marks)
5) If $\begin{vmatrix} a & a^2 & 1+a^3 \\ b & b^2 & 1+b^3 \\ c & c^2 & 1+c^3 \end{vmatrix} = 0$ ant the vectors **A**=(1,a,a^2),**B**=(1,b,b^2),**C**=(1,c,c^2), are co-planar, then the product abc=.... (1985-2 marks)
6) If **ABC** are the three non-coplanar vectors, then- $\frac{\mathbf{A}.\mathbf{B}\times\mathbf{C}}{\mathbf{C}\times\mathbf{A}.\mathbf{B}} + \frac{\mathbf{B}.\mathbf{A}\times\mathbf{C}}{\mathbf{C}.\mathbf{A}\times\mathbf{B}}$ =..... (1985-2 marks)
7) $\mathbf{A} = (1,1,1)$, $\mathbf{C} = (0,1,-1)$ are given vectors, then a vector B satisfying the given equations $\mathbf{A}\times\mathbf{B} = \mathbf{C}$ and $\mathbf{A}.\mathbf{B} = 3$..... 1985-2 marks
8) If the vectors $a\hat{i}+\hat{j}+\hat{k}$,$\hat{i}+b\hat{j}+\hat{k}$ and $\hat{i}+\hat{j}+c\hat{k}$ $(a \neq b \neq c \neq 1)$ are co-planar, then the value of the $\frac{1}{(1-a)}+\frac{1}{(1-b)}+\frac{1}{(1-c)}$=..... (1987-2 marks)
9) Let $b = 4\hat{i}+3\hat{j}$ and **c** be two vectors perpendicular to each other in the xy-plane.All vectors in the same plane having projections 1 and 2 along **b** and **c**, respectively, are given by..... (1987-2 marks)
10) The components of a vectors **a** along and perpendicular to a non-zero vector **b** are ..... and.....respectively. (1988-2 marks)
11) Given that $\mathbf{a} = (1,1,1)$, $\mathbf{c} = (0,1,-1)$,$\mathbf{a}.\mathbf{b} = 3$ and $\mathbf{a}\times\mathbf{b} = \mathbf{c}$,then **b** =..... (1991-2 marks)
12) A unit vector coplanar with $\hat{i}+\hat{j}+2\hat{k}$ and $\hat{i}+2\hat{j}+\hat{k}$ and perpendicular to $\hat{i}+\hat{j}+\hat{k}$ is..... (1992-2 marks)
13) A unit vector perpendicular to the plane determined by the points P$(1,-1,2)$Q(2,0,-1) and R(0,2,1) is..... (1994-2 marks)
14) A nonzero vector **a** is parallel to the line of intersection of the the plane determined by the vectors $\hat{i},\hat{i}+\hat{j}$ and the plane determined by the vectors $\hat{i}-\hat{j},\hat{i}+\hat{k}$.The angle between $veca and the vector $\hat{i}-2\hat{j}+2\hat{k}$ is..... (1996-2 marks)
15) If **b** and **c** are two non-collinear unit vectors and **a** is any vector, then $(\mathbf{a}.\mathbf{b})\mathbf{b} + (\mathbf{a}.\mathbf{c})\mathbf{c} + \frac{\mathbf{a}.(\mathbf{b}\times\mathbf{c})}{|\mathbf{b}\times\mathbf{c}|}(\mathbf{b}\times\mathbf{c})$ =..... (1996-2 marks)