HOLIDAY HOME WORK

CLASS 12,SUB:MATHS

1. Construct a 2×2 matrix whose elements a_{ij} are given by $a_{ij}=\left|\frac{-3i+j}{2}\right|$.
2. Simplify $\cos\theta\begin{bmatrix}\cos\theta & \sin\theta\\ -\sin\theta & \cos\theta\end{bmatrix}+\sin\theta\begin{bmatrix}\sin\theta & -\cos\theta\\ \cos\theta & \sin\theta\end{bmatrix}$
3. Find a matrix X such that 2A+B+X=0.
4. Find two matrices A and B whose product is a null matrix while neither A nor B are null matrices.
5. If $A=\begin{bmatrix}0 & 1\\ -1 & 0\end{bmatrix}$, find x and y such that $(xI+yA)^2=A$.
6. If $A=\begin{bmatrix}1 & 0\\ -1 & 7\end{bmatrix}$, find k so that $A^2=8A+kI$, where I is the identity matrix of order 2.
7. If $A_\alpha=\begin{bmatrix}\cos\alpha & \sin\alpha\\ -\sin\alpha & \cos\alpha\end{bmatrix}$, then prove that $A_\alpha . A_\beta=A_{\alpha+\beta}$.
8. Find the values of x,y and z if the matrix $A=\begin{bmatrix}0 & 2y & z\\ x & y & -z\\ x & -y & z\end{bmatrix}$ satisfy the equation $A^T.A=I_3$.
9. If $A=\begin{bmatrix}2 & 3\\ -1 & 2\end{bmatrix}$ and $f(x)=x^2-4x+7$.Show that f(A)=0 Use this result to find A^3.
10. If $A=\begin{bmatrix}0 & 1\\ 0 & 0\end{bmatrix}$. Prove that $(aI+bA)^n=a^nI+na^{n-1}bA$, where I is the unit matrix of order 2, and 'n' is an integer.
11. If $A=\begin{bmatrix}0 & -\tan\frac{\alpha}{2}\\ \tan\frac{\alpha}{2} & 0\end{bmatrix}$ and I is the identity matrix of order 2, show that $I+A=(I-A)\begin{bmatrix}\cos\alpha & -\sin\alpha\\ \sin\alpha & \cos\alpha\end{bmatrix}$.
12. If A and B are invertible matrices of the same order then, prove that $(AB)^{-1}=B^{-1}A^{-1}$.
13. Obtain the inverse of the following matrix by using elementary operations.
$\begin{bmatrix}1 & 3 & -2\\ -3 & 0 & -5\\ 2 & 5 & 0\end{bmatrix}$.