Dear students,

It is likely that you will have some ideas about how the problems in Matrices can be solved when you study and practice the explanations added in the last session. Using this idea in mind, answer the following questions. The solutions shall be sent to you in the next session. Remesh sir.

Questions	
1.	Let $A=\begin{bmatrix}3&6&5\\6&7&8\end{bmatrix}$ and $C=\begin{bmatrix}3&6&5\\6&7&8\end{bmatrix}$ a) Find 2A b) Find the matrix B such that $2A+B=3C$.
2	Let $A=\begin{bmatrix}2&4\\-1&1\end{bmatrix}$ a) Apply the elementary operation $R_1 \to \frac{R_1}{2}$ in the matrix A. b) Find the inverse of A using elementary transformations.
3	If $A=\begin{bmatrix}3&-5\\-4&2\end{bmatrix}$, a) Show that $A^2-5A-14I=0$. b) Hence find A^{-1}.
4	a) Find the values of x and y from the following equations: $a\begin{bmatrix}x&5\\7&y-3\end{bmatrix}+\begin{bmatrix}3&-4\\1&2\end{bmatrix}=\begin{bmatrix}7&6\\15&14\end{bmatrix}$ b) Given $A=\begin{bmatrix}1&2\\3&-1\\4&2\end{bmatrix}; B=\begin{bmatrix}-1&4&-5\\2&1&0\end{bmatrix}$ Show that $AB \neq BA$
5	Given $P=\begin{bmatrix}2&-3\\-1&2\end{bmatrix}$ Find the inverse of P by elementary row and column operation.
6	a) If $A=\begin{bmatrix}1&0\\-1&7\end{bmatrix}$, find k so that $A^2=8A+kI$. b) If $f(x)=x^2-2x-3$, find f(A), when $A=\begin{bmatrix}1&2\\2&1\end{bmatrix}$.
7	If $A=\begin{bmatrix}\cos\theta&\sin\theta\\-\sin\theta&\cos\theta\end{bmatrix}$, find A^2, show that $A^3=\begin{bmatrix}\cos 3\theta&\sin 3\theta\\-\sin 3\theta&\cos 3\theta\end{bmatrix}$
8	If $A=\begin{bmatrix}\cos x&-\sin x&0\\\sin x&\cos x&0\\0&0&1\end{bmatrix}$, then show that $F(x).F(y)=F(x+y)$.
9	a) If the matrices A and B are of orders m x n and n x p respectively, what is the order of AB? b) If A is a square matrix when will A^{-1} exits? c) When does $(A+B)^2 = A^2 + 2AB + B^2$ hold in the case of two matrices A and B?
10	Using elementary transformation, find the inverse of the following matrix: $\begin{bmatrix}1&2&3\\2&5&7\\-2&-4&-5\end{bmatrix}$
11	If $M(\theta)=\begin{bmatrix}\cos\theta&\sin\theta\\-\sin\theta&\cos\theta\end{bmatrix}$, show that $M(x)\times M(y)=M(x+y)$.
12	Let $A=\begin{bmatrix}1&2&-3\\2&1&-1\end{bmatrix}$ and $B=\begin{bmatrix}2&3\\5&4\\1&6\end{bmatrix}$ a) What is the order of AB? b) Find A^T and B^T. c) Verify that $(AB)^T=B^T.A^T$
13	If $\begin{bmatrix}7&5\\-3&7\end{bmatrix}\times A=\begin{bmatrix}17&-1\\47&-13\end{bmatrix}$ then a) Find A b) Find A^2 c) Show that $A^2+5A-6I=0$
14	If $A=\begin{bmatrix}5&3&10\end{bmatrix}$ and $B=\begin{bmatrix}2\\4\\6\end{bmatrix}$ then find AB

15	If $A=\begin{bmatrix}0 & a\\ 0 & b\end{bmatrix}$ and $B=\begin{bmatrix}c & d\\ 0 & 0\end{bmatrix}$ where a,b,c are all different from zero, Complete AB. What is the inference from your answer?
16	For what value of x, $\begin{bmatrix}1 & 1 & x\end{bmatrix}\begin{bmatrix}1 & 0 & 2\\ 0 & 2 & 1\\ 2 & 1 & 0\end{bmatrix}\begin{bmatrix}1\\ 1\\ 1\end{bmatrix}=0.$
17	Let $A=\begin{bmatrix}0 & 2\beta & \gamma\\ \alpha & \beta & -\gamma\\ \alpha & -\beta & \gamma\end{bmatrix}$ $be\,a\,3\times 3\,matrix.$ (a) Find A', the transpose of A. (b) If $A'A=6I$, where I is the 3×3.Identity matrix, find the values of $\alpha,\beta\,and\,\gamma$