INDIAN SCHOOL AL WADI AL KABIR
Dept. of Mathematics 2022 – 2023
Class XII Mathematics – Holiday Home Work

1	Construct a 2×3 matrix , 3×2 matrix B , whose elements are given by $a_{ij}=\dfrac{(i-2j)^2}{2}$
2	If $A=\begin{bmatrix} 2 & -3 & -5 \\ -1 & 4 & 5 \\ 1 & -3 & -4 \end{bmatrix}$ and $B=\begin{bmatrix} -1 & 3 & 5 \\ 1 & -3 & -5 \\ -1 & 3 & 5 \end{bmatrix}$, show that $AB=BA=O_{3\times 3}$
3	If $A=\begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$ and $I=\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, then **(i)** find λ,μ so that $A^2=\lambda A+\mu I$ **(ii)** prove $A^3-4A^2+A=O$
4	Express the following matrices as the sum of symmetric and a skew-symmetric matrix: **(a)** $\begin{bmatrix} 3 & -4 \\ 1 & -1 \end{bmatrix}$ **(b)** $\begin{bmatrix} 3 & -1 & 0 \\ 2 & 0 & 3 \\ 1 & -1 & 2 \end{bmatrix}$ **(c)** $\begin{bmatrix} 1 & 3 & 5 \\ -6 & 8 & 3 \\ -4 & 6 & 5 \end{bmatrix}$ **(d)** $\begin{bmatrix} 6 & 1 & -5 \\ -2 & -5 & 4 \\ -3 & 3 & -1 \end{bmatrix}$ **(e)** $A=\begin{bmatrix} 2 & -2 & -4 \\ -1 & 3 & 4 \\ 1 & -2 & -3 \end{bmatrix}$ **(f)** $A=\begin{bmatrix} 2 & 3 & 1 \\ 1 & -1 & 2 \\ 4 & 1 & 2 \end{bmatrix}$
5	Find the matrix C, such that $A+B+C$ is a zero matrix, where $A=\begin{bmatrix} 2 & 0 & 1 \\ 3 & -1 & 0 \end{bmatrix}, B=\begin{bmatrix} 2 & 1 & -1 \\ 0 & 2 & 1 \end{bmatrix}$
6	Find a matrix X such that $2A+B+X=0$, where $A=\begin{bmatrix} -1 & 2 \\ 3 & 4 \end{bmatrix}$, $B=\begin{bmatrix} 3 & -2 \\ 1 & 5 \end{bmatrix}$
7	If $2A+3X=5B$, where $A=\begin{bmatrix} 2 & -2 \\ 4 & 2 \\ -5 & 1 \end{bmatrix}$ ' $B=\begin{bmatrix} 8 & 0 \\ 4 & -2 \\ 3 & 6 \end{bmatrix}$, find X .
8	If $A=\begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$, prove that $A^3-4A^2+A=0$.

9	If $A=\begin{bmatrix}1 & 0\\ -1 & 7\end{bmatrix}$, find k such that $A^2-8A+kI=0$.
10	**(a)** If $A=\begin{bmatrix}2 & 1 & 3\\ 4 & 1 & 0\end{bmatrix}$ and $B=\begin{bmatrix}1 & -1\\ 0 & 2\\ 5 & 0\end{bmatrix}$, verify that $(AB)'=B'A'$
11	If $A=\begin{bmatrix}2 & 0 & -1\\ 5 & 1 & 0\\ 0 & 1 & 3\end{bmatrix}$, prove that $A^{-1}=A^2-6A+11I$
12	If $A=\begin{bmatrix}0 & 1\\ 1 & 0\end{bmatrix}$ and $B=\begin{bmatrix}0 & -1\\ 1 & 0\end{bmatrix}$, prove that $(A+B)(A-B)\neq A^2-B^2$
13	Find the integral values of x, $\begin{bmatrix}x & 4 & -1\end{bmatrix}\begin{bmatrix}2 & 1 & -1\\ 1 & 0 & 0\\ 2 & 2 & 4\end{bmatrix}\begin{bmatrix}x & 4 & -1\end{bmatrix}^t=0$
14	Find the value of x : $\begin{bmatrix}2 & 0 & 7\\ 0 & 1 & 0\\ 1 & -2 & 1\end{bmatrix}\begin{bmatrix}-x & 14x & 7x\\ 0 & 1 & 0\\ x & -4x & -2x\end{bmatrix}$ is equal to an identity matrix
15	Construct a 3x3 matrix $A=\left[a_{ij}\right]$ whose elements are given by $a_{ij}=\begin{cases}1+i+j & ,i\geq j\\ \dfrac{\lvert i-2j\rvert}{2} & ,i<j\end{cases}$
16	If $A=\begin{pmatrix}1 & 0 & 2\\ 0 & 2 & 1\\ 2 & 0 & 3\end{pmatrix}$ and $A^3-6A^2+7A+kI_3=O$, find k
17	If $A=\begin{bmatrix}1 & 2 & 3 & 4\\ 5 & 6 & 7 & 8\\ 9 & 10 & 11 & 12\end{bmatrix}$ and B is a matrix of order 4×3, write order of matrix $(AB)^T$
18	Find the value of x and y if $2\begin{bmatrix}1 & 3\\ 0 & x\end{bmatrix}+\begin{bmatrix}y & 0\\ 1 & 2\end{bmatrix}=\begin{bmatrix}5 & 6\\ 1 & 8\end{bmatrix}$
19	If $A=\begin{bmatrix}a & b & c & d\end{bmatrix}$, write the value of AA^T

20	Find whether the following system of equations is consistent or not, find solution of the system also. (i) $3x-y+2z=3$; $x-2y-z=1$; $2x+y+3z=5$ (ii) $5x-7y+z=11$; $6x-8y-z=15$; $3x+2y-6z=7$ (iii) $x+y+z=6$; $x+2y+3z=14$; $x+4y+7z=30$
21	Using matrix method, solve the following system of linear equations (i) $4x+2y+3z=2$; $x+y+z=1$; $3x+y-2z=5$ (ii) $x+2y+z=7$; $x+3z=11$; $2x-3y=1$ (iii) $x-y+z=2$; $2x-y=0$; $2y-z=1$ (iv) $x+y-z=1$; $3x+y-2z=3$; $x-y-z=-1$
22	If $A=\begin{bmatrix}1 & -1 & 1\\ 2 & 1 & -3\\ 1 & 1 & 1\end{bmatrix}$, find A^{-1}. find A^{-1}. Hence solve the following: $x+2y+z=4$, $-x+y+z=0$, $x-3y+z=2$
23	If $A=\begin{bmatrix}1 & 1 & 1\\ 1 & 2 & -3\\ 2 & -1 & 3\end{bmatrix}$, find A^{-1} and use it to solve the following system of equations: $x+y+2z=0$; $x+2y-z=9$; $x-3y+3z=-14$.
24	If $A=\begin{bmatrix}2 & -1 & 1\\ -1 & 2 & -1\\ 1 & -1 & 2\end{bmatrix}$ and $B=\begin{bmatrix}3 & 1 & -1\\ 1 & 3 & 1\\ -1 & 1 & 3\end{bmatrix}$, find AB
25	Solve the given system of equations: **(i)** $\frac{2}{x}-\frac{3}{y}+\frac{3}{z}=10$; $\frac{1}{x}+\frac{1}{y}+\frac{1}{z}=10$; $\frac{3}{x}-\frac{1}{y}+\frac{2}{z}=13$ **(ii)** $\frac{2}{x}+\frac{3}{y}-\frac{4}{z}=1$; $\frac{3}{x}+\frac{3}{y}+\frac{8}{z}=\frac{31}{6}$; $\frac{6}{x}+\frac{2}{y}+\frac{1}{z}=\frac{47}{12}$