DAV PUBLIC SCHOOL SECL BISHRAMPUR

SUMMER VACCATION HW

SESSION 2026-27

CLASS: - XII

SUBJECT: - MATHEMATICS (041)

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1. Given that $A = \begin{bmatrix} \alpha & \beta \\ \gamma & -\alpha \end{bmatrix}$ and $A^2 = 3I$, then

(a)$1 + \alpha^2 + \beta\gamma = 0$ (b) $1 - \alpha^2 - \beta\gamma = 0$

(c) $3 - \alpha^2 - \beta\gamma = 0$ (d) $3 + \alpha^2 + \beta\gamma = 0$

2. If A is square matrix such that A^2=A, then $(I+A)^3 - 7A$ is equal to

(A) A (B) I –A (C) I (D) 3A

3.A matrix $A = [a_{ij}]_{3\,x\,3}$ is defined by $a_{ij} = \begin{cases} 2i + 3j, & i < j \\ 5, & i = j \\ 3i - 2j, & i > j \end{cases}$ The number of elements in A which are more than 5, is

(a)3 (b) 4 (c) 5 (d) 6

4.If $\begin{vmatrix} x & 2 \\ 18 & x \end{vmatrix} = \begin{vmatrix} 6 & 2 \\ 18 & 6 \end{vmatrix}$, then x is equal to

(a) 6 (b)±6 (c)-6 (d) 0

5.Matrices A and B will be inverse of each other only if

(a) AB=BA (b) AB=BA=0 (c) AB=0, BA=I (d) AB=BA=I

6. Let A be a square matrix of order 3×3 .Then $|adjA|$ is equal to

(a) $|A|$ (b)$|A|^2$ (c)$|A|^3$ (d) $3|A|$

7. ASSERTION : All elements of a skew symmetric matrix are equal to 0.

REASON : Unit matrix is also called identity matrix.

8.ASSERTION : Determinant is only associated with square matrix.

REASON : Determinant of a skew matrix is always zero.

9. If A_{ij} is the cofactor of the element a_{ij} of the determinant $\begin{bmatrix} 2 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & -7 \end{bmatrix}$, then write the value of $a_{32}.A_{32}$.

10. Find k, if A = $\begin{bmatrix} -2 & 3 \\ k & 4 \end{bmatrix}$ is a singular matrix

11. If $A = \begin{bmatrix} 0 & 2 \\ 3 & -4 \end{bmatrix}$ and $kA = \begin{bmatrix} 0 & 3a \\ 2b & 24 \end{bmatrix}$, then find the value of $k, a\ and\ b$.

12. For what values of x : $[1 \quad 2 \quad 1]\begin{bmatrix} 1 & 2 & 0 \\ 2 & 0 & 1 \\ 1 & 0 & 2 \end{bmatrix}\begin{bmatrix} 0 \\ 2 \\ x \end{bmatrix} = 0$?

13. $A = \begin{bmatrix} cos\alpha & sin\alpha \\ -sin\alpha & cos\alpha \end{bmatrix}$,then find α satisfying $0 < \alpha < \frac{\pi}{2}.when\ A + A^T = \sqrt{2}I_2$, where A^T is the transpose of A.

14. In the interval $\frac{\pi}{2} < x < \pi$, find the value of x for which the matrix $\begin{bmatrix} 2sinx & 3 \\ 1 & 2sinx \end{bmatrix}$ is singular.

15. If for any 2 x 2 square matrix $A, A(adj\ A) = \begin{bmatrix} 8 & 0 \\ 0 & 8 \end{bmatrix}$, then write the value of $|A|$.

16. Determine the product of $\begin{bmatrix} -4 & 4 & 4 \\ -7 & 1 & 3 \\ 5 & -3 & -1 \end{bmatrix}\begin{bmatrix} 1 & -1 & -2 \\ 1 & -2 & -2 \\ 2 & 1 & 3 \end{bmatrix}$and then use to solve the system of equations $x - y + z = 4,\ x - 2y - 2z = 9\ and\ 2x + y + 3z = 1$.

17. The sum of three numbers is 6. If we multiply third number by 3 and add second number to it, we get 11. By adding first and third numbers, we get double of the second number. Represent it algebraically and find the numbers using matrix method.

18. Find the value of $y - x$ from the following equation $2\begin{bmatrix} x & 5 \\ 7 & y-3 \end{bmatrix} + \begin{bmatrix} 3 & -4 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 7 & 6 \\ 15 & 14 \end{bmatrix}$

19.**CASE STUDY BASED QUESTION :**Two schools P and Q want to award their selected students on the values of Tolerance, Kindness, and Leadership. The school P wants to award Rs x each, Rs y each and Rs z each for the three respective values to 3, 2 and 1 students respectively with total award money of Rs. 2200. School Q wants to spend Rs 3100 to award its 4, 1 and 3 students on the respective values (by giving the same award money to the three values as school P). If the total amount of award for one prize on each value is Rs 1200, using matrices, find the following:

(1) What is award money for Tolerance?

(2) What is the award money for leadership?

(3) What is award money for kindness?

20.**CASE STUDY BASED QUESTION** :Two farmers Ramkishan and Gurcharan singh cultivates only three varieties of rice namely Basmati , Permal and Naura. The sale (in Rupees) of these varieties of rice by both the farmers in the month of September and October are given by the following matrices A and B.

September sales (in Rupees)

	Basmati	Permal	Naura	
$A =$	10,000	20,000	30,000	*Ramkishan*
	50,000	30,000	10,000	*Gurucharan singh*

October sales (in Rupees)

	Basmati	Permal	Naura	
$A =$	5000	10,000	6000	*Ramkishan*
	20,000	10,000	10,000	*Gurucharan singh*

(1) Find the combined sales in September and October for each farmer in each variety.

(2) Find the decrease in sales from September to October .

(3) If both farmers receive 2% profit on gross sales, compute the profit for each farmer and for each variety sold in October.