VIGNAN'S FOUNDATION FOR SCIENCE, TECHNOLOGY & RESEARCH
(Deemed to be University) - Estd. u/s 3 of UGC Act 1956

SCHOOL OF APPLIED SCIENCE & HUMANITIES
DEPARTMENT OF MATHEMATICS

Subject: Foundations of Engineering Mathematics — Subject Code: 25MT101
Sem. : Pre-Semester — Academic Year: 2025-2026
Section: 20,26,31,32 — Regulation: R25
Instructor: D Bhanu Prakash, Department of Mathematics and Statistics

Unit 3: Matrices
Tutorial Quiz

---

1. If $\begin{bmatrix} x-2 & x+y \\ z-3 & 12 \end{bmatrix} = \begin{bmatrix} 0 & 3 \\ 4 & 12 \end{bmatrix}$ then $x = \ldots\ldots, y = \ldots\ldots, z = \ldots\ldots$

   (a) 2,1,7 (b) 1,2,7 (c) 1,7,2 (d) 7,2,1

2. If $\begin{bmatrix} 2x-y & x+y \\ 5 & 0 \end{bmatrix} = \begin{bmatrix} 1 & 3 \\ 5 & 0 \end{bmatrix}$ then $x = \ldots\ldots, y = \ldots\ldots$

   (a) $\frac{4}{3}, -\frac{5}{3}$ (b) $-\frac{4}{3}, \frac{5}{3}$ (c) $\frac{4}{3}, \frac{5}{3}$ (d) $-\frac{4}{3}, -\frac{5}{3}$

3. If $A-B = \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$ and $A+B = \begin{bmatrix} 3 & 4 \\ 2 & 5 \end{bmatrix}$ then $AB = \ldots\ldots\ldots$

   (a) $\begin{bmatrix} 2 & 2 \\ 1 & 2 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & 2 \\ 1 & 2 \end{bmatrix}$ (c) $\begin{bmatrix} 2 & 1 \\ 2 & 1 \end{bmatrix}$ (d) $\begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$

4. If $A = \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 3 \\ -2 \end{bmatrix}$ then $AB = \ldots\ldots\ldots$

   (a) $\begin{bmatrix} -3 \\ 2 \end{bmatrix}$ (b) $\begin{bmatrix} -3 \\ -2 \end{bmatrix}$ (c) $\begin{bmatrix} 3 \\ 2 \end{bmatrix}$ (d) $\begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$

5. If $A = \begin{bmatrix} 4 & 2 \\ -1 & 1 \end{bmatrix}$ then $(A-2I)(A-3I) = \ldots\ldots\ldots$

(a) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ (b) $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$ (c) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ (d) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

6. If $A = \begin{bmatrix} 1 & 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 9 \\ 6 & 3 \\ 8 & 0 \end{bmatrix}$ then $AB = ...$

(a) $\begin{bmatrix} 40 & 15 \end{bmatrix}$ (b) $\begin{bmatrix} 15 & 40 \end{bmatrix}$ (c) $\begin{bmatrix} 15 \\ 40 \end{bmatrix}$ (d) $\begin{bmatrix} 40 \\ 15 \end{bmatrix}$

7. If $A = \begin{bmatrix} 1 & 2 & 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 \\ 2 \\ 3 \\ 4 \end{bmatrix}$ then $AB = ...$

(a) $\begin{bmatrix} 1 \\ 23 \\ 12 \end{bmatrix}$ (b) $\begin{bmatrix} 12 \\ 10 \end{bmatrix}$ (c) $\begin{bmatrix} 23 & 12 \end{bmatrix}$ (d) $\begin{bmatrix} 30 \end{bmatrix}$

8. The inverse of the matrix $\begin{bmatrix} 1 & 3 \\ 2 & 6 \end{bmatrix}$ is……..

(a) $\begin{bmatrix} 6 & 3 \\ 2 & 1 \end{bmatrix}$ (b) $\begin{bmatrix} 6 & -3 \\ -2 & 1 \end{bmatrix}$ (c) $\begin{bmatrix} -1 & 3 \\ 2 & -6 \end{bmatrix}$ (d) None

9. A square matrix $A = \begin{bmatrix} a_{ij} \end{bmatrix}$ is called a symmetric matrix if

(a) $A^T = A$ (b) $A^T = -A$ (c) $A^T A = I$ (d) $A^T A = O$

10. The determinant of $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$ is……..

(a) 0 (b) -1 (c) 1 (d) 2

11. If $A = \begin{bmatrix} 3 & 2 \\ 1 & 4 \end{bmatrix}$ then $A.adj(A) = ...$

(a) $\begin{bmatrix} 0 & 10 \\ 10 & 0 \end{bmatrix}$ (b) $\begin{bmatrix} 0 & -10 \\ 10 & 0 \end{bmatrix}$ (c) $\begin{bmatrix} 10 & 0 \\ 0 & 10 \end{bmatrix}$ (d) $\begin{bmatrix} -10 & 0 \\ 0 & -10 \end{bmatrix}$

12. The inverse of the matrix $\begin{bmatrix} 1 & 3 \\ 2 & 5 \end{bmatrix}$ is……..

(a) $\begin{bmatrix} -1 & -3 \\ 2 & -5 \end{bmatrix}$ (b) $\begin{bmatrix} -5 & 3 \\ 2 & -1 \end{bmatrix}$ (c) $\begin{bmatrix} 3 & -1 \\ 5 & 2 \end{bmatrix}$ (d) $\begin{bmatrix} 3 & -1 \\ 5 & -2 \end{bmatrix}$

13. The determinant of $A = \begin{bmatrix} 1 & 1 & 0 \\ 0 & 0 & 1 \\ 2 & 2 & 2 \end{bmatrix}$ is

(a) 1 (b) 0 (c) -1 (d) 2

14. The determinant of an orthogonal matrix is……..

(a) 1 (b) 0 (c) -1 (d) ± 1

15. The matrix $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$ is……..

(a) Symmetric (b) Skew-symmetric (c) Orthogonal (d) None

16. The matrix is orthogonal if

(a) $A^T = A$ (b) $A^T = -A$ (c) $A^T A = I$ (d) $A^T A = O$

17. If $A = \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$ then $A^2 = ...$

(a) $2A$ (b) $3A$ (c) $4A$ (d) O

18. If $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$ then $AA^T = ...$

(a) 0 (b) 1 (c) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ (d) None

19. The value of the determinant $\begin{vmatrix} 3 & 2 & 1 \\ 4 & 1 & -7 \\ 0 & 3 & 4 \end{vmatrix}$ is

(a) 50 (b) 51 (c) 54 (d) 55

20. The rank of the matrix $A=\begin{bmatrix}1 & 1 & 0\\ 0 & 0 & 1\\ 2 & 2 & 2\end{bmatrix}$ is……

(a) 1 (b) 2 (c) 3 (d) 0

21. The rank of 3×3 matrix whose elements are all 2 is……

(a) 1 (b) 2 (c) 3 (d) 0

22. The maximum value of the rank of a 4×5 matrix is

(a) 3 (b) 4 (c) 5 (d) None

23. If $A=\begin{bmatrix}1\\2\\3\\4\end{bmatrix}$ and $B=\begin{bmatrix}1 & 0 & -1\end{bmatrix}$ then $AB=$.....

(a) $\begin{bmatrix}1 & 0 & -1\\ 2 & 0 & -2\\ 3 & 0 & -3\\ 4 & 0 & -4\end{bmatrix}$ (b) $\begin{bmatrix}1 & 0\\ 2 & 0\end{bmatrix}$ (c) $\begin{bmatrix}1 & 0 & -1\\ 2 & 0 & -2\\ 4 & 0 & -4\end{bmatrix}$ (d) $\begin{bmatrix}1 & -1\\ 2 & -2\end{bmatrix}$

24. If A, B and C are any three comparable matrices of the same type, then

$(A+B)+C=$

(a) $(A+B)+C^T$ (b) $(AB)+C^T$ (c) $A+(B+C)$ (d) $A+(B+C^T)$

25. Two matrices A and B are equal if

(a) Orders of A and B are not equal (b) Orders of A and B are equal

(c) Orders of A and B are equal and corresponding elements equal (d) None

26. If $A=\begin{bmatrix}1 & -1\\ -1 & 1\end{bmatrix}$ and $B=\begin{bmatrix}1 & 1\\ 1 & 1\end{bmatrix}$ then $AB=$.....

(a) $\begin{bmatrix}0 & 0\\ 0 & 1\end{bmatrix}$ (b) $\begin{bmatrix}1 & 0\\ 0 & 0\end{bmatrix}$ (c) $\begin{bmatrix}0 & 0\\ 1 & 1\end{bmatrix}$ (d) $\begin{bmatrix}0 & 0\\ 0 & 0\end{bmatrix}$

27. The additive identity of a matrix A is

(a) O (b) A (c) $-A$ (d) None

28. The additive inverse of a matrix A is

(a) O (b) A (c) $-A$ (d) None

29. Which of the following is a scalar matrix is

(a) $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}$ (c) $\begin{bmatrix} 0 & 0 \\ 1 & 1 \end{bmatrix}$ (d) $\begin{bmatrix} k & 0 \\ 0 & k \end{bmatrix}, k \neq 0$

30. If A is any matrix then $\left(A^T\right)^T = \ldots.$

(a) A^T (b) $-A$ (c) A (d) $-A^T$