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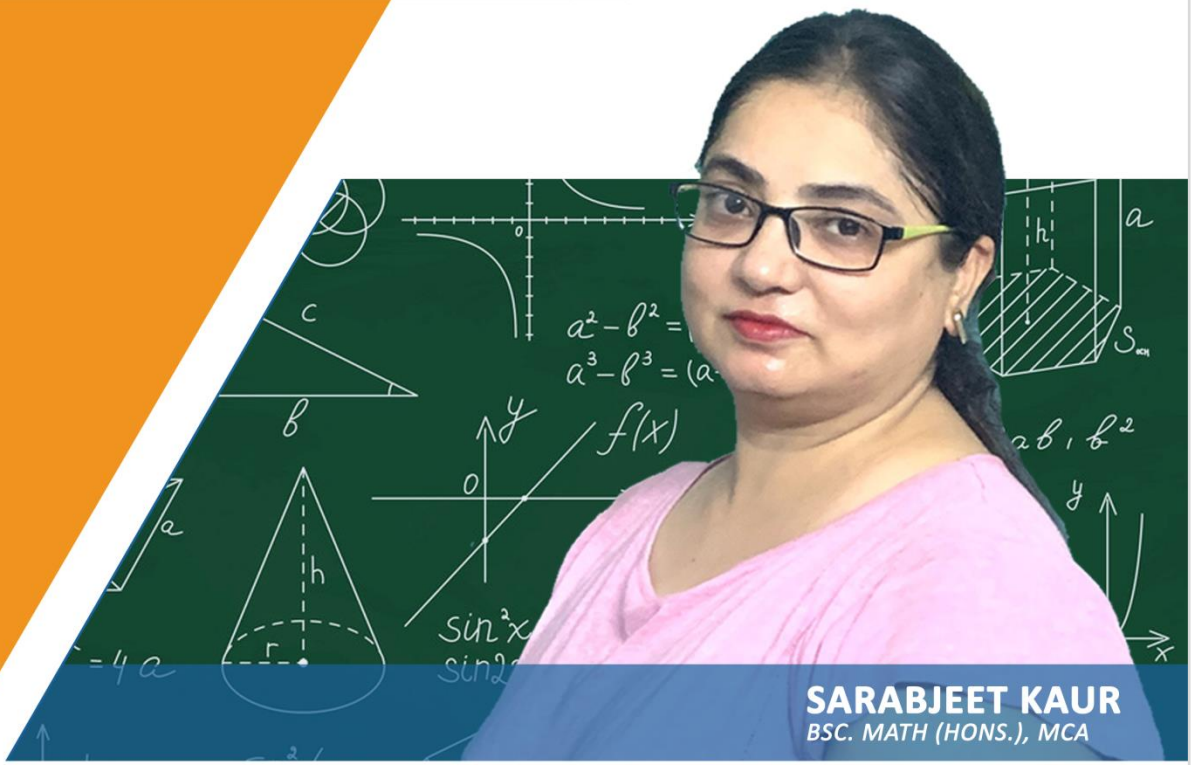

SARABJEET KAUR
BSC. MATH (HONS.), MCA

GRADE 12TH MATHS

CHAPTER 3

MATRICES

www.careerplusacademy.com careerplusacademy@gmail.com

/careerplusacademy /in/sarabkaur /careerplusacademy +91-987-111-5373

OBJECTIVE TYPE QUESTIONS (1 MARK)

1. If a matrix has 6 elements, then number of possible orders of the matrix can be
(a) 2 (b) 4 (c) 3 (d) 6

2. If A and B are square matrices of the same order, then (A + B) (A – B) is equal to
(a) $A^2 - B^2$ (b) $A^2 - BA - AB - B^2$ (c) $A^2 - B^2 + BA - AB$ (d) $A^2 - BA + B^2 + AB$

3. If $A = \begin{bmatrix} 2 & -1 & 3 \\ -4 & 5 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 3 \\ 4 & -2 \\ 1 & 5 \end{bmatrix}$, then
(a) only AB is defined (b) only BA is defined
(c) AB and BA both are defined (d) AB and BA both are not defined.

4. The matrix $A = \begin{bmatrix} 0 & 0 & 5 \\ 0 & 5 & 0 \\ 5 & 0 & 0 \end{bmatrix}$ is a
(a) scalar matrix (b) diagonal matrix (c) unit matrix (d) square matrix

5. If A and B are symmetric matrices of the same order, then (AB′ –BA′) is a
(a) Skew symmetric matrix (b) Null matrix (c) Symmetric matrix (d) None of these

6. The matrix $P = \begin{bmatrix} 0 & 0 & 4 \\ 0 & 4 & 0 \\ 4 & 0 & 0 \end{bmatrix}$ is a
(a) square matrix (b) diagonal matrix (c) unit matrix (d) none

7. If $A = [a_{ij}]$ is a 2 × 3 matrix, such that $aij = \frac{(-i+2j)^2}{5}$, then a_{23} is
(a) $\frac{1}{5}$ (b) $\frac{2}{5}$ (c) $\frac{9}{5}$ (d) $\frac{16}{5}$

8. If A = diag(3, –1), then matrix A is
(a) $\begin{bmatrix} 0 & 3 \\ 0 & -1 \end{bmatrix}$ (b) $\begin{bmatrix} -1 & 0 \\ 3 & 0 \end{bmatrix}$ (c) $\begin{bmatrix} 3 & 0 \\ 0 & -1 \end{bmatrix}$ (d) $\begin{bmatrix} 3 & -1 \\ 0 & 0 \end{bmatrix}$

9. Total number of possible matrices of order 2 × 3 with each entry 1 or 0 is
(a) 6 (b) 36 (c) 32 (d) 64

10. If A is a square matrix such that $A^2 = A$, then $(I + A)^2 - 3A$ is
(a) I (b) 2A (c) 3I (d) A

11. If matrices A and B are inverse of each other then
(a) AB = BA (b) AB = BA = I (c) AB = BA = O (d) AB = O, BA = I

12. The diagonal elements of a skew symmetric matrix are
(a) all zeroes (b) are all equal to some scalar k(≠ 0)
(c) can be any number (d) none of these

13. If $A = \begin{bmatrix} 5 & x \\ y & 0 \end{bmatrix}$ and $A = A'$ then
(a) $x = 0, y = 5$ (b) $x = y$ (c) $x + y = 5$ (d) $x - y = 5$

14. If a matrix A is both symmetric and skew symmetric then matrix A is
(a) a scalar matrix (b) a diagonal matrix
(c) a zero matrix of order $n \times n$ (d) a rectangular matrix.

15. If $F(x) = \begin{bmatrix} \cos x & \sin x \\ -\sin x & \cos x \end{bmatrix}$ then $F(x)\,F(y)$ is equal to
(a) $F(x)$ (b) $F(xy)$ (c) $F(x + y)$ (d) $F(x - y)$

16. If $A = \begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$, then A^6 is equal to
(a) zero matrix (b) A (c) I (d) none of these

17. If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$, then $A^2 - 5A - 7I$ is
(a) a zero matrix (b) an identity matrix
(c) diagonal matrix (d) none of these

18. The matrix A satisfies the equation $\begin{bmatrix} 0 & 2 \\ -1 & 1 \end{bmatrix} A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ then matrix A is

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

19. If $A = \begin{bmatrix} 0 & 2 \\ 2 & 0 \end{bmatrix}$, then A^2 is

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

20. Total number of possible matrices of order 3×3 with each entry 2 or 0 is
(a) 9 (b) 27 (c) 81 (d) 512

21. If $\begin{bmatrix} 2x + y & 4x \\ 5x - 7 & 4x \end{bmatrix} = \begin{bmatrix} 7 & 7y - 13 \\ y & x + 6 \end{bmatrix}$, then the value of $x + y$ is
(a) $x = 3, y = 1$ (b) $x = 2, y = 3$ (c) $x = 2, y = 4$ (d) $x = 3, y = 3$

22. If $A = \frac{1}{\pi}\begin{bmatrix} \sin^{-1}(x\pi) & \tan^{-1}\left(\frac{x}{\pi}\right) \\ \sin^{-1}\left(\frac{x}{\pi}\right) & \cot^{-1}(\pi x) \end{bmatrix}$, $B = -\frac{1}{\pi}\begin{bmatrix} -\cos^{-1}(x\pi) & \tan^{-1}\left(\frac{x}{\pi}\right) \\ \sin^{-1}\left(\frac{x}{\pi}\right) & -\tan^{-1}(\pi x) \end{bmatrix}$, then $A - B$ is equal to
(a) I (b) O (c) 2I (d) $\frac{1}{2}I$

23. If A and B are two matrices of the order $3 \times m$ and $3 \times n$, respectively, and $m = n$, then the order of matrix $(5A - 2B)$ is
(a) $m \times 3$ (b) 3×3 (c) $m \times n$ (d) $3 \times n$

24. If $A = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$, then A^2 is equal to
(a) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & 0 \\ 1 & 0 \end{bmatrix}$ (c) $\begin{bmatrix} 0 & 1 \\ 0 & 1 \end{bmatrix}$ (d) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

25. If matrix $A = [a_{ij}]_{2 \times 2}$, where $a_{ij} = 1$ if $i \neq j$ and 0 if $i = j$ then A^2 is equal to
(a) I (b) A (c) 0 (d) None of these

26. The matrix $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 4 \end{bmatrix}$ is a
(a) identity matrix (b) symmetric matrix (c) skew symmetric matrix (d) none of these

27. The matrix $\begin{bmatrix} 0 & -5 & 8 \\ 5 & 0 & 12 \\ -8 & -12 & 0 \end{bmatrix}$ is a
(a) diagonal matrix (b) symmetric matrix (c) skew symmetric matrix (d) scalar matrix

28. If A is matrix of order $m \times n$ and B is a matrix such that AB' and $B'A$ are both defined, then order of matrix B is
(a) $m \times m$ (b) $n \times n$ (c) $n \times m$ (d) $m \times n$

29. If A and B are matrices of same order, then $(AB' - BA')$ is a
(a) skew symmetric matrix (b) null matrix (c) symmetric matrix (d) unit matrix

30. On using elementary column operations $C_2 \rightarrow C_2 - 2C_1$ in the following matrix equation $\begin{bmatrix} 1 & -3 \\ 2 & 4 \end{bmatrix} = \begin{bmatrix} 1 & -1 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} 3 & 1 \\ 2 & 4 \end{bmatrix}$, we have :
(a) $\begin{bmatrix} 1 & -5 \\ 0 & 4 \end{bmatrix} = \begin{bmatrix} 1 & -1 \\ -2 & 2 \end{bmatrix} \begin{bmatrix} 3 & -5 \\ 2 & 0 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & -5 \\ 0 & 4 \end{bmatrix} = \begin{bmatrix} 1 & -1 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} 3 & -5 \\ 0 & 2 \end{bmatrix}$
(c) $\begin{bmatrix} 1 & -5 \\ 2 & 0 \end{bmatrix} = \begin{bmatrix} 1 & -3 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} 3 & 1 \\ -2 & 4 \end{bmatrix}$ (d) $\begin{bmatrix} 1 & -5 \\ 2 & 0 \end{bmatrix} = \begin{bmatrix} 1 & -1 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} 3 & -5 \\ 2 & 0 \end{bmatrix}$

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

32. For any two matrices A and B, we have
(a) $AB = BA$ (b) $AB \neq BA$ (c) $AB = O$ (d) None of the above

33. On using elementary row operation $R_1 \rightarrow R_1 - 3R_2$ in the following matrix equation:
$\begin{bmatrix} 4 & 2 \\ 3 & 3 \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ 0 & 3 \end{bmatrix} \begin{bmatrix} 2 & 0 \\ 1 & 1 \end{bmatrix}$, we have :

(a) $\begin{bmatrix} -5 & -7 \\ 3 & 3 \end{bmatrix} = \begin{bmatrix} 1 & -7 \\ 0 & 3 \end{bmatrix}\begin{bmatrix} 2 & 0 \\ 1 & 1 \end{bmatrix}$ (b) $\begin{bmatrix} -5 & -7 \\ 3 & 3 \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ 0 & 3 \end{bmatrix}\begin{bmatrix} -1 & -3 \\ 1 & 1 \end{bmatrix}$

(c) $\begin{bmatrix} -5 & -7 \\ 3 & 3 \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ 1 & -7 \end{bmatrix}\begin{bmatrix} 2 & 0 \\ 1 & 1 \end{bmatrix}$ (d) $\begin{bmatrix} 4 & 2 \\ -5 & -7 \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ -3 & -3 \end{bmatrix}\begin{bmatrix} 2 & 0 \\ 1 & 1 \end{bmatrix}$

34. If A and B are two skew symmetric matrices of same order, then AB is symmetric matrix if _____.

35. If A and B are matrices of same order, then $(3A - 2B)'$ is equal to _____.

36. Addition of matrices is defined if order of the matrices is _____

37. _____ matrix is both symmetric and skew symmetric matrix.

38. Sum of two skew symmetric matrices is always _____ matrix.

39. The negative of a matrix is obtained by multiplying it by _____.

40. The product of any matrix by the scalar _____ is the null matrix.

41. A matrix which is not a square matrix is called a _____ matrix.

42. Matrix multiplication is _____ over addition.

43. If A is a symmetric matrix, then A^3 is a _____ matrix.

44. If A is a skew symmetric matrix, then A^2 is a _____.

45. If A and B are square matrices of the same order, then
(i) $(AB)' =$ _____.
(ii) $(kA)' =$ _____. (k is any scalar)
(iii) $[k(A - B)]' =$ _____.

46. If A is skew symmetric, then kA is a _____. (k is any scalar)

47. If A and B are symmetric matrices, then
(i) AB – BA is a _____.
(ii) BA – 2AB is a _____.

48. If A is symmetric matrix, then B′AB is _____.

49. If A and B are symmetric matrices of same order, then AB is symmetric if and only if _____.

50. In applying one or more row operations while finding A^{-1} by elementary row operations, we obtain all zeros in one or more, then A^{-1} _____.