QB365 Question Bank Software Study Materials

Matrices and Determinants 50 Important 1 Marks Questions With Answers (Book Back and Creative)

11th Standard

Maths

Total Marks : 50

Multiple Choice Question

50 x 1 = 50

1) If $a_{ij} = \frac{1}{2}(3i-2j)$ and A = $[a_{ij}]_{2x2}$ is

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

2) What must be the matrix X, if 2x + $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} = \begin{bmatrix} 3 & 8 \\ 7 & 2 \end{bmatrix}$?

(a) $\begin{bmatrix} 1 & 3 \\ 2 & -1 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & -3 \\ 2 & -1 \end{bmatrix}$ (c) $\begin{bmatrix} 2 & 6 \\ 4 & -2 \end{bmatrix}$ (d) $\begin{bmatrix} 2 & -6 \\ 4 & -2 \end{bmatrix}$

3) Which one of the following is not true about the matrix $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 5 \end{bmatrix}$?

(a) a scalar matrix (b) a diagonal matrix (c) an upper triangular matrix (d) a lower triangular matrix

4) If A and B are two matrices such that A + B and AB are both defined, then

(a) A and B are two matrices not necessarily of same order **(b) A and B are square matrices of same order**

(c) Number of columns of A is equal to the number of rows of B (d) A = B.

5) If A = $\begin{bmatrix} \lambda & 1 \\ -1 & -\lambda \end{bmatrix}$, then for what value of λ, A^2 = O?

(a) 0 **(b)** ±1 (c) -1 (d) 1

6) If A = $\begin{bmatrix} 1 & -1 \\ 2 & -1 \end{bmatrix}$, B = $\begin{bmatrix} a & 1 \\ b & -1 \end{bmatrix}$ and $(A + B)^2 = A^2 + B^2$, then the values of a and b are

(a) a = 4, b = 1 **(b) a = 1, b = 4** (c) a = 0, b = 4 (d) a = 2, b = 4

7) If A = $\begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & -2 \\ a & 2 & b \end{bmatrix}$ is a matrix satisfying the equation $AA^T = 9I$, where I is 3×3 identity matrix, then the ordered pair (a, b) is equal to

(a) (2, - 1) (b) (- 2, 1) (c) (2, 1) **(d) (- 2, - 1)**

8) If A is a square matrix, then which of the following is not symmetric?

(a) $A + A^T$ (b) AA^T (c) $A^T A$ **(d) $A - A^T$**

9) If A and B are symmetric matrices of order n, where (A $\neq$ B), then

(a) A + B is skew-symmetric **(b) A + B is symmetric** (c) A + B is a diagonal matrix (d) A + B is a zero matrix

10) If A = $\begin{bmatrix} a & x \\ y & a \end{bmatrix}$ and if xy = 1, then det $(A A^T)$ is equal to

(a) $(a - 1)^2$ (b) $(a^2 + 1)^2$ (c) $a^2 - 1$ **(d) $(a^2 - 1)^2$**

11) The value of x, for which the matrix A = $\begin{bmatrix} e^{x-2} & e^{7+x} \\ e^{2+x} & e^{2x+3} \end{bmatrix}$ is singular

(a) 9 **(b) 8** (c) 7 (d) 6

12) If the points (x,−2), (5, 2), (8, 8) are collinear, then x is equal to

(a) -3 (b) $\frac{1}{3}$ (c) 1 **(d) 3**

13) If $\begin{vmatrix} 2a & x_1 & y_1 \\ 2b & x_2 & y_2 \\ 2c & x_3 & y_3 \end{vmatrix} = \frac{abc}{2} \neq 0$, then the area of the triangle whose vertices are $\left(\frac{x_1}{a}, \frac{y_1}{a}\right), \left(\frac{x_2}{b}, \frac{y_2}{b}\right), \left(\frac{x_3}{c}, \frac{y_3}{c}\right)$ is

(a) $\frac{1}{4}$ (b) $\frac{1}{4}abc$ **(c) $\frac{1}{8}$** (d) $\frac{1}{8}abc$

14) If the square of the matrix $\begin{bmatrix} \alpha & \beta \\ \gamma & -\alpha \end{bmatrix}$ is the unit matrix of order 2, then α, β and γ should satisfy the relation.

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

15) If △ = $\begin{vmatrix} a & b & c \\ x & y & z \\ p & q & r \end{vmatrix}$, then $\begin{vmatrix} ka & kb & kc \\ kx & ky & kz \\ kp & kq & kr \end{vmatrix}$ is

(a) △ (b) k△ (c) 3k△ **(d) k^3△**

16) A root of the equation $\begin{vmatrix} 3-x & -6 & 3 \\ -6 & 3-x & 3 \\ 3 & 3 & -6-x \end{vmatrix} = 0 \; is$

(a) 6 (b) 3 **(c) 0** (d) -6

17) The value of the determinant of A = $\begin{bmatrix} 0 & a & -b \\ -a & 0 & c \\ b & -c & 0 \end{bmatrix} is$

(a) -2abc (b) abc **(c) 0** (d) $a^2 + b^2 + c^2$

18) If x_1, x_2, x_3 as well as y_1, y_2, y_3 are in geometric progression with the same common ratio, then the points (x_1, y_1), (x_2, y_2), (x_3, y_3) are

(a) vertices of an equilateral triangle (b) vertices of a right angled triangle (c) vertices of a right angled isosceles triangle

(d) collinear

19) If a $\neq$ b, b, c satisfy $\begin{vmatrix} a & 2b & 2c \\ 3 & b & c \\ 4 & a & b \end{vmatrix} = 0$, then abc =

(a) a + b + c (b) 0 **(c) b^3** (d) ab + bc

20) If A = $\begin{vmatrix} -1 & 2 & 4 \\ 3 & 1 & 0 \\ -2 & 4 & 2 \end{vmatrix}$ and B = $\begin{vmatrix} -2 & 4 & 2 \\ 6 & 2 & 0 \\ -2 & 4 & 8 \end{vmatrix}$, then B is given by

(a) B = 4A **(b) B = -4A** (c) B = -A (d) B = 6A

21) If $\lfloor . \rfloor$ denotes the greatest integer less than or equal to the real number under consideration and $-1 \leq x < 0$, $0 \leq y < 1$, $1 \leq z < 2$, then the value of the determinant $\begin{vmatrix} \lfloor x \rfloor + 1 & \lfloor y \rfloor & \lfloor z \rfloor \\ \lfloor x \rfloor & \lfloor y \rfloor + 1 & \lfloor z \rfloor \\ \lfloor x \rfloor & \lfloor y \rfloor & \lfloor z \rfloor + 1 \end{vmatrix}$ is

(a) $\lfloor z \rfloor$ (b) $\lfloor y \rfloor$ (c) $\lfloor x \rfloor$ (d) $\lfloor x \rfloor + 1$

22) If A is skew-symmetric of order n and C is a column matrix of order n × 1, then $C^T AC$ is

(a) an identity matrix of order n (b) an identity matrix of order 1 **(c) a zero matrix of order 1**

(d) an identity matrix of order 2

23) The matrix A satisfying the equation $\begin{bmatrix} 1 & 3 \\ 0 & 1 \end{bmatrix}$ A = $\begin{bmatrix} 1 & 1 \\ 0 & -1 \end{bmatrix}$ is

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

24) If A + I = $\begin{bmatrix} 3 & -2 \\ 4 & 1 \end{bmatrix}$, then (A + I)(A - I) is equal to

(a) $\begin{bmatrix} -5 & -4 \\ 8 & -9 \end{bmatrix}$ (b) $\begin{bmatrix} -5 & 4 \\ -8 & 9 \end{bmatrix}$ (c) $\begin{bmatrix} 5 & 4 \\ 8 & 9 \end{bmatrix}$ (d) $\begin{bmatrix} -5 & -4 \\ -8 & -9 \end{bmatrix}$

25) Let A and B be two symmetric matrices of same order. Then which one of the following statement is not true?

(a) A + B is a symmetric matrix **(b) AB is a symmetric matrix** (c) AB = $(BA)^T$ (d) $A^T B = AB^T$

26) If A(B + C) = AB + AC where A, B, C are matrices of the same order than the property applied is matrix multipication is _______ .

(a) commutative (b) association **(c) distributive over addition** (d) distributive over multiplication

27) A matrix which is not a square matrix is called a_________matrix.

(a) singular (b) non-singular (c) non-square **(d) rectangular**

28) The product of any matrix by the scalar_________is the null matrix.

(a) 1 **(b) 0** (c) I (d) matrix itself

29) 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) 5 (b) 6 (c) 4 **(d) 3**

30) |adj A| =_________ where A is a square matrix of order

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

31) The value of $\begin{vmatrix} 1 & 1 & 1 \\ 1 & 1+sin\theta & 1 \\ 1 & 1 & 1+cos\theta \end{vmatrix}$ is ____________

(a) 3 (b) 1 (c) 2 **(d) $\frac{1}{2}$**

32) If A is a square matrix of order 3, then the number of minors in determinant of A are ____________

(a) 3 (b) 21 **(c) 9** (d) 27

33) If f(x) = $\begin{vmatrix} 0 & x-a & x-b \\ x+a & 0 & x-c \\ x+b & x+c & 0 \end{vmatrix}$ then ____________

(a) f(a) = 0 (b) f(b) = 0 (c) f(0) = 0 **(d) f(1) = 0**

34) Find the odd one out of the following:

(a) $\begin{bmatrix} 0 & 2 \\ -2 & 0 \end{bmatrix}$ (b) $\begin{bmatrix} 0 & \frac{-7}{2} \\ \frac{7}{2} & 0 \end{bmatrix}$ (c) $\begin{bmatrix} 0 & 3.2 \\ -3.2 & 0 \end{bmatrix}$ **(d)** $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$

35) Assertion (A): The inverse of $\begin{bmatrix} 2 & -1 \\ -4 & 2 \end{bmatrix}$ does not exist.

Reason (R): The matrix is non-singular

(a) Both A and R are true and R is the correct explanation of A

(b) Both A and R are true and R is not a correct explantion of A **(c) A is true but R is false** (d) A is false but R is true

36) If $p+q+r=0=a+b+c$, then the value of the determinant $\begin{vmatrix} pa & qb & rc \\ qc & ra & pb \\ rb & pc & qa \end{vmatrix}$ is ____________

(a) 0 (b) pa + qb + rc (c) 1 (d) None of these

37) If $\begin{vmatrix} a & b-c & c+b \\ a+c & b & c-a \\ a-b & a+b & c \end{vmatrix} = 0$ then the line $ax+by+c=0$ passes through the fixed point which is ____________

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

38) If p, q, r are in A.P., then the value of determinant $\begin{vmatrix} a^2+2^{n+1}+2p & b^2+2^{n+2}+3q & c^2+p \\ 2^n+p & 2^{n+1}+q & 2q \\ a^2+2^n+p & b^2+2^{n+1}+2q & c^2-r \end{vmatrix}$ is ________

(a) 1 **(b) 0** (c) $a^2b^2c^2-2n$ (d) $\left(a^2+b^2+c^2\right)-2^nq$

39) The determinant $\begin{vmatrix} y^2 & -xy & x^2 \\ a & b & c \\ a' & b' & c' \end{vmatrix}$ is equal to

(a) $\begin{vmatrix} bx+ay & cx+by \\ b'x+a'y & c'x+b'y \end{vmatrix}$ (b) $\begin{vmatrix} ax+by & bx+cy \\ b'x+a'y & b'x+c'y \end{vmatrix}$ (c) $\begin{vmatrix} bx+cy & ax+by \\ b'x+c'y & a'x+b'y \end{vmatrix}$ **(d)** $\begin{vmatrix} ax+by & bx+cy \\ a'x+b'y & b'x+c'y \end{vmatrix}$

40) The value of $\begin{vmatrix} -1 & 2. & 1 \\ 3+2\sqrt{2} & 2+2\sqrt{2} & 1 \\ 3-2\sqrt{2} & 2-2\sqrt{2} & 1 \end{vmatrix}$ is equal to ________

(a) 0 **(b)** $-16\sqrt{2}$ (c) $-8\sqrt{2}$ (d) None of these

41) If A and B are square matrices of order n, then $\mathrm{A}-\lambda\mathrm{I}$ and $\mathrm{B}-\lambda\mathrm{I}$ commutate for every scalar λ only if

(a) AB = BA (b) AB + BA = 0 (c) A = -B (d) none of these

42) Matrix A such that $A^2=2A-I$, where I is the identity matrix, then for $n\geq 2, A''$ is equal to

(a) $2^{n-1}A-(n-1)I$ (b) $2^{n-1}A-I$ **(c)** $nA-(n-1)I$ (d) $nA-I$

43) If $A=\begin{bmatrix} i & -i \\ -i & i \end{bmatrix}$ and $B=\begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$, then A^8equals

(a) 4 B **(b) 128 B** (c) -128 B (d) -64 B

44) If n^{th} order square matrix A is a orthogonal, then $|\mathrm{adj}(adjA)|$ is ________ .

(a) always -1 if n is even **(b) always I if n is odd** (c) always 1 (d) none of these

45) In which of the following type of matrix inverse, does not exist always ________

(a) Idempotent (b) Orthogonal (c) Involutory (d) None of these

46) If A is an orthogonal matrix, then A^{-1} equals ________

(a) A^T (b) A (c) A^2 (d) None of these

47) If Z is an idempotent matrix, then $(I+Z)^n$ ________

(a) $I+2^nZ$ **(b)** $I+(2^n-1)Z$ (c) $I-(2^n-1)Z$ (d) None of these

48) If A is a nilpotent matrix of index 2, then. for any positive integer n, A $(I + A)^n$ is equal to ________.

(a) A^{-1} **(b) A** (c) A^n (d) I^n

49) Let A be n^{th} order square matrix and B be its adjoint. Then $|AB+KI_n|$ is (where K is a scalar quantity)

(a) $(|A|+K)^{n-2}$ **(b)** $(|A|+K)^n$ (c) $(|A|+K)^{n-1}$ (d) none of these

50) If $A^2=I$, then the value of $\det(A-I)$ is (where A has order 3).

(a) 1 (b) -1 (c) 0 **(d) Cannot say anything**