QB365 Question Bank Software Study Materials

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

12th Standard

Business Maths and Statistics

Total Marks : 50

<u>**Multiple Choice Question**</u>

50 x 1 = 50

1) If A = (1 2 3), then the rank of AA^T is _____.

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

2) The rank of m x n matrix whose elements are unity is _____.

   (a) 0   **(b) 1**   (c) m   (d) n

3) if T = $\begin{array}{c} A \\ B \end{array} \begin{pmatrix} \overset{A}{0.4} & \overset{B}{0.6} \\ 0.2 & 0.8 \end{pmatrix}$ is a transition probability matrix, then at equilibrium A is equal to _____.

   (a) $\frac{1}{4}$ (b) $\frac{1}{5}$ (c) $\frac{1}{6}$ (d) $\frac{1}{8}$

4) If A = $\begin{pmatrix} 2 & 0 \\ 0 & 8 \end{pmatrix}$, then $\rho(A)$ is _____.

   (a) 0   (b) 1   **(c) 2**   (d) n

5) The rank of the matrix $\begin{pmatrix} 1 & 1 & 1 \\ 1 & 2 & 3 \\ 1 & 4 & 9 \end{pmatrix}$ is _____.

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

6) The rank of the unit matrix of order n is _____.

   (a) n −1   **(b) n**   (c) n +1   (d) n^2

7) If $\rho(A)$ = r then which of the following is correct?

   (a) all the minors of order r which does not vanish   **(b) A has at least one minor of order r which does not vanish**

   (c) A has at least one (r+1) order minor which vanishes   (d) all (r+1) and higher order minors should not vanish

8) If A = $\begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$ then the rank of AA^T is _____.

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

9) If the rank of the matrix $\begin{pmatrix} \lambda & -1 & 0 \\ 0 & \lambda & -1 \\ -1 & 0 & \lambda \end{pmatrix}$ is 2. Then λ is _____.

   (a) 1   (b) 2   (c) 3   (d) only real number

10) The rank of the diagonal matrix $\begin{pmatrix} 1 & & & & & \\ & 2 & & & & \\ & & -3 & & & \\ & & & 0 & & \\ & & & & 0 & \\ & & & & & 0 \end{pmatrix}$

   (a) 0   (b) 2   **(c) 3**   (d) 5

11) If $T = \begin{array}{c} A \\ B \end{array} \begin{pmatrix} 0.7 & 0.3 \\ 0.6 & x \end{pmatrix}$ is a transition probability matrix, then the value of x is _____.

(a) 0.3   (b) 0.3   **(c) 0.4**   (d) 0.7

12) Which of the following is not an elementary transformation?

(a) $R_i \leftrightarrow R_j$ **(b) $R_i \to 2R_i + 2C_j$**   (c) $R_i \to 2R_i - 4R_j$ (d) $C_i \to C_i + 5C_j$

13) If $\rho(A) = \rho(A, B)$ then the system is _____.

(a) Consistent and has infinitely many solutions   (b) Consistent and has a unique solution   **(c) Consistent**

(d) inconsistent

14) If $\rho(A) = \rho(A, B)$ the number of unknowns, then the system is_____.

(a) Consistent and has infinitely many solutions   **(b) Consistent and has a unique solution**   (c) consistent

(d) inconsistent

15) If $\rho(A) \neq \rho(A, B)$, then the system is _____.

(a) Consistent and has infinitely many solutions   (b) Consistent and has a unique solution   **(c) inconsistent**

(d) consistent

16) In a transition probability matrix, all the entries are greater than or equal to _____.

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

17) If the number of variables in a non-homogeneous system AX = B is n, then the system possesses a unique solution only when _____.

(a) $\rho(A) = \rho(A, B) > n$ **(b) $\rho(A) = \rho(A, B) = n$**   (c) $\rho(A) = \rho(A, B) < n$ (d) none of these

18) The system of equations 4x + 6y = 5, 6x + 9y = 7 has _____.

(a) a unique solution   **(b) no solution**   (c) infinitely many solutions   (d) none of these

19) For the system of equations x + 2y + 3z = 1, 2x + y + 3z = 2, 5x + 5y + 9z = 4 _____.

(a) there is only one solution   (b) there exists infinitely many solutions   (c) there is no solution   (d) None of these

20) If $|A| \neq 0$, then A is _____.

(a) non-singular matrix   (b) singular matrix   (c) zero matrix   (d) none of these

21) The system of linear equations x + y + z = 2, 2x + y − z = 3, 3x + 2y + k = 4 has unique solution, if k is not equal to _____.

(a) 4   **(b) 0**   (c) -4   (d) 1

22) Cramer's rule is applicable only to get an unique solution when _____.

(a) $\triangle_z \neq 0$ (b) $\triangle_x \neq 0$ **(c) $\triangle \neq 0$**   (d) $\triangle_y \neq 0$

23) If $\frac{a_1}{x} + \frac{b_1}{y} = c_1, \frac{a_2}{x} + \frac{b_2}{y} = c_2, \triangle_1 = \begin{vmatrix} a_1 & b_1 \\ a_2 & b_2 \end{vmatrix}, \triangle_2 = \begin{vmatrix} b_1 & c_1 \\ b_2 & c_2 \end{vmatrix} \triangle_3 = \begin{vmatrix} c_1 & a_1 \\ c_2 & a_2 \end{vmatrix}$ then (x, y) is _____.

(a) $\left(\frac{\triangle_2}{\triangle_1}, \frac{\triangle_3}{\triangle_1} \right)$ (b) $\left(\frac{\triangle_3}{\triangle_1}, \frac{\triangle_2}{\triangle_1} \right)$ (c) $\left(\frac{\triangle_1}{\triangle_2}, \frac{\triangle_1}{\triangle_3} \right)$ **(d) $\left(\frac{-\triangle_1}{\triangle_2}, \frac{-\triangle_1}{\triangle_3} \right)$**

24) $|A_{n \times n}| = 3 |adjA| = 243$ then the value n is _____.

(a) 4   (b) 5   **(c) 6**   (d) 7

25) Rank of a null matrix is _____.

(a) 0   (b) -1   (c) ∞ (d) 1

26) If the minor of a_{23} = the co-factor of a_{23} in $|a_{ij}|$ then the minor of a_{23} is $|a_y|$ then the minor of a_{23} is _____

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

27) If IAI = 0, then [adj AI is _____

(a) 0   (b) 1   (c) -1   (d) ± 1

28) For what value of k, the matrix $A = \begin{pmatrix} 2 & k \\ 3 & 5 \end{pmatrix}$ has no inverse?

(a) $\frac{3}{10}$ **(b) $\frac{10}{3}$**   (c) 3   (d) 10

29) The rank of an n x n matrix each of whose elements is 2 is _____

(a) 1   (b) 2   (c) n   (d) n^2

30) The value of $\begin{vmatrix} 5^2 & 5^3 & 5^4 \\ 5^3 & 5^4 & 5^5 \\ 5^4 & 5^5 & 5^6 \end{vmatrix}$

(a) 5^2 **(b) 0**   (c) 5^{13} (d) 5^9

31) If A, B are two n x n non-singular matrices, then _____

(a) AB is non-singular   (b) AB is singular   (c) $(AB)^{-1} = A^{-1} B^{-1}$ (d) $(AB)^{-1}$ does not exit

32) The rank of the matrix $\begin{pmatrix} 2 & -4 \\ -1 & 2 \end{pmatrix}$ is _____

(a) 1   (b) 2   (c) 0   (d) 8

33) Equivalent matrices are obtained by _____

(a) Taking Inverses   (b) Taking transposes   (c) Taking adjoints

(d) Taking finite number of elementary transformation

34) In echelon form, which of the following is incorrect?

(a) Every row of A which has all its entries O occurs below every row which had a non - zero entry.

(b) The first non -zero entry in each non-zero row is 1

(c) The number of zeros before the first non zero element in a row is less than the number of such zeros in the next row.

(d) 2 rows can have the same number of zeros before the first non-zero entry

35) If $\Delta \neq 0$ then the system is _____

(a) consistent and has unique solution   (b) consistent and has infinitely many solution   (c) inconsistent

(d) either consistent or inconsistent

36) The rank of the matrix $\begin{pmatrix} 1 & -1 & 2 \\ 2 & -2 & 4 \\ 4 & -4 & 8 \end{pmatrix}$ is _____

(a) 1   (b) 2   (c) 3   (d) 4

37) The rank of the diagonal matrix $\begin{pmatrix} -1 & & & & \\ & 2 & & & \\ & & 0 & & \\ & & & -4 & \\ & & & & 0 \end{pmatrix}$ is _____

(a) 0   (b) 2   **(c) 3**   (d) 5

38) If A = (2 01) then rank of AA^T is _____

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

39) If the equation $-2x + y + z = l, x - 2y + z = m, x + y - 2z = n$ such that 1 + m + n = 0, then the system has _____

(a) non - zero unique solution   (b) Trivial solutions   **(c) Infinitely many solutions**   (d) No solution

40) If A is a square matrix of order 3, then |Adj A| = _____

(a) $|A|^2$ (b) |A| (c) $|A|^3$ (d) $|A|^4$

41) If |A| = 0, then |adj A| = _____

(a) 0   (b) 1   (c) -1   (d) ± 1

42) The rank of n x n matrix each of whose element is 1 is _____

(a) 1   (b) 2   (c) n   (d) n^2

43) The rank of a non-singular matrix of order n x n is _____

(a) n   (b) n^2 (c) 0   (d) 1

44) If $\mathbf{T} = A \begin{pmatrix} 0.7 & 0.3 \\ x & 0.8 \end{pmatrix}$ is transition probability matrix then x = _____

(a) 0.3   **(b) 0.2**   (c) 0.4   (d) 0.7

45) Choose the correct statement

(a) The rank of a zero matrix is taken to be 1   (b) For zero matrix, the least value of the rank is 1

(c) Rank of a non-singular matrix of order n x n is n   (d) $\rho(A) \neq \rho\left(A^T\right)$

46) If a matrix is self inverse then which of the following is incorrect?

(a) $\mathrm{adj}(A) = |A|A$ (b) $A^2 = I$ **(c) $A\,\mathrm{adj}(A) = I$**   (d) $A^3 = A^{-1}$

47) Consider Assertion a) and Reason (R) given below.

Assertion (A) : Rank of a diagonal matrix of order n x n is n

Reason (R) : Since p(A) $\leq$ min {m, n}

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

(b) Both A and R are true but R is nor the correct explanation of A.   (c) A is true but R is false.

(d) A is false but R is true

48) Match List I with List Il

$\rho(A, B) = \rho(A)$	Consistent and has infinitely many solution
$\rho(A, B) = \rho(A) = \mathbf{n}$	Consistent
$\rho(A, B) = \rho(A) < \mathbf{n}$	Inconsistent, No solution
$\rho(A, B) \neq \rho(A)$	Consistent and has unique solution

Where n denotes the number of unknowns.

The correct match is

(a) d, b ,c, a   (b) a, c, b, d   (c) c,a,d,b   **(d) b,d,a,c**

49) If a matrix is self inverse then which of the following is incorrect?

(a) $\mathrm{adj}(A) = |A|A$ (b) $A^2 = I$ **(c) $A\,\mathrm{adj}(A) = I$**   (d) $A^3 = A^{-1}$

50) $|\mathbf{A}| = 13$ and $|\mathbf{Adj\ A}| = \begin{vmatrix} 4 & x \\ 5 & 7 \end{vmatrix}$ then the value of x is _____

(a) 3   (b) 4   (c) 2   (d) -5