



M COM ENTRANCE

BUSINESS MATHEMATICS PRACTICE QUESTIONS

CH 1: MATRICES & DETERMINANTS

1. If each element of a determinant of order 3 with value A is multiplied by 3. The value of the newly formed determinant is
 - A 3A
 - B 9A
 - C 27A
 - D None of these

2. If the value of a determinant of order 3 is 11, the value of the determinant formed by the cofactors is:
 - A 11
 - B 121
 - C 1331
 - D 14641

3. If $f(x) = x(x-1)$ then $\Delta = \begin{vmatrix} f(0) & f(1) & f(2) \\ f(1) & f(2) & f(3) \\ f(2) & f(3) & f(4) \end{vmatrix}$ equals
 - A 0
 - B 4
 - C -6
 - D -8

4. The equations $x + 2y + 3z = 1$; $x - y + 4z = 0$; $2x + y + 7z = 1$ have
 - A only one solution
 - B only two solutions
 - C Infinitely many solutions
 - D No solution

5. If $A = \begin{bmatrix} 2+x & 3 & 4 \\ 1 & -1 & 2 \\ x & 1 & -5 \end{bmatrix}$ is a singular matrix, then x is:

- A** 13/25
- B** -25/13
- C** 5/13
- D** 25/13

6. The inverse of $\begin{bmatrix} 2 & -3 \\ 3 & 4 \end{bmatrix}$ is:

- A** $-\frac{1}{17} \begin{bmatrix} 4 & 3 \\ -3 & 2 \end{bmatrix}$
- B** $-\frac{1}{17} \begin{bmatrix} -4 & -3 \\ 3 & -2 \end{bmatrix}$
- C** $\frac{1}{17} \begin{bmatrix} 2 & 3 \\ -3 & 4 \end{bmatrix}$
- D** $\frac{1}{17} \begin{bmatrix} 4 & -3 \\ 3 & 2 \end{bmatrix}$

7. If A is a non-singular matrix and $A^2 = I$, then A^{-1} equals:

- A** A^2
- B** O
- C** A
- D** I

8. If the equations $2x + 3y + z = 0$, $3x + y - 2z = 0$ and $ax + 2y - bz = 0$ has non-trivial solution, then

- A** $a - b = 2$
- B** $a + b + 1 = 0$
- C** $a + b = 3$
- D** $a - b - 8 = 0$

9. If $\begin{vmatrix} 2x & -1 \\ 4 & 2 \end{vmatrix} = \begin{vmatrix} 3 & 0 \\ 2 & 1 \end{vmatrix}$ then x is:

- A 3
- B $2/3$
- C $3/2$
- D $-1/4$

10. If A is a square matrix of order 2 and $A(\text{adj } A) = \begin{bmatrix} 8 & 0 \\ 0 & 8 \end{bmatrix}$ then $|A| =$

- A 64
- B 8
- C 1
- D None of these

11. Simon-Hawkins condition for the viability of the input-output model implies that :

- A Determinant of Leontief matrix > 0 and diagonal elements of the technology matrix < 0 .
- B Determinant of Leontief matrix > 0 and diagonal elements of the technology matrix > 0 .
- C Determinant of Leontief matrix > 0 and diagonal elements of the technology matrix < 1 .
- D Determinant of Leontief matrix > 0 and diagonal elements of the technology matrix > 1 .

12. **Statement I:** The object of Leontief input-output model is to find the amount of production for a forecasted demand.

Statement II: Simon-Hawkins conditions ensure that the system does not give a fractional number as output.

- A Both the statements are correct
- B Both the statements are incorrect
- C Statement I is correct and Statement II is incorrect
- D Statement I is incorrect and Statement II is correct

13. A hypothetical economy produces only two commodities X and Y. To produce a unit of X, 0.7 unit of X and 0.4 unit of Y are needed. Similarly. To produce a unit of Y, 0.5 unit of X and 0.6 unit of Y are needed. The Leontief Matrix is given by:

A $\begin{bmatrix} -0.3 & 0.5 \\ 0.4 & -0.4 \end{bmatrix}$

B $\begin{bmatrix} 0.3 & 0.5 \\ 0.4 & 0.4 \end{bmatrix}$

C $\begin{bmatrix} 0.3 & -0.5 \\ -0.4 & -0.4 \end{bmatrix}$

D $\begin{bmatrix} 0.3 & -0.5 \\ -0.4 & 0.4 \end{bmatrix}$

14. If A is a singular matrix, then:

- A** A is a square matrix such that $|A| = 0$
- B** A is a square matrix such that $|A| > 0$
- C** A is any square matrix.
- D** A is not a square matrix.

15. The system of linear equations is inconsistent when:

- A** $|A| = 0$ and $(\text{adj.}A).B = 0$
- B** $|A| \neq 0$ and $(\text{adj.}A).B = 0$
- C** $|A| = 0$ and $(\text{adj.}A).B \neq 0$
- D** None of the above.

16. A square matrix is skew-symmetric if $A' =$

- A** A
- B** $-A$
- C** 0
- D** None of these

17. The system of equation is expressed below in matrix form :

$$\begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & 1 \\ 3 & 6 & 5 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$

The given system has :

- A** Only one trivial solution

- B** Infinitely many non-trivial solutions
- C** No solution
- D** None of these

18. Which of the following is not the assumption of Leontief Input Output model?

- A** Economy decomposed into 'n' number of interdependent sectors
- B** Output of an industry is either used for production or final consumption
- C** Production level of an industry is determined on the basis of certain optimality criteria
- D** Technical coefficient do not change as there is change in industry output.

19. For a system of linear equation, A represents the coefficient matrix and B represents the matrix of the constants. If $|A| = 0$, the system is said to be inconsistent if :

- A** $(\text{adj.}A)B = 0$
- B** $(\text{adj.}A)B \neq 0$
- C** $|B| = 0$
- D** $|B| \neq 0$

20. If A is a matrix of order $m \times n$ and B is a matrix such that $B'A$ and AB' are both defined, then the order of matrix B is

- A** $m \times m$
- B** $n \times n$
- C** $n \times m$
- D** $m \times n$

21. The conditions given by D. Hawkins and H. A. Simon ensure that the Input-Output system:

- A** gives non-zero output
- B** does not give output in fractions
- C** gives non-negative output
- D** None of these

22. A closed Leontief model implies that
- A** No new industry can enter the economy
 - B** The industries completely utilize each other's output and there is no final demand
 - C** The final demand for the next period remains same as that in the previous period
 - D** None of these
23. If $|A| = 25$ then A is
- A** A Singular Matrix
 - B** A Square Matrix
 - C** An Identity Matrix
 - D** A Row Matrix
24. If A is a singular matrix then
- A** $|A| = 0$
 - B** $|A| \neq 0$
 - C** Both A and B
 - D** None of these
25. A square matrix is invertible if and only if it is
- A** an orthogonal matrix
 - B** a symmetric matrix
 - C** a singular matrix
 - D** a non-singular matrix