Maths

Reg.No. :

I.Answer all the Questions.

II.Use blue pen only.

Time : 02:00:00 Hrs

Total Marks : 86

Section-A

6 x 1 = 6

1)

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

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

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

(a) Every row of A which has all its entries 0 occurs below every row which has a non-zero entry   (b) The first non-zero entry in each non-zero row is 1

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

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

3) If $\triangle \neq 0$ then the system is

(a) Consistent and has unique solution   (b) Consistent and infinitely many solutions   (c) Inconsistent   (d) Either consistent or inconsistent

4) In the system of 3 linear equations with three unknowns, if $\Delta = 0$ and one of Δ_x, Δ_y or Δ_z is non-zero then the system is

(a) consistent   (b) inconsistent   (c) consistent and the system reduces to two equations   (d) consistent and the system reduces to a single equation

5) In the system of 3 linear equations with three unknowns, if $\Delta = 0, \Delta_x = 0, \Delta_y = 0, \Delta_z = 0$ and atleast one 2 x 2 minor of $\Delta \neq 0$ then the system is

(a) consistent   (b) inconsistent   (c) consistent and the system reduces to two equations   (d) consistent and the system reduces to a single equation

6) In the system of 3 linear equations with three unknowns, if $\Delta = 0$ and all 2 x 2 minors of $\Delta = 0$ and atleast one 2 x 2 minor of Δ_x or Δ_y or Δ_z is non-zero then the system is

(a) consistent   (b) inconsistent   (c) consistent and the system reduces to two equations   (d) consistent and the system reduces to a single equation

Section-B

5 x 6 = 30

7) Find the rank of the following matrices: $\begin{bmatrix} 3 & 1 & 2 & 0 \\ 1 & 0 & -1 & 0 \\ 2 & 1 & 3 & 0 \end{bmatrix}$

8) Find the rank of the following matrices $\begin{bmatrix} 0 & 1 & 2 & 1 \\ 2 & -3 & 0 & -1 \\ 1 & 1 & -1 & 0 \end{bmatrix}$

9) Find the rank of the following matrices $\begin{bmatrix} 1 & 2 & -1 & 3 \\ 2 & 4 & 1 & -2 \\ 3 & 6 & 3 & -7 \end{bmatrix}$

10) Find the rank of the following matrices $\begin{bmatrix} 1 & -2 & 3 & 4 \\ -2 & 4 & -1 & -3 \\ -1 & 2 & 7 & 6 \end{bmatrix}$

11) Examine the consistency of the following system of equations. If it is consistent then solve the same. $x - 4y + 7z = 14; 3x + 8y - 2z = 13; 7x - 8y + 26z = 5$

Section-C

5 x 10 = 50

12) Examine the consistency of the following system of equations. If it is consistent then solve the same: solve :

$x - 3y - 8z = -10 \;;\; 3x + y - 4z = 0 \;;\; 2x + 5y + 6z - 13 = 0$

13) Examine the consistency of the following system of equations. If it is consistent then solve the same: solve : $x + y - z = 1 \;;\; 2x + 2y - 2z = 2 \;;\; -3x - 3y + 3z = -3$

14) Solve the following non-homogeneous equations of three unknowns. $x + y + 2z = 6 \;;\; 3x + y - z = 2 \;;\; 4x + 2y + z = 8$

15) Solve the following non-homogeneous equations of three unknowns. $x + y + 2z = 4 \;;\; 2x + 2y + 4z = 8 \;;\; 3x + 3y + 6z = 12$

16) a)   Solve the following non-homogeneous equations of three unknowns $x + y + 2z = 4 \;;\; 2x + 2y + 4z = 8 \;;\; 3x + 3y + 6z = 10$

b)   If $A = \begin{bmatrix} 5 & 2 \\ 7 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -1 \\ -1 & 1 \end{bmatrix}$ Verify that (i) (AB)⁻¹=B⁻¹A⁻¹ (ii) (AB)ᵀ=BᵀAᵀ

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