

B.Sc. Honours Internal Evaluation- 2020

(Under CBCS Pattern)

Semester-II

Subject-Mathematics

Paper-GE2: Algebra

Candidates are required to give their answer in their own words as far as practicable. Questions are of equal value.

Full marks-30

Answer any five question

from the following:

1. Consider the following system-

$$x+y+z=6$$

$$x+2y+3z=10$$

$$x+2y+\lambda z=\mu$$

For what values of λ and μ does the system have (i) no solution (ii) unique solution (iii) infinitely many solution.

2. Verify the Cauchy-Hamilton theorem for the matrix $A = \begin{pmatrix} 5 & 6 \\ 1 & 2 \end{pmatrix}$ and find A^{-1} .

3. Find the eigen values and eigen vector for the matrix $A = \begin{pmatrix} 1 & 2 \\ 3 & 2 \end{pmatrix}$.

4. Under what condition the rank of the matrix $\begin{pmatrix} 2 & 4 & 2 \\ 2 & 1 & 2 \\ 1 & 0 & x \end{pmatrix}$ is 3.

5. Determine k so that the set $S = \{(k, 1, 1), (1, k, 1), (1, 1, k)\}$ is linearly dependent in \mathbb{R}^3 .

6. $T: \mathbb{R}^2 \rightarrow \mathbb{R}^3$ defined by $T(x, y) = (x-y, x+y, y)$ show that the transformation is linear transformation from \mathbb{R}^2 to \mathbb{R}^3 .

7. Apply elementary row operations to reduce the following matrix to a row echelon matrix

$$\begin{pmatrix} 2 & 0 & 4 & 2 \\ 3 & 2 & 6 & 5 \\ 5 & 2 & 10 & 7 \\ 0 & 3 & 2 & 5 \end{pmatrix}$$

8. For what values of a the system of equations is consistent? Solve completely in each case.

$$x-y+z=1$$

$$x+2y+4z=a$$

$$x+4y+6z=a^2$$