

## DEPARTMENT OF MATHEMATICS SCHOOL OF ADVANCED SCIENCES

Fall Semester - 2019 ~ 2020

Continuous Assessment Test - I, Aug - 2018

Course Code : MAT3004

Course Name : Applied Linear Algebra

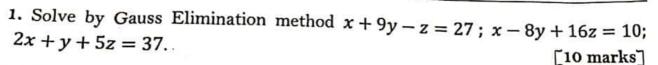
Duration

: 90 Minutes

Slot: C1+TC1

Date: 20.08.2018

Max. Marks: 50



2. Solve by LU decomposition method

$$x + 2y - z = -3;$$

y-z=1;

$$3x - y + z = 4$$
.

[10 marks]

3. (a) Find the inverse of the matrix using Gauss Jordan elimination

$$\begin{bmatrix} 7 & 2 & 1 \\ 0 & 3 & -1 \\ -3 & 4 & -2 \end{bmatrix}.$$

[5 marks]

(b) Let  $x_1, x_2, ..., x_n$  be vectors in a vector space V. Then the set W = $\{a_1x_1 + a_2x_2 + \dots + a_nx_n : a_i \in R\}$  of all linear combinations of  $x_1, x_2, \dots, x_n$  is a subspace of V. 5 marks

4. Find a basis and dimension of the following subspaces of  $M_{3\times3}(\mathcal{R})$ 

(1) The space of all 3 × 3 diagonal matrices

(2) The space of all  $3 \times 3$  symmetric matrices

(3) The space of all 3 × 3 skew-symmetric matrices

[10 marks]

5. (a) Consider the polynomials  $p(x) = 1 + 3x + 2x^2$ ,  $q(x) = 3 + x + 2x^2$ ,  $r(x) = 2x + x^2$  in  $\mathcal{P}_2$ . Where  $\mathcal{P}_2$  is collection of all polynomials of degree less than or equal to 2. Is  $\{p(x), q(x), r(x)\}\$  linearly independent? [5 marks]

(b) Determine the values for q such that the following set of vectors { (1,1,2,1),

(2, 1, 2, 3), (1, 4, 2, 1), (1, 3, 5, q) span  $\mathbb{R}^4$ .

5 marks



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