Roll No. Total No. of Pages : 02

Total No. of Questions : 07

B.Sc.(CS) (2013 & Onwards) (Sem.–6)

LINEAR ALGEBRA

Subject Code : BCS-602

M.Code : 72782

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.**

SECTION-A

Q1 Answer the followings in short :

a) Define Groups.

b) Define Field.

c) Define Vector Spaces.

d) Define Linear dependent.

e) Define Quotient Space.

f) Define Linear Transformations.

g) If T is a linear operator on V such that $T^2 - T + I = 0$. Prove that T is invertible.

h) Define isomorphism.

i) Define Nullity of a Matrix.

j) If V and W are finite dimensional vector spaces such that $dimV = dimW$. Then prove that a linear transformation $T : V \rightarrow W$ is one-one iff T is onto.

SECTION-B

Q2 Prove that the union of two subspaces is a subspace if and only if one of them is contained in other.

Q3 Write the vector v = (1, –3,5) belongs to the linear space generated by S, where $S = \{(1,2,1), (1,1,-1), (4,5,-2)\}$ or not?

Q4 State and prove Existence theorem for basis.

Q5 State and prove Rank-Nullity theorem.

Q6 Let T be a linear operator on R^2 defined by $T(x,y) = (4x - 2y, 2x + y)$ Find the matrix of T relative to the basis $B = \{(1,1); (-1,0)\}$.

Q7 Prove that the characteristic and minimal polynomials of an operator or a matrix have the same roots except for multiplicities.

NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC case against the Student.