S.Y.B.SC. (COMPUTER SCIENCE) SEM –III (2014 COURSE) :
WINTER - 2017
SUBJECT: LINEAR ALGEBRA

Day: Saturday
Date: 28/10/2017

Time: 12.00 NOON TO 02.00 PM
Max. Marks: 40

W-2017-0745

N.B:

1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** marks.

Q.1 Attempt **ANY TWO** of the following: **(10)**

a) Solve the following Homogeneous system of linear equation by Gauss Jorden method.

$$2x_1 + x_2 + 3x_3 = 0$$
$$x_1 + 2x_2 = 0$$
$$x_2 + x_3 = 0$$

b) Determine the value of 'a' for which the following system have
i) No solution ii) Unique solution

$$x_1 + a\,x_2 = 4$$
$$a\,x_1 + 9x_2 = 5$$

c) Prove that if V is a vector space then
i) $c.\overline{0} = \overline{0}$, for every scalar c
ii) $(-1)\overline{u} = -\overline{u}$, for every $\overline{u}$ in V

Q.2 Attempt **ANY TWO** of the following: **(10)**

a) Show that intersection of two subspaces of a given vector space is subspace.

b) Check whether the vectors
$\overline{v_1} = (1,2,1)$, $\overline{v_2} = (1,0,2)$ and $\overline{v_3} = (1,1,0)$ span vector space R^3.

c) Find basis and dimension of the solution space of homogeneous system.

$$x_1 + x_2 + x_3 + x_4 = 0$$
$$2x_1 + x_2 - x_3 + x_4 = 0$$

Q.3 Attempt **ANY TWO** of the following: **(10)**

a) Show that if λ is an Eigen value of matrix A then $\dfrac{\det(A)}{\lambda}$ is Eigen value of adjoint of A i.e. adj A .

b) Find all eigenvalues of a matrix A and hence write the eigenvalues of A^t and A^{-1}, where $A = \begin{bmatrix} 3 & 2 & 2 \\ 1 & 4 & 1 \\ -2 & -4 & -1 \end{bmatrix}$

c) Find the matrix P that diagonalize the matrix $A = \begin{bmatrix} 1 & 0 \\ 6 & -1 \end{bmatrix}$

P.T.O.

Q.4 Attempt **ANY FIVE** of the following: **(10)**

a) Find the dot product of $\bar{a}=[9 \quad 4 \quad 7 \quad -8]$ and $\bar{b}=\begin{bmatrix} 6 \\ 4 \\ -2 \\ 9 \end{bmatrix}$.

b) Define solution of Linear equation.

c) Define Linear span.

d) Write definition of column space.

e) Define Eigen vectors.

f) Find the characteristics polynomial of the matrix $A=\begin{bmatrix} 4 & 2 \\ 3 & 3 \end{bmatrix}$.

g) Define Diagonalization.

* * * * *