Linear Algebra. (M_5)

Important Questions.

Unit-I

1. Define Vector Space, Subspace, Null space, column Space, linear span, Linear transformation, kernel, Range.

2. Thm-①
If $v_1, v_2 --- v_n$ are the vectors in a vector space then Span $\{v_1, v_2 -- v_n\}$ is a Subspace of V.

3. Thm-②
If H and K are two subspaces of a vector space V then $H \cap K$ is a Subspace of V.

4. Thm ③
The null space of an $m \times n$ matrix A is a subspace of $\mathbb{R}^n$

5. Thm ④
The column space of an $m \times n$ matrix A is a Subspace of $\mathbb{R}^m$.

6. Define linearly Independent and Linearly dependent., Basis and Dimension.

7. A set of two vector is L.D iff one of the vector is a multiple of other.

8. An index set $\{v_1, v_2 --- v_n\}$ of 2 or more vectors with $v_1 \neq \bar{0}$ is L.I. iff. some v_j (with $j>1$) is a linear combination of preceeding vector.

9. Spanning Set Theorem

10. Unique Representation theorem

Unit – II

1. Define Row space, Rank, Eigenvalue and Eigen vector, characteristic equation

2. State and prove Rank theorem

3. Prove that The eigen values of triangular matrix are the entries on the main diagonal.

4. Prove that the Eigen vectors are linearly independent

5. Thm

If $m \times n$ matrices A and B are similar then they have the same characteristic poly. and hence the same eigen value with same multiplicity.

Unit. III

1. Diagnolizable problems.
2. Diagnolization theorem.
3. Matrix of Linear transformation problems.
4. Define Inner product space. Properties of IPS
5. Length of vector, unit vector, orthogonal, orthonormal, distance, Def. and problems
6. State and prove The Pythogorean theorem
7. State and prove parallelogram law
8. S.T. orthogonal set of vectors is Linearly Independent.

Important
Problems.

1. Subspace, Linear Transformation, Basis, ~~colu~~ Basis of column Space, Basis of Null Space, linearly Independent & dependent.
Dimension and coordinate System. problems.

<u>Note</u>
Practice all problems in C.W and all practical. Problems.