R20 Regulation *Subject code:3B1AM*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B. Tech I Semester Supplementary Examinations, June 2026

LINEAR ALGEBRA GRAPH THEORY

(Common to CSE, IT, CSE(AI&ML) & CSE(DS))

Maximum Marks: 70 Date: 16.06.2026 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X2M=20 Marks)		Marks	CO	BTL
1	Define symmetric matrix.	2M	1	L1
2	Define Rank of a matrix.	2M	1	L1
3	If A is a square matrix of order 3x3 having eigen values 1,2,-1, then find the eigen values of A^{-1} ,A^2	2M	2	L1
4	Find the nature of quadratic form $2x^2 + 3y^2 - 5z^2 - 4xy + 8xz - 10yz$	2M	2	L1
5	Define conjugate of a matrix with an example.	2M	3	L1
6	Define Hermitian matrix with an example.	2M	3	L1
7	Define isomorphism of two graphs.	2M	4	L1
8	Define dual of a planar graph and explain it through an example.	2M	4	L1
9	Define Chromatic number of a graph.	2M	5	L1
10	Define minimal spanning tree.	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	Find the rank of the matrix by reducing to Echelon form where A = $\begin{bmatrix} 4 & 2 & 3 \\ 8 & 4 & 6 \\ -2 & -1 & -1 \end{bmatrix}$.	10M	1	L2
	OR			
12	Find the rank of the matrix by reducing to Normal form where	10M	1	L2

	$A=\begin{bmatrix}2 & 3 & 1 & 4\\ 5 & 2 & 3 & 0\\ 9 & 8 & 0 & 8\end{bmatrix}$			
13	Determine the Eigen values and Eigen vectors of the following matrices ; $A=\begin{bmatrix}1 & 1 & 1\\ -1 & -3 & -3\\ 2 & 4 & 4\end{bmatrix}$.	10M	2	L2
	OR			
14	Prove that the Eigen values of a Skew-Hermitian matrix are purely imaginary or zero.	10M	2	L2
15	Show that the matrix A=$\begin{bmatrix}0 & i\\ i & 0\end{bmatrix}$ is Skew Hermitian and hence find it's Eigen values and Eigen vectors.	10M	3	L2
	OR			
16	Find the Eigen values and Eigen vectors of $\begin{bmatrix}4 & 1-3i\\ 1+3i & 7\end{bmatrix}$	10M	3	L2
17	Define graph colouring and chromatic number of a graph and find the chromatic number of $a)$ $K_{3,3}$ b) cycle with even number of vertices	5M 5M	4	L2
	OR			
18	Define the following terms. Give one suitable example for each a) Euler circuit b) Hamiltonian graph	5M 5M	4	L2
19	Explain DFS algorithm with suitable example.	10M	5	L2
	OR			
20	Explain PRIMS algorithm and list the advantages.	10M	5	L2