R22 Regulation *Subject code:4E4FA*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Semester Regular/Supplementary Examinations, June 2026

DISCRETE MATHEMATICS

(IT)

Maximum Marks: 60 Date:08.06.2026 Duration: 3 hours

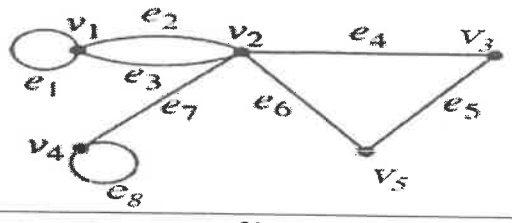
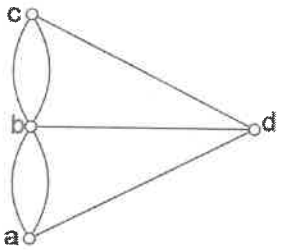
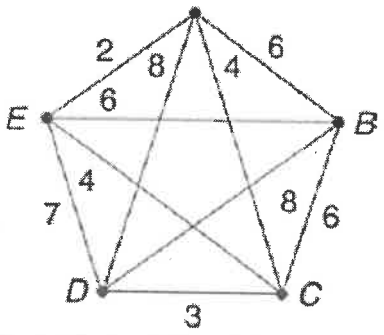
Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X1M=10 Marks)		Marks	CO	BTL
1.a)	Define the disjunction of two proportions and give its truth table.	1M	1	2
b)	What is quantifier?	1M	1	1
c)	What is the generating function?	1M	2	1
d)	In how many ways can the letters of the word 'READER' be arranged?	1M	2	2
e)	Define a graph.	1M	3	1
f)	Mention applications of a tree.	1M	3	2
g)	Define a sub group with an example.	1M	4	1
h)	State Lagrange's theorem.	1M	4	1
i)	Define partial ordering Relation.	1M	5	2
j)	The two sets are A= {1, 2, 3, 4} and B= {2, 3, 7} find AxB .	1M	5	1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
2	a) Construct truth table for the following p→(~ q ∨r). b) Discuss important laws of implications and equivalences with examples.	5M 5M	1	2 2
	OR			
3	Show that ∀(x)(P(x)→Q(x))∧∀ (x)(Q(x)→R(x))→ ∀ (x) (P(x)→R(x))	10M	1	3
4	a) Compute n and r if $P(n,r)$=3024. b) Find the number of committees of 5 that can be selected from 7 men and 5 women if the Committee consists of at least 1 man and 1 woman?	5M 5M	2	2 2
	OR			
5	a) How many integral solutions are there to $x_1 + x_2 + x_3 + x_4 + x_5 = 20$, where each $x_i \geq 2$. b) Solve the recurrence relation $a_n = a_{n-1} + 2a_{n-2}, n \geq 2$ with $a_0 = 0, a_1 = 1$.	5M 5M	2	2 3

6	Find the adjacency and incidence matrices of the graph:  	10M	3	3
	OR			
7	a) Identify whether the following graph Contains Euler path, Hamiltonian Cycle? If yes, find them.  	5M	3	2
	b) Find the minimum spanning tree for the weighted graph shown in Figure,  	5M		3
8	Let Q be set of all rational numbers and * is defined by a*b=a+b-ab Show that (Q,*) is a group.	10M	4	3
	OR			
9	a) Verify whether the mapping f(x)=2x from (Z,+) to (Z,+) is a homomorphism. b) Explain the relation between cosets and index of a subgroup.	5M 5M	4	2 2
10	Define Equivalence relation. Show that the relation $R=\{(1,1),(1,4),(4,1),(4,4),(2,2),(2,3),(3,2),(3,3)\}$ is an Equivalence relation of the set $X=\{1,2,3,4\}$.	10M	5	3
	OR			
11	Let f(x)= x+ 2, g(x)=x-2, and h(x)=3x for x belongs to **R**, where **R** is the set of real numbers. Find gof , fog, hog, fo(goh), (fog)oh .	10M	5	2