## UNIT – IV

8. (a) Explain Kruskal's algorithm for finding minimum spanning tree.

   (b) Prove that a connected graph with $n$ vertices and $n-1$ edges is a tree.

9. (a) Explain :

   (i) Eurelian Paths and Circuits

   (ii) Hamilton paths and Circuits

   (b) Explain :

   (i) Isomorphic graph

   (ii) Homeomorphic graph

   (iii) Degree of vertex

   (iv) Sub Graph



Roll No. .....

# 24041

## B. Tech. 3rd Semester (CS & IT) Examination – February, 2022

### DISCRETE STRUCTURE

**Paper : CSE-203-F**

*Time : Three hours ]* *[ Maximum Marks : 100*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

***Note :*** Attempt ***five*** questions in all. Question No. **1** is ***compulsory.*** Selecting ***one*** question from each Unit. All questions carry equal marks.

1. (a) Define Equivalence relation.

   (b) What is propositional calculus ?

   (c) Define Isomorphism.

   (d) What is cyclic group ?

   (e) Define Cut point and Bridge.

   (f) What is Planar graph ?

(g) What is generating function ?

(h) Find the number $m$ of committee of three that can be formed from eight people.

**UNIT – I**

2. (a) Let function $f$ and $g$ be defined by $f(x) = 2x + 1$ and $g(x) = x^2 - 2$ respectively. Find : (i) $gof$ (ii) $fog$ (iii) $fof$ (iv) $gog$

(b) What are various type of relation ? Explain each type with suitable example.

3. (a) Show that the proposition $(p \wedge q) \wedge \sim (p \vee q)$ is a contradiction.

(b) Explain with example :

(i) Power sets

(ii) Cartesian product

(iii) Classes of sets

(iv) Multi sets

**UNIT – II**

4. (a) Solve the recurrence relation : $a_r = 2a_{r-1} + 8a_{r-2}$ for $n>=2$ with $a_0 = 4$ and $a_1 = 10$.

(b) Find the number of distinct permutation that can be formed from all the letters of each word :

(i) RADAR

(ii) UNUSUAL



5. (a) Solve the difference equation : $a_r + 6a_{r-1} + 9a_{r-2} = 3$ with initial condition $a_0 = 0$ and $a_1 = 1$.

(b) The sum of three numbers in A.P. is 15. If 1, 4 and 19 are added to the numbers the resulting numbers are in G.P. find the numbers.

**UNIT – III**

6. (a) State and prove Lagrange's theorem.

(b) Explain :

(i) Monoid

(ii) Semi group

(iii) Groups

(iv) Rings

7. (a) Define subgroups and normal subgroups. Show that any subgroup H of an abelian group G is normal.

(b) Explain :

(i) Integral Domains

(ii) Fields

(iii) Cosets