B.Sc(PROGRAMME) SIXTH SEMESTER EXAMINATIONS, 2022

Subject: Computer Science

Course Code: SP/CSC/601/DSE-1B **Course ID: 61518**

Course Title: Discrete Structures

Full Marks: 40 **Time: 2 hr**

Answer all the questions.

UNIT I

1. Answer *any five* of the following questions: **(5x2=10)**

a) Define a Universal Set.

b) What do you mean by subset of a set? Give examples.

c) What is binary relation? Give example.

d) What is closure property?

e) What do you mean by permutation and combination?

f) Define mathematical induction.

g) What is multigraph?

h) Distinguish between graph and tree.

UNIT II

2. Answer *any four* of the following questions: **(4*5=20)**

a) Define one-to-one, onto, and invertible functions with suitable examples.

b) Define equivalence relation with an example.

c) Let $f(x) = x^2 + x$ and $g(x)= x+1$ then find out f°g and g°f.

d) Each of the following defines a relation on the positive integers N:

i. " x is greater than y "

ii. " xy is the square of an integer"

iii. x+y=10.

Determine which relations are(a) reflexive; (b) symmetric; (c) antisymmetric; (d) transitive.

e) What is recurrence relation and how does we solve it?

f) Define Euler and Hamiltonian Paths and circuits.

g) Describe the following graphs with example:

i) Complete graph; ii). Regular graph; iii). Bipartite graph.

UNIT III

3. Answer *any one* of the following questions: (1*10=10)

a) Prove the proposition P that the sum of the first n positive integers is ½ n(n+1):

that is, P(n): 1+2+3+4+----------+n= ½ n(n+1) with mathematical induction.

b) What is minimum spanning tree? Find out the minimum spanning tree of the following graph.