BENNETT UNIVERSITY
THE TIMES GROUP

Enrolment No: _____

Name of Student: _____

Department/ School: _____

END-TERM EXAMINATION EVEN SEMESTER 2021-22

COURSE CODE	CSET106	**MAX. DURATION**	2 HRS
COURSE TITLE	Discrete Mathematical Structures		
COURSE CREDIT	4(3L-1T-0P)	**TOTAL MARKS:**	35

GENERAL INSTRUCTIONS: -

1. Do not write anything on the question paper except **name, enrolment number** and **department/school.**
2. Carrying mobile phone, smart watch and any other non-permissible materials in the examination hall is an act of **UFM.**
3. Do not unnecessarily smile at the person sitting next to you, he/she may also not know the answer, moreover exam hall is not the right place for networking.
4. Answer without logic is illogical (simple logic)
5. It's good to have lot of beautiful options in life but **all questions are compulsory** here.

All the best!!!

Part A

1. Consider two fuzzy sets of the set U = {a, b, c, d, e, f} referred to as $\tilde{A}$ and $\tilde{B}$ such that (5)
   $\tilde{A}$ = {(a, 0.3), (b, 1), (c, 0.5), (d, 0.57), (e, 0.25), (f, 0)}
   $\tilde{B}$ = {(a, 0.03), (b, 0), (c, 0.8), (d, 1), (e, 0.5), (f, 0.68)}
   Compute the following:-
   I. supp($\tilde{A}$) and supp($\tilde{B}$)
   II. core($\tilde{A}$) and core($\tilde{B}$)
   III. n($\tilde{A}$) and n($\tilde{B}$)
   IV. $\tilde{A} \cup \tilde{B}$
   V. $\tilde{A} \cap \tilde{B}$
   VI. If x=0.4, then x.$\tilde{A}$ and x.$\tilde{B}$
   VII. If **x**=3, then $\tilde{A}^x$ and $\tilde{B}^x$
   VIII. α-cut of $\tilde{A}$ and $\tilde{B}$ for α =0.5
   IX. α-strong cut of $\tilde{A}$ and $\tilde{B}$ for α =0.5
   X. h($\tilde{A}$) and h($\tilde{B}$)

2. Consider a relation R defined on set A= {1,2,3,4} as (5)
R = {(1,1), (2,3), (3,3), (3,4), (4,1), (4,3)}
Compute the following:-
   I. R^{-1} and R^2
   II. 0-1 matrix for relation R and R^{-1}.
   III. Draw the diagraph of R and R^2.
   IV. Find whether RoR^{-1} and RoR are equivalent relations or not!
   V. Find the transitive closure of R.

3. Find the solution of the following linear congruences using Chinese Remainder Theorem. (5)

$$x \equiv 2 \pmod 4$$
$$x \equiv 3 \pmod 5$$
$$x \equiv 1 \pmod 9$$

4. Define any 5 types of simple graphs with example and appropriate diagrams. (5)

Part B

5. Draw the Hasse diagram for the $< P(S), \subseteq >$, where S={0,1,2}. Is it a lattice? (3)

6. Draw the truth table for the following logical expression (3)

$P \vee Q \wedge (R \rightarrow \neg Q) \wedge P \Leftrightarrow Q$

7. Find gcd(270,192) using Euclidean Algorithm. (3)

Part C

8. Determine whether the given statements are True or False:- (6)

(a) A set with zero element is called a Singleton set.

(b) In the Digraph of anti-symmetric relation, self loops are allowed.

(c) Let <A,R> be a POSET, if least upper bound and greatest lower bound exists for every pair of elements in A, then POSET is not a lattice.

(d) If T is false and F is true, then $T \rightarrow F$ is True.

(e) The complete graph of 4 vertices has 6 edges.

(f) Chromatic number of a 4 vertices wheel graph is 3.