University Institute of Engineering & Technology

(Recognised Under Section 2(f) and 12B of UGC)

Kurukshetra University, Kurukshetra

THEORY EXAMINATION – JULY 2021	
B.TECH - CSE	**SEMESTER – IV**

TIME – 4 Hrs.

M.M. - 75

PAPER - PC-CS-202

SUBJECT- Discrete Mathematics

INSTRUCTIONS TO BE FOLLOWED

- **The candidates will be required to attempt All questions in Part-A and Part-B (Compulsory Sections). Attempt any four questions from Part-C selecting at least one from each unit.**
- **Allotted time for examination is 4 hours that includes time for downloading the question paper, writing answers, scanning of answer sheets and uploading the sheets on the Attendance Sheet Cum Answer Sheet Uploading google form.**
- **For all CSE Reappear students, they should join the Google Meet Link and WhatsApp Link for Section-B Students for appearing in the exam and should upload their sheets in the Attendance Sheet Cum Answer Sheet Uploading Google Form meant for CSE-B regular students.**
- **The PDF files should be saved as Roll No. and Subject Code.**
- **Maximum Page Limit should be 36 (Thirty Six) for attempting the question paper on A4 sheets which could be downloaded and printed from the sample sheets given in the UIET Website.**
- **Over-attemptation should be avoided.**
- **Handwriting should be neat and clean and diagrams should be clear and contrasted.**
- **The candidate should not write their Mobile No. otherwise Unfair Means Case will be made.**
- **While attempting the paper, the candidate will use blue/black pen only.**
- **Before attempting the paper, the candidate will ensure that he/she has downloaded the correct question paper. No complaint for attempting wrong question paper by the candidate will be entertained.**
- **Candidate must ensure that he/she has put his/her signature on each page of the answer sheet used by him/her. Answer sheet without the signature of the candidate will not be evaluated.**
- **Attempt parts A, B & C separately. Do not inter-mix them. Write neatly & mention the question number clearly.**

PART-A (15 Marks)

Q. No. – 1 Answer the following questions. **15x1=15**

(i)	A ={1,2,3,4},B ={x:x is a positive integer and x^2 <18}. Is A=B?
(ii)	Define finite and infinite sets.
(iii)	If A={1,2,3}.R is relation defined on A,R={(1,2),(2,1),(2,2),(3,1),(3,3)}Is R is equivalence Relation?
(iv)	Define term lattice.
(v)	Define cyclic groups.
(vi)	In how many ways can the letters in word COMPUTER be arranged if the letters CO must remain next to each other as a unit?
(vii)	Differentiate asymmetric and antisymmetric relations.
(viii)	Let f(x)=2x+1 and g(x)= x^2 -2. Find (g o f)(4).
(ix)	An algebraic structure(A,*) is called a monoid if its elements follows...................properties.
(x)	X={2,4,6} ,Y={8,10,11,10}, observe how X is related to Y.
(xi)	Draw venn Diagram for Complement of a set Z.
(xii)	How many people at least in a group of 85 have the same last initials?
(xiii)	Define DeMorgan's Law.
(xiv)	If set X has 10 members, how many members do P(X) has?
(xv)	Write symbolic form for the statement: Program is readable only if it is well structured.

PART-B (20 Marks)

	UNIT-I	
2	**Prove by mathematical Induction** **1+2+3+4..........................+n=(n(n+1))/2**	**5**
	UNIT-II	
3	**Let A={5,6,7,8}and R={(6,5),(6,7),(7,6),(8,7)}Find the transitive closure using warshall's Algorithm.**	**5**
	UNIT-III	
4	**How many five person committees constituted from a group of six men and five women consists of i) atleast one man ii) atmost one men.**	**5**
	UNIT-IV	
5	**Let G be a set of all non-zero real numbers.A binary relation * is defined on G as:for a,b∈G , a*b=ab/2, Examine that (G,*) is an abelian Group or not.**	**5**

PART-C (40 Marks)

	UNIT-I	
6	**In a survey of 60 people,it was found that 25 read Newsweek magazine,26 read Time, and 26 read Fortune.Also 9 read both Newsweek and Fortune,11 read both Newsweek and Time,8 read both Time and Fortune. And 8 read no magazine at all.** **a)Find the number of people who read all three magazine**	**10**

	b)Draw venn diagram for the same and fill the correct number of people in all regions of venn diagram **c)Determine the number of people who read exactly one magazine**	
7	**Prove that a)(B^c ∩U) ∩ (A^c U Φ)=(AU B)^c** **b)AU(A∩B)=A** **c)(A U B)) ∩C= (A ∩C)U(B ∩C)**	**10**
	UNIT-II	
8	**Let A={2,3,6,12,18,24,36},divisibility relation is defined on A.Draw the hasse diagram of the poset(A,|).** **Find the maximal and minimal element, greatest element, least element, lower bounds, upper bounds,glb ,and lub of the following subsets of A:** **a)A1={2,3,6} b)A2={6,12,18,36} c)A3={12,24,36}**	**10**
9	**a)Let A={4,5,6,7}.Determine whether the following relation are Reflexive,Symmetric, Transitive Or Antisymmetric.(i)R1={(4,4),(5,5),(5,6),(7,7),(7,6),(6,6)}** **(ii)R2={(4,4),(5,5)}(iii)R3= Φ (iv) R4={(4,5),(5,4),(7,6),(6,7)}** **b)A={a,b,c,d},R={(a,b),(a,c),(b,a),(b,c),(c,d),(d,a)}.Find Transitive closure of Relation R.**	**10**
	UNIT-III	
10	**Describe types of functions with suitable examples.**	**10**
11	**Solve the recurrence relation a_{r+2} - 3a_{r+1} +2 a_r=0 by method of generating functions with initial conditions a_0=2 and a_1 =3.**	**10**
	UNIT-IV	
12	**Consider the set Q of rational numbers, and let * be the operation defined on Q defined by a*b=a+b-ab** **a)Find 3*4,2*(-5), and 7*1/2 b) Is (Q,*) a semigroup? Is it commutative? c) Find the identity element for *.**	**10**
13	**Define a group.Write properties for a group, explain with suitable example.**	**10**