(Please write your Enrolment No. immediately)   Enrolment No. 1471560 3122

MID TERM EXAMINATION

B.TECH PROGRAMMES (UNDER THE AEGIS OF USICT)

B.Tech 3rd_Semester, November, 2023

Paper Code: CIC-205   Subject: Discrete Mathematics
Time: 1½ Hrs.   Max. Marks: 30

Note: Q. No. 1 is compulsory and attempt any two more questions from remaining.

Q. No.	Question	Max. Marks	CO(s)
1(a)	What is extended pigeonhole principle? explain with suitable example.	2	CO1
1(b)	Write down the converse, contrapositive, inverse and negation of the following sentence: If it rains then the crop will grow ?	2	CO1
1(c)	Represent the given statement using predicate and quantifier and negate it. For all the real number x if x > 5 then $x^2 > 25$.	2	CO1
1(d)	What is the necessary condition for the relation to become Poset ? Explain with example.	2	CO2
1(e)	What is Function? Write the condition of the Function to be injective?	2	CO2
2(a)	Consider these statements, of which the first three are premises and the fourth is a valid conclusion. "All humming birds are richly colored." "No large birds live on honey." "Birds that do not live on honey are dull in color." "Humming birds are small." Express the statements in the argument using quantifiers, assume that the domain consists of all birds.	5	CO1
2(b)	Find the CNF and PCNF of $(\sim p \rightarrow r) \wedge (q \leftrightarrow p)$.	5	CO1
3(a)	Let A ={1,2,3,4,6,12} and R is a Relation on the Set A such that aRb. if a divides b, Find (i) Relation R (ii) Digraph of R (ii) Find Adjacency matrix of R (iv) Indergree and outdegree of each node (v) Find its Hasse diagram	5	CO2
3(b)	Solve the recurrence Relation using Master Method: T (n) = T (n/2) + 2^n	5	CO2
4(a)	Consider the following five relations on the set A = {1, 2 3, 4}: R1 = {1, 1), (1, 2), (2, 3), (1, 3), (4, 4)} R2= {(1, 1), (1, 2), (2, 1), (2, 2), (3, 3), (4, 4)} R3= {(1, 3), (2, 1)} R4 = Ø, the empty relation R5 = A × A, the universal relation Determine which of the relations are Reflexive, Synmmetric, Antisymmetric, Asymmetric, Transitive and Equivalence.	6	CO1
4(b)	What is the Generating Function for the generating sequence1,9,25,49,...?	4	CO2

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