MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section2(f) & 12(B)of the UGC act,1956

MLRS

II B.Tech I Sem Supply End Examination, July-2022
Discrete Mathematics
(CSM)

Time: 3 Hours.   Max. Marks: 70

Note: 1. Question paper consists: Part-A and Part-B.
2. In Part – A, answer all questions which carries 20 marks.
3. In Part – B, answer any one question from each unit.
   Each question carries 10 marks and may have a, b as sub questions.

PART- A
(10*2 Marks = 20 Marks)

1. a)	Define Propositional logic?	2M	CO1	BL1
b)	What is Nested Quantifier?	2M	CO1	BL1
c)	What are the properties of a set theory?	2M	CO2	BL1
d)	What is onto function?	2M	CO2	BL1
e)	Define Permutation?	2M	CO3	BL1
f)	What is well ordered formula?	2M	CO3	BL1
g)	Define generating function?	2M	CO4	BL1
h)	What is homogeneous recurrence relation?	2M	CO4	BL1
i)	Define Hamiltonian graph?	2M	CO5	BL1
j)	What is binary search tree?	2M	CO5	BL1

PART- B
(10*5 Marks = 50 Marks)

2 a)	Show that $\sim p$ follows from the set of premises $(r \to \sim q), r \lor s, s \to \sim q,$ $p \to q$ using indirect method of proof	5M	CO1	BL3
b)	Obtain CNF of the following formulas (i)$(P \land Q \land R) \lor (\sim P \land R \land Q) \lor (\sim P \land \sim Q \land \sim R)$	5M	CO1	BL3

OR

3	Define well formed formula? Write in brief about well defined formulas?	10M	CO1	BL1

4 a)	Draw the Hasse diagram for X={2,3,6,24,36,48} and relation $\leq$ be such that x$\leq$y, if x divides y.	5M	CO2	BL1
b)	For any two sets A and B, Prove the following Identity A-(A∩B) = A-B	5M	CO2	BL3

OR

5	Define equivalence relation and explain with example.	10M	CO2	BL4

6	a)	Use multinomial theorem to expand $(x_1+x_2+x_3+x_4)^4$.	5M	CO3	BL3
	b)	Find the number of non negative integral solutions to $X_1+X_2+X_3+X_4+X_5=10$.	5M	CO3	BL3

OR

7	In how many ways can 23 different books be given to 5 students so that 2 of the students will have 4 books each and other 3 will have 5 books each	10M	CO3	BL3

8	a)	Solve the recurrence relation $a_n-7a_{n-1}+12a_{n-2}=0$ for $n\geq2$ where $a_0=1$, $a_1=2$	5M	CO4	BL3
	b)	Solve the recurrence relation using generating function $a_n-6a_{n-1}=0$ for $n\geq1$ where $a_0=1$	5M	CO4	BL3

OR

9	Find the general expression for a solution to the recurrence relation $a_n-5a_{n-1}+6a_{n-2}=n(n-1)$ for $n\geq2$	10M	CO4	BL3

10	a)	Explain and illustrate BFS and DFS with examples?	5M	CO5	BL4
	b)	Write Kruskal's Algorithm and explain it with an example.	5M	CO5	BL4

OR

11	Find the Chromatic number of the following graphs (a) Complete Graph (K_3) (b) Complete Bipartite Graph ($K_{2,3}$)	10M	CO5	BL3

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