



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 Section 2(f) & 12(B) of the UGC act, 1956

II B.Tech II Sem Supply End Examination, March 2022

DISCRETE MATHEMATICS

(CSE & INF)

Time: 3 Hours.

Max. Marks: 70

Note: 1. Answer any FIVE questions.

2. Each question carries 14 marks and may have a, b as sub questions.

- Prove that the following argument is valid or invalid:
- 1 a) No Mathematicians are fools. 7M CO1 BL3
 No one who is not a fool is an administrator.
 Sitha is a mathematician. Therefore Sitha is not an administrator
 - b) Show that R is a valid conclusion from the premises $P \vee Q$, $Q \rightarrow R$, $P \rightarrow M$ and $\neg M$. 7M CO1 BL3
 - 2 a) Check whether $(P \rightarrow Q) \wedge R = (P \rightarrow Q) \vee (Q \rightarrow R)$. 7M CO1 BL3
 b) Describe in brief about Propositional logic? 7M CO1 BL2
 - 3 a) A function $f(x)$ on Z is defined by $f(x, z) = 4x - 5y$. Prove that f is not one-to-one, but on to 7M CO2 BL3
 b) Draw the Hasse diagram for the partial ordering $\{(A, B) | A \subseteq B\}$ on the power set $P(S)$, where $S = \{a, b, c\}$. 7M CO2 BL1
 - 4 a) Let $X = \{1, 2, 3, 4\}$ and a mapping $f: X \rightarrow X$ be given by $f = \{(1, 2), (2, 3), (3, 4), (4, 1)\}$. Find the composition function f^2 , f^3 and f^4 . 7M CO2 BL3
 b) Define recursion? Explain in brief about Towers of Hanoi problem? 7M CO3 BL4
 - 5 a) Explain in brief about program correctness? 7M CO3 BL4
 b) Describe in brief about Recursive algorithms? 7M CO3 BL2
 - 6 a) 25 males and 15 females are members are seated in a round table meeting. How many ways they can seated if all the females seated together? 7M CO4 BL3
 b) What is solution of the recurrence relation $a_n = a_{n-1} + 2a_{n-2}$ with $a_0 = 2$ and $a_1 = 7$ 7M CO4 BL1
 - 7 a) Solve the $a_n - 6a_{n-1} + 8a_{n-2} = n \cdot 4$ where $a_0 = 8$ and $a_1 = 22$? 7M CO4 BL3
 b) Prove that isomorphism is an equivalence relation on diagraphs? 7M CO5 BL3
 - 8 a) Define Binary search Tree? Explain in brief about Tree Traversal techniques with example? 7M CO5 BL4
 b) Define Spanning Tree? Explain in brief about Kruskals algorithm with example? 7M CO5 BL4