

Reg. No:

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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
MCA I Year I Semester Regular Examinations Jan 2020
DISCRETE MATHEMATICS

Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

- 1 a Explain conjunction and disjunction with suitable Examples 6M
b What is principle conjunctive normal form? 6M
Obtain the PCNF of $(\neg P \rightarrow R) \wedge (Q \leftrightarrow P)$

OR

- 2 Using indirect method of proof, derive $p \rightarrow \neg s$ 12M
from the premises $p \rightarrow (q \vee r), q \rightarrow \neg p, s \rightarrow \neg r$ and p

UNIT-II

- 3 a Solve $a_{n+2} - 5a_{n+1} + 6a_n = 2$, with the conditions $a_0 = 1, a_1 = -1$. 6M
b Using generating function, solve $a_n = 3a_{n-1} + 2$, $a_0 = 1$. 6M

OR

- 4 Solve $a_n - 7a_{n-1} + 10a_{n-2} = 4^n$. 12M

UNIT-III

- 5 a Define semigroup, monoid and group 6M
b If $(G, *)$ is an abelian group iff $(a * b)^2 = a^2 * b^2 \quad \forall a, b \in G$. 6M

OR

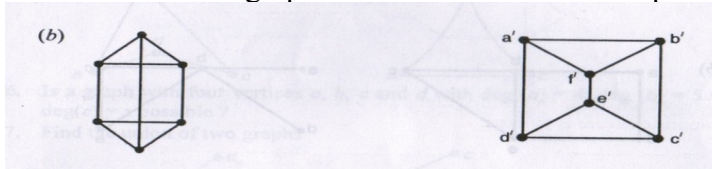
- 6 State and prove the Lagrange's theorem 12M

UNIT-IV

- 7 a Define isomorphism. Explain Isomorphism of graphs with a suitable example. 6M
b Define the following graph with one suitable examples for each graphs 6M
(i) complement graph (ii) subgraph (iii) induced subgraph (iv) spanning subgraph

OR

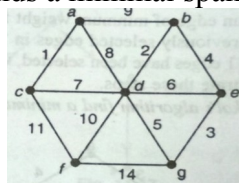
- 8 a Show that in any graph the number of odd degree vertices is even. 6M
b Show that the two graphs shown below are isomorphic? 6M

**UNIT-V**

- 9 a Define Spanning tree and explain the algorithm for Depth First Search (DFS) traversal of a graph with suitable example 6M
b Prove that a tree with n vertices has $n - 1$ edges 6M

OR

- 10 Show how Kruskal's algorithm finds a minimal spanning tree for the following graph. 12M



*** END ***