



K23P 0060

Reg. No. :

Name :

III Semester M.C.A. Degree (C.B.S.S. - Reg./Supple./Imp.)
Examination, November 2022
(2020 Admission Onwards)
MCA3C02 : THEORY OF COMPUTATION

Time : 3 Hours

Max. Marks : 60

SECTION – A

Answer **all** questions. **Each** question carries **two** marks.

1. Let $L(x, y)$ be the statement "x loves y," where the domain for both x and y consists of all people in the world. Use quantifiers to express each of these statements.
 - a) There is somebody whom Lydia does not love.
 - b) There is somebody whom no one loves.
2. Define power set and null set with the help of examples.
3. Define Bayes theorem.
4. What is random variable ?
5. Define a formal language.
6. Define Regular grammar.
7. Define Chomsky Normal Form.
8. What are the different ways of acceptance by PDA ?
9. What do you mean by LBA ?
10. What do you mean by Recursively enumerable language ? (10×2=20)

P.T.O.



SECTION – B

Answer **all** questions. **Each** question carries **eight** marks.

11. A) Define Tautology and Contradiction. Check whether the given propositional logic is a tautology or not. $((P \Rightarrow Q) \wedge P) \Rightarrow Q$.

OR

B) i) Find the sets A and B if $A - B = \{1, 5, 7, 8\}$, $B - A = \{2, 10\}$, and $A \cap B = \{3, 6, 9\}$.

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ii) Explain equivalence relation with the help of an example.

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12. A) Three coins are tossed. Describe :

i) Two events which are mutually exclusive.

ii) Two events which are mutually exclusive and exhaustive.

iii) Two events which are not mutually exclusive.

iv) Two events which are not mutually exclusive but not exhaustive.

OR

B) Explain Marginal distribution function and conditional probability density function.

13. A) Design a minimal finite automata that accepts all the strings of a's and b's where each string contains even number of a's and odd number of b's.

OR

B) Explain closure properties of regular languages.

14. A) Construct a PDA for the language $L = \{0^n 1^n \mid n > 0\}$.

OR

B) Explain in detail about CNF and GNF.

15. A) Explain Turing machine with its formal definition and example.

OR

B) Explain in detail the post correspondence problem.

(5×8=40)