

**[Total No. of Questions - 9] [Total No. of Printed Pages - 2]
(2064)**

14850

MCA 3rd Semester Examination

Theory of Computation (N.S.)

MCA-304

Time : 3 Hours

Max. Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D below and all the subparts of the questions in Section E.

SECTION - A

1. Explain the differences between Mealy and Moore Machine. (12)
2. Design a FA to accept decimal numbers divisible by 3. (12)

SECTION - B

3. State the principle of Pumping lemma. What are the applications of pumping lemma? Explain the closure properties of regular languages. (12)
4. Draw a FA with epsilon moves that accepts strings over $\Sigma = \{1, 2, 3\}$ having any number of 1's followed by any number of 2's followed by any number of 3's. (12)

SECTION - C

5. Write down the CFG for following language in CNF where $T = (a, b)$. All strings with equal number of a's and b's. (12)

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6. Design PDA for accepting $\{wcw^r w \text{ in } (0+1)^*\}$.	(12)

SECTION - D

7. Design a Turing Machine M to recognize the language $\{l^n 2^n 3^n | n \geq l\}$. (12)
8. Write Note on decidable and non decidable problems with examples. (12)

SECTION - E

9. (a) Define Instantaneous Description (ID).
 (b) Define Regular Set.
 (c) Write short note on Universal Turing Machine.
 (d) Define Mealy machine. (4×3=12)