[Total No. of Questions - 9] [Total No. of Printed Pages - 2]
(2123)

1514

MCA 3rd Semester Examination

Theory of Computation

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 Equivalence of NFA and DFA. **(12)**

2. Design a Moore machine that counts how many times 001 occurs in a long input string. **(12)**

SECTION - B

3. Explain the applications of FA. **(12)**

4. Let L = $\{0^{n!} | n >= 0\}$. Show that L is not regular. **(12)**

SECTION - C

5. Find the grammar in GNF equivalent to the grammar:

   $E \rightarrow E + T \mid T, T \rightarrow T*F \mid F, F \rightarrow (E) \mid a$ **(12)**

6. Write note on Chomsky Hierarchy of Languages. **(12)**

SECTION - D

7. Write note on :

   (a) Halting problem

   (b) Reducibility **(12)**

8. Define Turing Machine. Explain the variants of TM. **(12)**

SECTION - E

9. (a) Write the formal definition of DFA.

   (b) Define Regular Language.

   (c) Define Recursive and recursive enumerable languages.

   (d) Define Moore Machine. **(4×3=12)**