1785

MCA 3rd Semester Examination

Theory of Computation (NS)

MCA-304

Time : 3 Hours   Max. Marks : 60

e 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 from each of the sections A, B, C & D below and all subparts of the questions in section E.

SECTION - A

1. Construct a DFA for the following:

    (a) All strings that contain exactly 4 zeroes.

    (b) All string that don't contain the substring 110. (2×6=12)

2. Write a note on Mealy and Moor machine.   (12)

SECTION - B

3. Prove that a balanced parenthesis is not a regular language.
                                                                (12)

4. Explain in detail application of finite automata.   (12)

SECTION - C

5. Explain in detail the ambiguity in context free grammar.   (12)

6. Construct a context free grammar for the languages $L(G1)=\{a^i b^{2i}/I>0\}$ and $L(G2)=\{a^n b a^n /n>0\}$.   (12)

[P.T.O.]

SECTION - D

7. (a) Discuss in detail about universal Turing machine.   (6)

    (b) Prove that halting problem is undecidable.   (6)

8. Prove that the union and intersection of two recursive languages are also recursive.   (12)

SECTION - E

9. (a) What is the difference between DFA and NFA?

    (b) Explain how DFA process strings.

    (c) Define transition diagram.

    (d) Define Moore Machine.

    (e) Define Regular language.

    (f) What is undecidability?   (6×2=12)