

MCA-18
December – Examination 2021
Master of Computer Application
(III Year) Examination
Formal Language and Automata
Paper : MCA-18

Time : 1½ Hours]

[Maximum Marks : 80

Note :- The question paper is divided into two Sections A and B. Write answers as per the given instructions.

Section-A

4×4=16

(Very Short Answer Type Questions)

Note :- Answer any *four* questions. As per the nature of the question delimit your answer in one word, one sentence or maximum up to **30** words. Each question carries 4 marks.

1. (i) What are the applications of Finite Automata ?
- (ii) What is Pushdown Automata ?
- (iii) What is Parse tree ? Give an example.
- (iv) Give a formal definition of Language.
- (v) What are the null sets ?
- (vi) State halting problem.
- (vii) What do you mean by Lexical Analyzer ?
- (viii) What is Context Free Language ?

Section-B **4×16=64**

(Short Answer Type Questions)

Note :- Answer any *four* questions. Answer should not exceed **200** words. Each question carries 16 marks.

2. Define DFA. Differentiate between deterministic finite automata and non-deterministic finite automata.
3. Define the basic model of a Finite Automata.
4. Explain the pumping lemma for CFGs.

5. Explain the Turing Machine in brief. Discuss the similarities between Turing Machine and Computers.
6. Give a brief overview of the Multiple tape TM.
7. Explain the minimization of DFA with suitable example.
8. Find a reduced grammar equivalent to the grammar :

$$S \rightarrow aAa$$

$$A \rightarrow bBB$$

$$B \rightarrow ab$$

$$C \rightarrow aB$$

9. Design CFG for the following :

$$\{0^n1^n \mid n > 0\}$$