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MCA-18

June – Examination 2020

Master of Computer Application (III Year) Examination

Formal Language and Automata

Paper : MCA-18

Time : 3 Hours]

[Maximum Marks : 80

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

Section-A

8×2=16

(Very Short Answer Type Questions)

Note :- Answer all 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 2 marks.

1. (i) Which data structure is used in pushdown automata ?
- (ii) What is Grammar ?

- (iii) What are the productions ?
- (iv) Which symbol is used to represent final/accept state in NFA ?
- (v) What are the sets ?
- (vi) What is full form of PDA ?
- (vii) What do you mean by Kleene Star ?
- (viii) What is Language ?

Section-B **4×8=32**

(Short Answer Type Questions)

Note :- Answer any *four* questions. Each answer should not exceed **200** words. Each question carries 8 marks.

2. State and explain pumping Lemma.
3. What is ambiguity in a context-free grammar ?
4. Write a CFG which generates strings having an equal number of a's and b's. Also, explain with an example.
5. Explain the Halting problem in brief.
6. Give a brief overview of the NFA.
7. Explain multiple tape Turing Machine in brief.

8. What is Greibach normal form ? Write the procedure to convert CFG into Greibach normal form.
9. Explain the Polynomial-time reduction with a suitable example.

Section-C **2×16=32**

(Long Answer Type Questions)

Note :- Answer any *two* questions. You have to delimit your each answer maximum upto **500** words. Each question carries 16 marks.

10. Construct a Turing machine over $\Sigma = \{0, 1\}$ to accept the language $L = \{0^m 1^{2m} \mid m > 0\}$.
11. What is Finite Automata ? Explain the applications of Finite Automata with example.
12. What is Regular Language ? Explain various properties of Regular Language.
13. Explain the Parsing and Parse Tree with a suitable example.