

Roll No.....

Total No. of Printed Pages: [01]

Total No. of Questions: [11]

M. Sc. IT (Semester – 4th)
THEORY OF COMPUTATION
Subject Code: MITE1417
Paper ID: [220430]

Time: 03 Hours

Maximum Marks: 60

Instruction for candidates:

1. Section A is compulsory. It carries 16 marks. It consists of 4 questions of 4 marks each.
2. Section B consist of 4 questions of 8 marks each. The student has to attempt any 3 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A

(4 marks each)

- Q1. What is meant by union operation of languages?
- Q2. Derive the string aaaaaabbbb for the given context free grammar:
 $S \rightarrow aAbB$, $A \rightarrow aAa|a$, $B \rightarrow bB|b$
- Q3. Give and explain the basic model of PDA.
- Q4. What is Context Sensitive Language? Give its one example.

Section – B

(8 marks each)

- Q5. Design an automata accepting strings generated over $\{a, b\}$ and starting with ab.
- Q6. Explain pumping lemma for CFG.
- Q7. Convert the CFG in the question 2 above into Chomsky Normal Form.
- Q8. What is Chomsky Hierarchy and its importance?

Section – C

(10 marks each)

- Q9. Design a DFA for accepting strings generated over $\{0, 1\}$ having even number of 0's and 1's.
- Q10. Design a PDA for accepting strings of the language $\{a^{n+1}b : n \text{ is a natural number}\}$ generated over $\{a, b\}$.
- Q11. Design a Turing Machine to accept strings generated over $\{2, 3\}$ and ending with 322.