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Total No. of Printed Pages: [01]

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B. Tech. (AI & Machine Learning) (Semester – 5th)
FORMAL LANGUAGE AND AUTOMATA THEORY
Subject Code: BCSED2512
Paper ID: [22113117]

Time: 03 Hours

Maximum Marks: 60

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 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

(2 marks each)

Q1. Attempt the following:

- a) What is a grammar?
- b) What are the operators used in regular expressions?
- c) What is pumping lemma for regular language?
- d) What is CNF?
- e) What is meant by ambiguity in grammar?
- f) What is linear bounded Automata?
- g) What is recursive language?
- h) What is Universal Turing Machine?
- i) What is Rice's theorem?
- j) What is undecidability?

Section – B

(5 marks each)

- Q2. What types of string are expressed by $(0 + 1) (0 + 1)^*$?
- Q3. What is meant by closure property of CFL?
- Q4. Design a Turing Machine that accepts strings ending with a particular alphabet (to be chosen by you).
- Q5. Design an Automata accepting the string $(0 + 1) (0 + 1)^*$.
- Q6. What is Church's Turing thesis?

Section – C

(10 marks each)

- Q7. What is minimization of an Automata? Explain with an example.
- Q8. How will you put a CFG to CNF? Explain with example.
- Q9. How does a PDA work? Explain.