Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Artificial Intelligence & Machine Learning) / (CSE) (Sem.–5)

FORMAL LANGUAGE & AUTOMATA THEORY

Subject Code : BTCS 502-18

M.Code : 93172

Date of Examination : 20-12-22

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. **Write briefly :**

   a. L is a subset of Σ*(T/F). Justify

   b. Define Tuples used in Grammar.

   c. I={0,1}, Write RE for the alphabet whose 9th symbol from the L.H.S is 1.

   d. Define Derivation Tree

   e. Define instantaneous description of a Turing Machine

   f. Why do we need different normal forms for CFG?

   g. How PDA is different from FA?

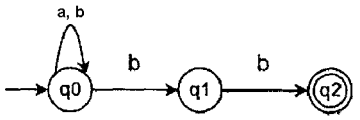
   h. Define Regular grammar.

   i. What is halting problem in TM?

   j. Define NP Complete problem.

SECTION-B

2.



3. What are regular expressions? Can regular expressions be converted in to Finite Automation? Justify your answer with the help of example.

4. Discuss Hamiltonian Path and Hamiltonian Cycle with the help of a suitable example.

5. Discuss Push down Automation in detail. Design PDA for {wcwT | w = {a,b}*

6. Discuss the difference between Decidability and Undecidability problems.

SECTION-C

7. Explain the concept of Turing Machine. Construct a TM for L = {0nln2n | n≥l}.

8. What is a Context Free Grammar? Prove that If L1 and If L2 are two context free languages, their union L1 U L2 will also be context free.

9. Write a short note on :

   a. Church Turing Thesis

   b. Linear Bounded Automation.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.