M.Sc. DEGREE EXAMINATION,APRIL 2020
I Year I Semester
Theory of Computation

Time : 3 Hours   **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. State the difference between NFA and DFA.

2. List the additional forms of proof.

3. Construct NFA for the regular expression a^*b^*.

4. What is a regular expression?

5. Mention the application of CFG.

6. What is ambiguous grammar?

7. What are the two normal forms?

8. State pumping lemma theorem.

9. Give two "UNDECIDABLE" problems.

10. What is post's correspondence problem?

11. State the definition of Pushdown automata.

12. What is Turing machine?

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. Discuss the importance of NFA with $\in$ - transition.

14. Explain regular expression with example.

15. Construct the PDA accepting the language $L = (ab)n|n >= 1$ by empty stack.

16. Prove that CFLs are not closed under intersection.

17. Explain undecidability with respect to post correspondence problem.

18. Find the context free languages for the following grammars
    $S \rightarrow aSb|aAb, A \rightarrow bAa, A \rightarrow ba$

19. Construct a DFA that accepts the following. All strings w over 0,1 such that the number of 1's in w is divisible by 3.

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. Explain in detail about Deterministic Finite State Automata with example.

21. Prove any two closure properties of regular languages.

22. Explain Languages accepted by PDA with illustration.

23. Write briefly about the programming techniques for Turing Machine

24. State and prove that the halting problem is undecidable.

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