B.Sc. DEGREE EXAMINATION,APRIL 2019
III Year VI Semester
FORMAL LANGUAGES AND AUTOMATA THEORY

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

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

Answer any **TEN** questions

1. Define Context - sensitive language
2. Define Context free grammar.
3. Define the union and product of L1 and L2.
4. Define reversal or reflection.
5. Define word or string or sentence and give examples.
6. Define phrase structure language.
7. Define transition diagram.
8. Define regular set.
9. State Ogden's Lemma
10. Define regular expression.
11. Define finite control.
12. Prove that n is no greater than the number of states of the smallest FA accepting L.

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

Answer any **FIVE** questions

13. Construct context – free grammar to generate a context free language where N ={S}, T = {a,b} and P = S $\rightarrow$ aSb and S $\rightarrow$ ab.
14. Prove that every context sensitive language is generated by a context sensitive
15. Construct context – sensitive grammar to generate a context sensitive language. Let G = (N, T, P, S) where N ={S, B}, T = {a,b,c} and P = S $\rightarrow$aSBc , S$\rightarrow$ abc, cB$\rightarrow$Bc, Bb $\rightarrow$bb.
16. Show that L be a set accepted by a nondeterministic finite automaton then there exists a deterministic finite automaton that accepts L.
17. Show that r be a regular expression then there exist an NFA with ϵ - transitions that accepts L(r)

18. State any two applications of pumping lemma.
19. State the pumping lemma for the CFL

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

Answer any **THREE** questions

20. Let L = {w/w is in {a,b}+ and w consists of an even number of a's and an even number of b's generate the regular grammar and give reason.
21. Prove that the families of PSL, CSL, CFL and RL are closed under product.
22. Let L = {w/w is in {a,b}+ and w does not contain two consecutive a's } generate the regular grammar and give reason.
23. Prove that equivalence of NFA's with and without ϵ - moves.
24. State and prove Ogden's Lemma.

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