BT-5/D-22   **45261**

THEORY OF COMPUTATION
Paper–PC-CS-AIDS-301A

Time : Three Hours]   [Maximum Marks : 75

Note : Attempt *five* questions in all, selecting at least*one* question from each unit. Each question carry equal marks.

UNIT-I

1. (a) If L is accepted by an NFA with ε-transition then show that L is accepted by an NFA without ε-transition.

   (b) Construct a DFA equivalent to the NFA. M = ({p, q, r}, {0, 1}, δ, p, {q, s}). Where δ is defined in the following table.

δ	0	1
p	{q,s}	{q}
q	{r}	{q,r}
r	{s}	{p}
s	–	{q}

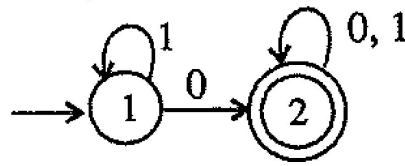   (7+8=15)

2. (a) Write short notes on precedence of Regular expression operators. Construct an NFA equivalent to the regular expression (0+1)*(00+11)(0+1)*.

(b) Write about equivalence and minimization of NFA and DFA automata. Obtain the regular expression that denotes the language accepted by the following DFA.

(7+8=15)

UNIT-II

3. (a) Let G be the grammar S->aB/bA, A->a/aS/bAA, B->b/bS/aBB. Obtain parse tree for the string aaabbabbba.

(b) Discuss closure properties of CFL.

(c) Convert the grammar S->AB, A->BS/b, B->SA/a into Greibach Normal Form. (5+5+5=15)

4. (a) Discuss Pumping lemma along with its advantages. State Pumping Lemma for Context free languages.

(b) Define a Regular set using pumping lemma. Show that the language L = {$0i^2$ / i is an integer i >= 1} is not regular. (7+8=15)

UNIT- III

5. Write a detailed note on the representation, equivalence and designing of Mealey and Moore machines. (15)

6. What are the different ways in which a PDA accepts the language? Define them. Is it true that non-deterministic PDA is more powerful than that of deterministic PDA? Justify your answer and explore the potential applications of PDA. (15)

UNIT- IV

7. (a) What is Turing machine? Explain in detail : "The Turing Machine as a Computer of integer functions".

   (b) Explain time and tape complexity measures of Turing machines.   (7+8=15)

8. (a) When a problem is said to be decidable or undecidable? Give an example of decidable and an undecidable.

   (b) What is Post's Correspondence problem (PCP)? Discuss.
                                                                 (7+8=15)

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