[Total No. of Questions - 9] [Total No. of Printed Pages - 3]
(2064)

14643

B. Tech 4th Semester Examination

Theory of Computation (N.S.)

CS-222

Time : 3 Hours **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five question in all selecting one question each from sections A, B, C, D and Section E is compulsory. Each question carry 20 marks.

SECTION - A

1. (a) (i) CNF and GNF Notation.

   (ii) Turing machine and its application.

   (b) Construct a DFA that will accept strings on {a, b} where the number of b's divisible by 3. (20)

2. Construct a finite automaton that accepts the set of all strings in {a, b, c}* such that the last symbol in input string appears earlier in the string. (20)

SECTION - B

3. Construct a NFA for regular expression (a/b)*abb and draw its equivalent DFA. (20)

4. (a) Construct a CFG accepting L={ambn/n}

(b) Convert the grammar with productions into CNF A→ Bab/λ. (20)

SECTION - C

5. (a) Explain Turing machine. What is the physical significance of Turing Machine?

   (b) Show there exists a TM for which the halting problem is unsolvable. (20)

6. (a) Prove that the function fadd (x,y)=x+y is a primitive recursive

   (b) Explain Mealy and Moore machine with examples. (20)

SECTION - D

7. (a) Consider the following grammar; find the Left most derivation, Right most derivation and construct a derivation tree whose yield is aabbaa. And also find the grammar is ambiguous or not? S→aAS | a
   A→SbA| SS | ba

   (b) Construct a DFA that accept all the string of even length contains odd no. of 0's over the alphabet (0,1). (20)

8. (a) State and explain the Chomsky classification.

   (b) Design a Turing machine for $L=\{a^n b^n c^n \mid n>0\}$ (20)

SECTION - E

9. This section is compulsory. Each question carry 2 marks

   (a) State the difference between NFA and DFA.

   (b) Construct the DFA for all string that do not contain the substring 110.

(c) Is the grammar below ambiguous, S→SS|(S)|S(S)S|E?

(d) Explain Turing machine.

(e) What is context free grammar?

(f) Define pushdown automata.

(g) Define Automaton?

(h) What is the principle of mathematical Induction?

(i) Construct a DFA for the regular expression aa*/bb*..

(j) Construct a DFA over Σ=(a,b) which produces not more than 3 a's. (10×2=20)