(2066)

16054(J)   I-16

B. Tech 4th Semester Examination

Theory of Computation (NS)

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 : Candidates are required to attempt five questions in all selecting one from each of the sections A, B, C & D. And all subparts of the questions in section E.

SECTION - A

1. Construct a DFA for the following:

    (a) All strings that contain exactly 4 zeroes.

    (b) All string that don't contain the substring 110.   (20)

2. Explain the Difference and Equivalence between NFA and DFA
                                                                (20)

SECTION - B

3. State and Prove pumping lemma for Context free languages.
                                                                (20)

4. Write note on (a) Myhill-Nerode theorem (b) Minimization Algorithm.   (20)

SECTION - C

5. Write a note on (a) Regular set (b) Context sensitive grammar (c) Pumping lemma (d) Parsing   (4×5=20)

[P.T.O.]

6. (a) State the two normal forms and give an example.

    (b) State the Pumping lemma for CFG.

    (c) Write the formal definition of PDA.

    (d) Define ambiguity regular grammar.   (4×5=20)

SECTION - D

7. (a) Explain how the multiple tracks in a Turing Machine can be used for testing given positive integer is a prime or not?
                                                                (10)

    (b) Explain in detail:" The Turing Machine as a Computer of integer functions".   (10)

8. (a) State the techniques for Turing machine construction? Illustrate with a simple language   (10)

    (b) Explain Chomsky Hierarchies of Grammar.   (10)

SECTION - E

9. (a) List any two ways of theorem proving.

    (b) Define transition diagram.

    (c) Differentiate between recursive and recursively enumerable language.

    (d) What is the need for finite automata?

    (e) Design a Turning machine to compute n mod 2.

    (f) Define DFA.

    (g) Application of Pushdown Machines

    (h) Primitive recursive function.   (2½×8=20)