B.Sc. (I.T.) - III (CBCS Pattern) Sem-V

002 - Paper-I (Elective-II) : Theory of Computational Analyzer

P. Pages : 2 **GUG/W/22/13129**

Time : Three Hours * 1 2 4 6 * Max. Marks : 40

Notes : 1. All questions are compulsory and carry equal marks.
2. Draw neat and labelled diagrams wherever necessary.
3. Avoid vague answers and write answers relevant and specific to questions only.

Either:

1. a) List all the elements of Finite Automaton. Explain each element in detail. **4**

b) Construct a FA for the set of all strings ending with '00' over $\Sigma = \{0, 1\}$ **4**

OR

c) "Each DFA is NFA but vice versa is not compulsorily true". Explain. **4**

d) Consider the Finite State Machine whose transition function δ is given by transition table given as follows. **4**

States	Input	
Q	0	1
q_0	q_2	q_1
q_1	q_3	q_0
q_2	q_0	q_3
q_3	q_1	q_2

Give the entire sequence of the state for the input string x = 110101 and y = 110010

Either:

2. a) What is GNF? Explain how to convert a CFG to GNF with suitable example. **4**

b) What is Derivation Tree? Explain in detail. **4**

OR

c) Define the term Useless Symbol. Explain how to remove Useless Symbol with suitable example. **4**

d) Prove that $L = \left\{ a^{2n} \middle| n \geq 1 \right\}$ is regular. **4**

Either:

3. a) Explain working of Turing Machine in detail. **4**

b) Design a PDA for accepting a language $L = \left\{ 0^n 1^{2n} \middle| n >= 1 \right\}$ **4**

OR

c) Write a note on: **4**

i) Multi Tape Turing Machine

ii) NDPDA

d) Prove that $L = \left\{ a^i b^j c^k \middle| i < j < k \right\}$ is not a CFL **4**

Either:

4. a) Explain the Compilation process of computer executable language. **4**

b) Generate the three – address code for following with statement. **4**

While $(A > B \& A <= 2 * B - 5)$

{

A = A +B

}

OR

c) Describe the function of Code Optimization in detail. **4**

d) Draw the Transition Diagram for Identifier. Explain. **4**

5. Attempt **all** the questions.

a) Define NDFA. **2**

b) Define Chomsky Normal Form. **2**

c) Give the formal definition of PDA **2**

d) What is Translator? Explain. **2**

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