B.Sc. - III (Information Technology) (CBCS Pattern) Semester-V

# 002 - Elective-II - Paper-I - Theory of Computational Analyzer

P. Pages : 2 **GUG/S/25/13129**

Time : Three Hours * 0 2 7 5 * Max. Marks : 40

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Notes : 1. All questions are compulsory and carry equal marks.
2. Draw neat and labelled diagram and use supporting data whenever necessary.
3. Avoid vague answer and write specific answer related to question.

**Either :**

**1.** a) List the various types of FA. Explain any two in detail. **4**

b) Construct NFA for the following RE. **4**

R = (0+11) 0*1

**OR**

c) What is the acceptance of string by Finite Automation? Explain with suitable examples. **4**

d) Construct DFA for the set of all strings ending with '01' over $\Sigma = \{0,1\}$. **4**

**Either :**

**2.** a) What is GNF? Explain with suitable example. **4**

b) Find a grammar having no useless symbol for the following CFG. **4**

$S \rightarrow AB \mid a$

$A \rightarrow a$

**OR**

c) Define Ambiguity in grammar. Explain how to prove grammar as Ambiguious with suitable example. **4**

d) Obtain the Chomsky Normal form equivalent to the following CFG. **4**

$S \rightarrow a\,A\,b\,B$

$A \rightarrow a\,A \mid a$

$B \rightarrow bB \mid b$

**Either :**

**3.** a) What is the acceptance of string by PDA? List and explain its types. **4**

b) Prove following language is not a CFL. $L = \{a^n b^n c^n \mid n \geq 1\}$ **4**

**OR**

c) Explain the following in detail. **4**

i) Multi-tape TM.

ii) Deterministic push Down Automation.

d) Construct PDA for the following CFL. **4**

$$L = \left\{ a^n b^{2n} \mid n \geq 1 \right\}$$

**Either :**

**4.** a) Explain syntax Analysis in detail. **4**

b) Write a note on **4**

i) Constant folding

ii) Constant Propagation.

**OR**

c) What is Book keeping? Explain. **4**

d) List and explain the types of compiler. **4**

**5.** Solve all the questions.

a) Define Finite Automation. Give its formal definition also. **2**

b) What is Derivation? Explain Derivation tree with suitable example. **2**

c) Give the formal definition of Turing machine. **2**

d) What is induction variable? Explain. **2**

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