

**001 Paper-I (Elective-I) : Theory of Computational Analyzer**

P. Pages : 1

GUG/W/22/13076

Time : Three Hours



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) Explain the working of finite Automation in detail. 4  
 b) Construct a FA for the set of all strings containing at least three consecutive zeros anywhere in the string over  $\Sigma = \{0,1\}$  4

**OR**

- c) What are the types of FA? List all and explain any one in detail. 4
- d) Construct a NFA for Regular Expression  $R = (0+1)^*01$  4

**Either:**

2. a) What is Chomsky Normal Form? Explain how to convert a CFG to CNF with suitable example. 4  
 b) What is Parse Tree? Explain in detail. 4

**OR**

- c) What is Useless Symbol? Explain how to remove Useless Symbol from given Grammar. 4
- d) Prove that  $L = \{a^i b^j \mid j = i^2\}$  is not regular. 4

**Either:**

3. a) Draw and explain the model of PDA in detail. 4  
 b) Design a PDA for accepting a language  $L = \{a^n b^n \mid n \geq 1\}$  4

**OR**

- c) Write a note on 4  
     i) Language accepted by empty stack    ii) Language Accepted by final State
- b) Prove that  $L = \{0^n 1^n \mid n \geq 1\}$  is not a CFL 4

**Either:**

4. a) Explain the structure of compiler in detail. 4  
 b) Draw the Transition Diagram for Constant. Explain. 4

**OR**

- c) Describe the working of code Optimization in detail. 4
- d) Explain the Error Handling in detail. 4

5. Attempt all the Questions

- a) Define Finite Automation. 2
- b) Define Context Free Grammar. 2
- c) Give the formal definition of Turing Machine. 2
- d) Define Compiler. 2

\*\*\*\*\*