B.C.A.- III (CBCS Pattern) Semester-V

001 - Elective-I Paper-I - Theory of Computational Analyzer

P. Pages : 2 **GUG/S/25/13076**

Time : Three Hours * 0 1 9 0 * Max. Marks : 40

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) Define DFA and NFA. Differentiate between DFA and NFA. **4**

b) Construct a FA for the set of all strings containing atleast three consecutive 0's anywhere in the string over $\Sigma = \{0,1\}$. **4**

OR

c) Draw the block diagram of FA. Explain the function of each unit in detail. **4**

d) Construct a DFA equivalent to MFA $M = (\{p,q,r,s\},\{0,1\},\delta,\rho,\{s\})$ where δ is as follows- **4**

Q	I/P	
	0	1
p	p, q	p
q	r	r
r	s	-
s	s	s

Either:

2. a) What is Ambiguous grammar? Explain how to remove ambiguity from given grammar with suitable example. **4**

b) Find a grammar in CNF equivalent to- **4**
$S \rightarrow aAbB$
$A \rightarrow aA / a$
$B \rightarrow bB / b$

OR

c) Define Greibach Normal form. Explain how to convert a grammar to GNF with suitable example. **4**

d) Find a CFG with no useless symbol equivalent. **4**
$S \rightarrow AB / a$
$A \rightarrow a$

Either:

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

b) Prove the following language is not a CFL **4**
L = {the set of all strings containing equal no's of a's, b's & c's}

OR

c) Write a detail note on- **4**

i) Multi Head Turing Machine.

ii) Non-Deterministic Turing machine.

d) Construct PDA for the following CFL. **4**
$L = \left\{ a^n b^{2n} \middle| n \geq 1 \right\}$

Either:

4. a) Explain Intermediate code generation in detail. **4**

b) Describe the following with suitable example- **4**
i) Constant folding
ii) Constant propagation

OR

c) Explain Lexical Analysis in detail. **4**

d) What is Parse Tree? Explain how to draw parse tree with suitable example. **4**

5. Solve all the questions.

a) Define the acceptance of string by finite Automation. **2**

b) Give the theoretical and formal definition of context free Grammar. **2**

c) What is PDA? Give the formal definition of PDA. **2**

d) Define compiler. Draw the block diagram of compiler. **2**

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