

B.Sc.- III (Information Technology) CBCS Pattern Semester-V
002 - Elective-II - Paper-I : Theory of Computational Analyzer

P. Pages : 2
 Time : Three Hours



GUG/W/23/13129
 Max. Marks : 40

- Notes :
1. All questions are compulsory and carry equal marks.
 2. Draw neat and labelled diagram wherever necessary.
 3. Avoid vague answer and write specific and related answers to questions.

Either:

1. a) Draw block diagram of FA. List its element and explain its working also. 4
- b) Construct NFA for the following RE 4
 $R = 01^*+1$

OR

- c) Write a note on- 4
 - i) 2DFA
 - ii) NFA with ϵ -moves
- d) Construct DFA equivalent to the MFA 4
 $M = (\{p, q, r, s\}, \{0, 1\}, \delta, p, \{q, s\})$
 Where δ is as follows.

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

Either:

2. a) Let $G = (\{S, A\}, \{a, b\}, P, S)$ be the grammar where P consists of- 4
 $S \rightarrow aAs \mid a$
 $A \rightarrow Sba \mid ba \mid SS$
 Find
 1) Left most Derivation
 ii) Right most Derivation for the string $w = aabbaa$
- b) What is useless symbol? Explain how to remove it from grammar with example. 4

OR

- c) Find a equivalent GNF for following grammar. 4
 $S \rightarrow AA \mid 0$
 $A \rightarrow SS \mid 1$

- d) Prove following language is not Regular. 4
 $L = \{0^n 1^n / n \geq 1\}$

Either:

3. a) Construct PDA for following CFL. 4
 $L = \{a^m b^n c^m / m, n \geq 1\}$

- b) Write note on- 4
i) Multitape TM ii) Multihead TM

OR

- c) Explain the working of PDA in detail. 4
d) Construct TM to find 2's complement of given binary no. 4

Either:

4. a) Explain how to generate intermediate with suitable example. 4
b) Describe error handling phase in detail. 4

OR

- c) Write a note on- 4
i) Constant folding
ii) Constant propagation
d) Explain syntax analysis in brief. 4

5. Solve all the questions.
- a) Define finite Automation. 2
b) Explain Chomsky Normal form. 2
c) Define Turing machine formally. 2
d) Define phase and pass. 2
