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

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

P. Pages : 2 **GUG/W/24/13129**

Time : Three Hours * 4 9 6 8 * 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 finite Automation. List and explain the working of each element of FA. **4**

b) Construct DFA equivalent to NFA where M=({p, q, r, s}, {0, 1} δ, p, {s}) where δ is as follows. **4**

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

OR

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

i) Two way deterministic finite Automaton

ii) NFA with $\in$ moves.

d) Construct NFA for the following R.E. **4**

$R = 01^* + 1$.

Either:

2. a) What is Useless Symbol? Explain how to find a grammar having no useless symbol with suitable example. **4**

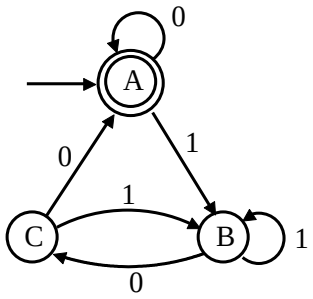
b) Prove following language is not Regular. **4**

$L = \{a^p \mid p \text{ is prime}\}$

OR

c) Define Chomsky Normal form. Explain how to convert a CFG to CNF with suitable example. **4**

d) Obtain Regular expression for the following finite Automation. **4**



Either:

3. a) Explain the working of Turing machine with its block diagram. **4**

b) Prove following language is not a CFL **4**

$L = \{a^i\ b^j \mid j = i^2\}$

OR

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

i) Multi Head Tm. ii) Two way infinite tape Tm.

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

$L = \{a^n\ b^m\ c^n \mid m, n \geq 1\}$

Either:

4. a) Draw and explain the transition diagram for Identifier and constant. **4**

b) Explain code optimization in detail. **4**

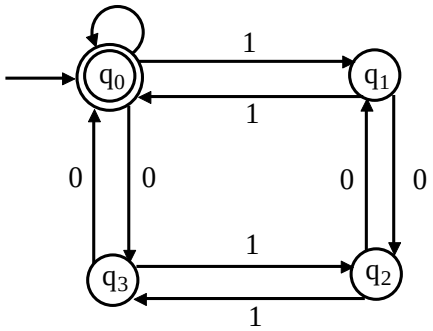
OR

c) Explain the structure of compiler in detail. **4**

d) Describe Error Handling in detail. **4**

5. Solve all the questions.

a) Consider a FA M = $(\{q_0, q_1, q_2, q_3\}, \{0,1\}, \delta, q_0, \{q_0\})$ where δ is given in following transition diagram. **2**



Check whether w = 010010 is accepted or not.

b) Define CFG. Give the formal definition also. **2**

c) What is PDA? Give its formal definition too. **2**

d) Explain the Role of syntax Analysis. **2**

****