4E1216

Roli No. _____

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# 4E1216

## B. Tech. IV - Sem. (Main) Exam., May - 2019

## PCC Computer Sc. & Engg.

## 4CS4 – 06 Theory of Computation

## CS, IT

**Time: 3 Hours** **Maximum Marks: 120**

*Instructions to Candidates:*

***Attempt all ten questions from Part A, five questions out of seven questions from Part B and four questions out of five from Part C.***

*Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.*

*Use of following supporting material is permitted during examination. (Mentioned in form No. 205)*

1. NIL

2. NIL

## PART – A

**(Answer should be given up to 25 words only)** **[10×2=20]**

**All questions are compulsory**

Q.1 What is sets and subsets?

Q.2 What are graphs?

Q.3 What is Binary tree?

Q.4 What is finite automata?

Q.5 What is NOFA?

Q.6 What is Moore Machine?

Q.7 What is Turing Machine?

Q.8 What is context free grammar?

Q.9 What is vertex cover problem?

Q.10 What is Universal Turing Machine?

# PART – B

**(Analytical/Problem solving questions)** **[5×8=40]**

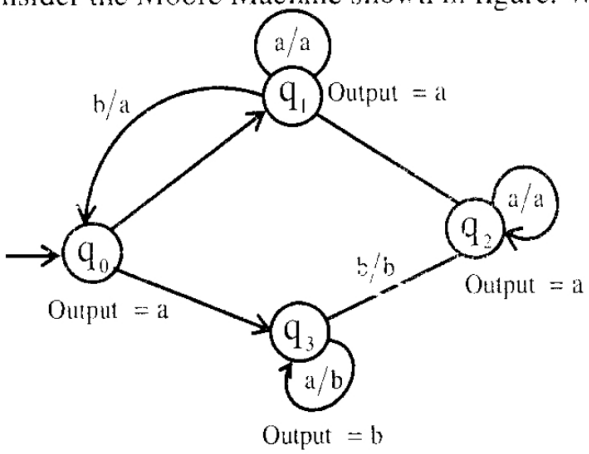
**Attempt any five questions**

Q.1 Explain the difference between Deterministic and non-deterministic finite automation.

Q.2 Design a FA which checks whether the given binary number is even.

Q.3 Check whether the strings abb, aba and abb abb are accepted by transition graph or not.

Q.4 Consider the Moore Machine shown in figure. What is the output for the input ababa?




Q.5 Convert the following Moore Machine into Mealy Machine:

| State | Input | | Output |
|---|---|---|---|
| | a | b | |
| → $q_0$ | $q_1$ | $q_3$ | 1 |
| $q_1$ | $q_3$ | $q_1$ | 0 |
| $q_2$ | $q_0$ | $q_3$ | 0 |
| $q_3$ | $q_3$ | $q_2$ | 1 |

Q.6 Consider the context free grammar-

S→AA

A→AAA\bA\Ab\a

Find the parse tree for the string bbaaaab

Q.7 Explain the difference between Deterministic and Non Deterministic Pushdown Automata.

# PART – C

**(Descriptive/Analytical/Problem Solving/Design Questions)** **[4×15=60]**

**Attempt any four questions**

Q.1 Example Chomsky classification of language with the help of suitable example.

Q.2 How can a pushdown automata be constructed for a given language? Explain with example.

Q.3 Explain the procedure for minimization of finite automata with example.

Q.4 Explain Turing Machine with its various way of representation.

Q.5 Explain Hamiltonian path problem.

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