

Total No. of Questions : 8]

[Total No. of Printed Pages : 2

Roll No

MCA-304

M.C.A. III Semester

Examination, December 2020

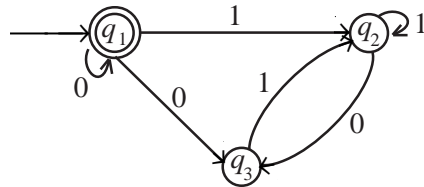
Theory of Computation

Time : Three Hours

Maximum Marks : 70

- Note :** i) Attempt any five questions.
ii) All questions carry equal marks.

- For $\Sigma = \{a, b\}$ construct DFA's that accept the sets consisting of
 - All strings with exactly one a.
 - All strings with atleast one a.
 - All strings with atleast one a and exactly two b's.
- Derive regular expression from this finite automata.



- Construct the FA for the following regular expression.
R.E $(aab^*ab)^*$
 - Describe the concept of finite state machine with output.
- Write a CFG for following
 - $ww^R \mid w \in (0, 1)^*$
 - $wcw^R \mid w \in (0, 1)^*$
 - $a^i b^i c^j d^j \mid i, j \geq 0$

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5. a) What is PDA? Explain relation of PDA with CFG.
b) Design a PDA for the language $a^n b^n$?

6. a) Explain tuple of Turing machine and function involved in a move of Turing machine in details.
b) Discuss Halting problem of TM.

7. a) Design a Turing machine that accept the language $a^n b^{n+1}$.
b) Explain decidability and undecidability.

8. Write short notes (any three):
 - i) CSG
 - ii) Linear Bounded Automates
 - iii) Regular expression
 - iv) Graphs and Trees
