SOMAIYA VIDYAVIHAR UNIVERSITY

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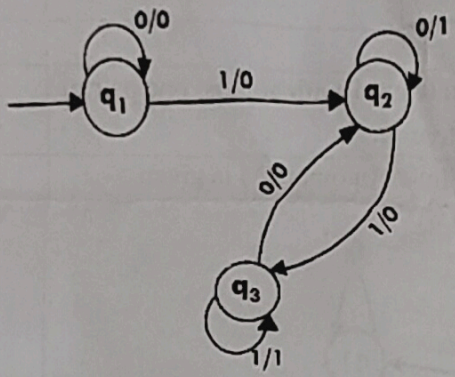
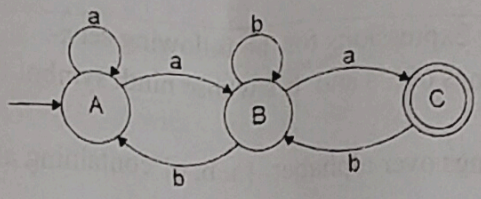
| Semester: January 2024- May 2024 | | | |
| Maximum Marks:30 | Examination: In-Semester Examination | | Duration:1hr 15 min |
| Programme code: 01<br>Programme: Computer Engineering | | Class: SY | Semester: IV (SVU 2020) |
| Name of the Constituent College:<br>K. J. Somaiya College of Engineering | | Name of the department: COMP | |
| Course Code: 116U01C404 | Name of the Course: Theory of Automata with Compiler Design | | |

| Question No. | | Max. Marks |
|---|---|---|
| Q1 | a) Construct a Moore Machine which is equivalent to the Mealy Machine M given below. Show all the intermediate steps. Draw the final transition diagram as well.   | 05 |
| | b) Design a Moore machine for input (0+1)*, if the input ends in '000', output A; if the input ends in '111' , output B; otherwise C. | 05 |
| Q2 | Attempt **any two**: | |
| | a) Find the Regular Expression for the given Finite Automata using the Arden's Theorem.   | 05 |
| | b) Design NFA from given Regular expression<br>01(1(10)*+1(11)*) | 05 |

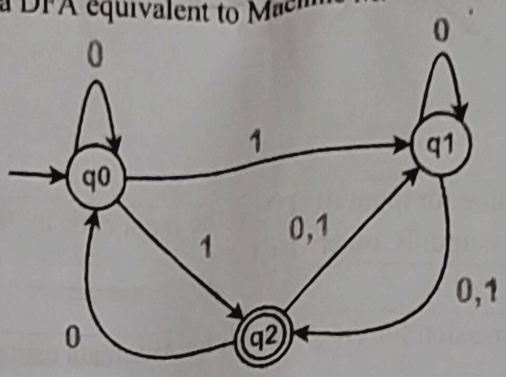
c) Construct a minimum state automaton equivalent to the finite automaton given below: 05

| Present State | Next State | |
|---|---|---|
| | 0 | 1 |
| → q0 | q1 | q5 |
| q1 | q6 | q2 |
| q2 (Final) | q0 | q2 |
| q3 | q2 | q6 |
| q4 | q1 | q5 |
| q5 | q2 | q6 |
| q6 | q6 | q4 |
| q7 | q6 | q2 |
| q8 | q8 | q8 |

**Q3** Attempt **any two**:

a) Design a DFA accepting the set of all strings on 0 and 1 with at most one pair of consecutive 0s and at most one pair of consecutive 1s. 05

b) The transition diagram of a Non-Deterministic Finite Automata M is given below. Construct a DFA equivalent to Machine M. 05




c) Define the Regular Expressions for the following sets:- 05

I. The set of strings of a's and b's whose ninth symbol from the right end is b

II. The set of strings over alphabet {a, b, c} containing at least one a and at least one b

III. The set of strings of 0's and 1's with at most one pair of consecutive 1's

END