



VIT[®]
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

School of Computer Science and Engineering

Fall Semester 2024-25

CAT I

SLOT: D1+TD1

Programme Name & Branch: B. Tech. (BBS)

Course Name & Code: Formal Languages and Automata Theory (CBS2002)

Class Number (s): VL2024250107119

Faculty Name (s): Debi Prasanna Acharjya

Exam Duration: 90 Min.

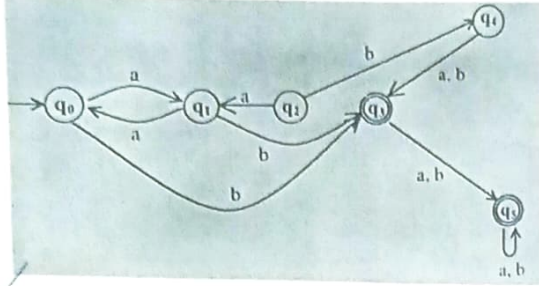
Maximum Marks: 50

General instruction(s):

Answer All Questions

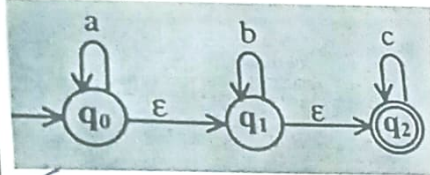
Q. No.	Question
1.	a) Obtain the grammar to generate signed or unsigned integers. Also, identify its type. (5 Marks) b) Let G be the grammar having productions $Q_0 \rightarrow aQ_0 \mid aA \mid a$, $A \rightarrow ab \mid aAb$, with Q_0 is the start symbol. Obtain the language generated by the grammar G. (5 Marks)
2.	a) Construct a deterministic finite automaton recognizing the language that begins with a 1 and ends with a 0 over an alphabet $\Sigma = \{0, 1\}$. Illustrate all the steps of construction. (5 Marks) b) Construct an equivalent deterministic finite automaton for the following non-deterministic finite automata. (5 Marks) <pre>graph LR start(()) --> q0((q0)) q0 -- "0, 1" --> q0 q0 -- 0 --> q3((q3)) q0 -- 1 --> q1((q1)) q3 -- 0 --> q4(((q4))) q1 -- 1 --> q2(((q2))) q2 -- "0, 1" --> q2 q4 -- "0, 1" --> q4</pre>

3. a) Minimize the deterministic finite automation given below. (6 Marks)

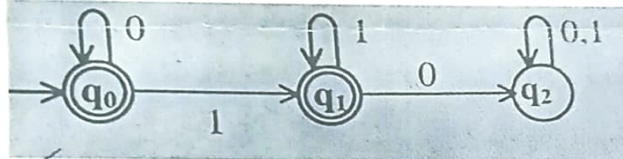


- b) Obtain the regular grammar for the reduced deterministic finite automaton. (4 Marks)

4. Convert the following NFA with null moves to deterministic finite automaton. (10 Marks)



5. a) Obtain the regular expression for the DFA given below. (5 Marks)



- b) Obtain the NFA for the regular expression $(a+b)^*aa$. (5 Marks)