

Quiz 1: CS 331 Formal Language and Automata Theory - 10 Marks MO/25 SET A

Instructions: Solve all questions. Show your work where applicable

Question 1 (2 marks)

Construct a DFA that accepts all strings from the language $L = \{\text{strings of size divisible by 3}\}$.

Draw the state diagram and provide the transition table.

Question 2 (2 marks)

Given the following DFA, determine whether the strings "1011" and "1010" are accepted or rejected. Show the path of computation for each string.

State diagram:

- States: $\{q_0, q_1, q_2\}$ Initial state: q_0 Final state: q_2
- Transitions:
 - $\delta(q_0, 0) = q_0, \delta(q_0, 1) = q_1$
 - $\delta(q_1, 0) = q_2, \delta(q_1, 1) = q_0$
 - $\delta(q_2, 0) = q_2, \delta(q_2, 1) = q_2$

Question 3 (1 mark)

In a DFA with alphabet $\Sigma = \{a, b, c\}$, what is the maximum number of transitions that can originate from any single state?

Question 4 (5 mark) Find the Minimum Automata: (Use Table Filling / Equivalence method)

State / Σ	a	b
$\rightarrow q_0$	q_1	q_2
q_1	q_4	q_3
q_2	q_4	q_3
$*q_3$	q_5	q_6
$*q_4$	q_7	q_6
q_5	q_3	q_6
q_6	q_6	q_6
q_7	q_4	q_6