COMSATS Institute of Information Technology

Abbottabad

Department of Computer Science

Mid Term Exam – Fall 2025

(Time allowed: 90 Minutes - Marks: 25)

CLO -1

Q1 L = {w ∈ {0,1} | w ends with "101"} Make a DFA for this language and write its 5-tuple. **(4)**

Q2. Explain the difference between Moore and Mealy machines with an example. **(4)**

Q3. Write Seven Myths by J. Anthony Hall. **(4)**

CLO-2

Q4. A small library wants to keep track of which books are borrowed by which members.
Each book can be borrowed by only one member at a time, but a member can borrow multiple books. **(4)**.
You are required to apply a Z specification technique for the library system write error case where necessary. Your specification should include:

a) A state schema that keeps track of which books are borrowed by which members.
b) An operation schema to borrow a book, ensuring that the book is not already borrowed.
c) An operation schema to return a book
d) An operation to check who has borrowed a specific book.

Q5. Required to apply z specification technique for login subsystem **(4)**
You are required to apply the Z specification for the login system write error case where necessary. Your specification should include:

a) A state schema
b) Initial schema
c) Add User
d) Change Password

CamScanner

CLO-3

Q6. You are given the following Incidence Matrix of a Petri Net: **[5]**

	T1	T2	T3
P1	-1	1	0
P2	1	-1	-1
P3	0	0	1

Draw the Petri Net corresponding to this incidence matrix and initial marking. Clearly show all places, transitions, and directed arcs
Initial marking is Mo= [1,0,1]
Analyze whether the system is live and safe

(Q) 9.