UTTARANCHAL UNIVERSITY, DEHRADUN
UTTARANCHAL SCHOOL OF COMPUTING SCIENCES
MID TERM EXAMINATION
ODD SEMESTER 2024-25
BCA | 3rd Semester
THEORY OF COMPUTATION | BCA – C302

Time: **1:15 Hour** Max. Marks: 30

Note: All questions are compulsory.

Q.1- Answer the following questions. **(1 x 6 = 6 Marks)**

Multiple Choice Questions

a) In Moore machine for n input, the output is: (CO-2, BL-1)

a. n
b. n+1
c. n+2
d. None of the above

b) Pushdown Automata accepts: (CO-3, BL-1)

a. Regular Language
b. Context Free Language
c. Context Sensitive Language
d. Recursive Language

c) Deterministic Finite Automata contains ____ tuples: (CO-2, BL-1)

a. 5
b. 6
c. 4
d. 7

State True/ False

d) An initial state can be the final state for a DFA.(CO-2, BL-2)

e) There is no need to define final states and dead states in output producing finite automata. (CO-2, BL-1)

f) The power of NFA and DFA are equal. (CO-2, BL-2)

Q.2-Write short note on any two (up to 70 words) (2 x 3 = 6 Marks)

a) State the difference between Mealy and Moore machine. (CO-2, BL-4)

b) Define regular expression with example. (CO-1, BL-1)

c) Construct a DFA over input alphabet={0, 1}, that accepts either odd number of 0's or even number of 1's. (CO-3, BL-2)

Q.3-Attempt any one of the following: **(1 x 6 = 6 Marks)**

a) Convert the given NFA into DFA. (CO-2, BL-6)

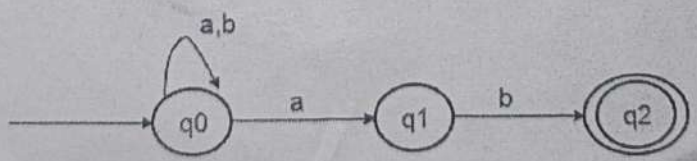


Figure 1

OR

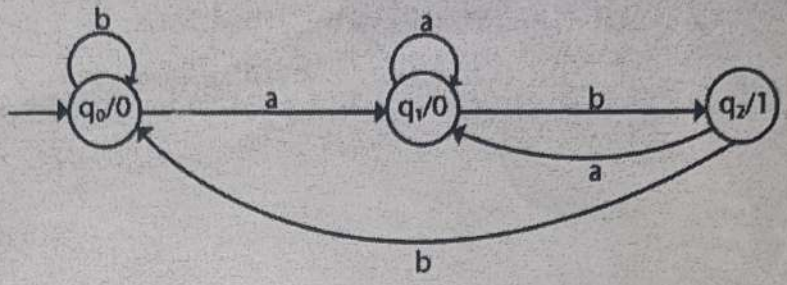
b) ~~Differentiate~~ between Mealy machine and Moore machine. (CO-2, BL-4)

Q Explain kleene closure & positive closure

Q.4- Attempt any one of the following. (1 x 6 = 6 Marks)

a) Convert following Moore machine into Mealy Machine. (CO- 2, BL-6)

6



OR

b) Explain pumping lemma for regular languages with suitable example. (CO- 2, BL-2)

Q.5- Attempt any one of the following. (1 x 6 = 6 Marks)

a) Consider the language L given by the regular expression (a+b)*b(a+b) over the alphabet{a, b}. Draw a NFA for the same and further convert it into DFA. (CO- 1, BL-6)

OR

b) Prove that the following language is not regular: (CO- 3, BL-5)
$\{w \in \{a, b\}^* \mid w = w^r\}$