

Tutorial No:3 More Examples on Finite Automata

Q:1 Solve the following MCQs with proper justification.

1 Which of the following is / are true?

- (i). $(0^*1)^* = (0+1)^*$ (ii) $(0+1)^*01(0+1)^*+1^*0^* \neq (0+1)^*$

(A) (i) only (B) (ii) only (C) (i) and (ii) (D) None of these

2 Consider the following finite state machine. Now if the language accepted by the given DFA is $(a+b(b+aa)^*ab)^*$ then the final state of the machine is, (q_0 :initial state)

- (A) q_0 (B) q_1 and q_0 (c) q_2 (D) None of these

State	$\delta(q,a)$	$\delta(q,b)$
q_0	q_0	q_1
q_1	q_2	q_1
q_2	q_1	q_0

3 Which of the following regular expression is equivalent to $(a+b)^* a(a+b)^* b(a+b)^*$

- (A) $(a+b)^* ab(a+b)^*$ (B) $a(a+b)^* b(a+b)^*$
(c) $(a+b)^* a(a+b)^* a(a+b)^*$ (D) $(a+b)^* b(a+b)^* a(a+b)^*$

4 A finite state machine with the following state table has a single input 'x' and a single output 'z' if the initial state is unknown, then the shortest input sequence to reach the final state 'c' is

- (A) 01 (B) 10 (C) 101 (D) 110

Present State	Next state z	
	X=1	X=0
A	D,o	B,o
B	B,1	C,1
C	B,o	D,1
D	B,1	C,o

5 Consider the DFA given below: Initial state is q_0 and final state is q_1

State	$\delta(q,a)$	$\delta(q,b)$
q_0	Q_1	Q_2
q_1	q_2	q_1
q_2	Q_2	Q_2

This automation accepts the language

(A) $L = \{a_n b_n \mid n \geq 0\}$

(C) $L = \{a_n b \mid n \geq 0\}$

(B) $L = \{a_n b_n \mid n \geq 1\}$

(D) $L = \{a b_n \mid n \geq 0\}$

Q.2 Draw the Finite Automata over alphabet set $\{0,1\}$ which when considered as a binary number is divisible by 5.

Q-3 Explain the Mealy Machine and Moore Machine. For the following Mealy Machine find the equivalent Moore Machine, consider q_2 is the start state.

	Input Symbol			
Current State	a		B	
	Next State	Output	Next State	Output
q ₀	q ₁	1	q ₃	1
q ₁	q ₁	0	q ₀	1
q ₂	q ₀	1	q ₂	0
q ₃	q ₃	0	q ₁	1