

 VIT-AP UNIVERSITY	Continuous Assessment Test – Winter Sem (2024-25) -JAN 2025	
	Maximum Marks: 50	Duration: 90 Mins
Course Code: CSE1008	Course Title: Theory of Computation	
Set No: 3	Exam Type : Closed Book	School: SCOPE
Date: 28-01-25	Slot: B1 + TB1 + TB3	Session: FN
Keeping mobile phone/smart watch, even in 'off' position is treated as exam malpractice		
General Instructions if any Open Book/Open Notebook/Closed Book:		
1. "fx series" - non Programmable calculator are permitted : NO		
2. Reference tables permitted : NO		

PART – A: Answer any ALL Questions, Each Question Carries 10 Marks (5×10=50 Marks)

1. Design a DFA for the language $L = \{w \mid \text{where } |w| \text{ is multiples of 3 and string starting with 'a'}\}$, $\Sigma = \{a, b\}$. Perform extended transition function for the following strings. (10 Marks)

- i) abb
ii) abab

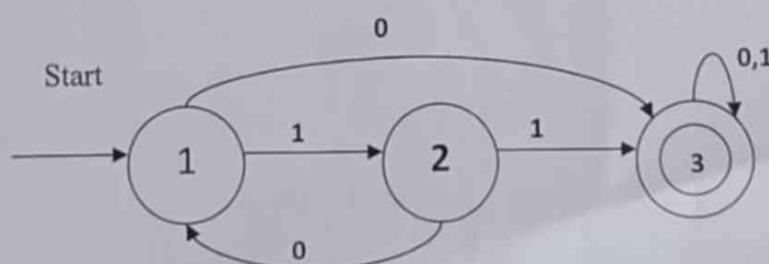
2. Consider the following ϵ -NFA and convert into DFA. (10 Marks)

Δ	ϵ	a	b	C
$\rightarrow p$	$\{q, r\}$	$\emptyset$	$\{q\}$	$\{r\}$
Q	$\{p\}$	$\{p\}$	$\{r\}$	$\{p, q\}$
$*r$	$\emptyset$	$\emptyset$	$\emptyset$	Φ

3. Consider the following DFA. Find the minimized version of the DFA. (10 Marks)

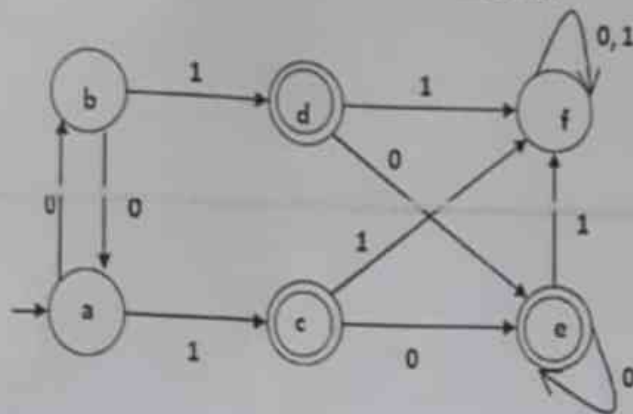
δ	0	1
$\rightarrow a$	b	a
b	a	c
$*c$	d	b
$*d$	d	a
$*e$	d	F
f	g	E
g	f	G
h	g	D

4. Consider the following DFA and find the corresponding regular expression. (10 Marks)



3. Minimize the following DFA. Write the steps for minimization clearly.

(10M)

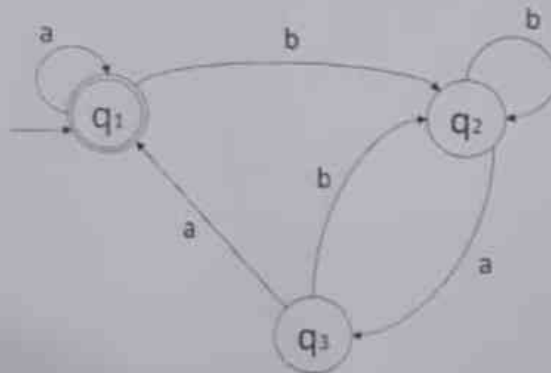


4. Construct an FA for the regular expression: $(a + b)^*(a^*bb^*a + b^*ab^*)$. Write the step-by-step construction.

(10 M)

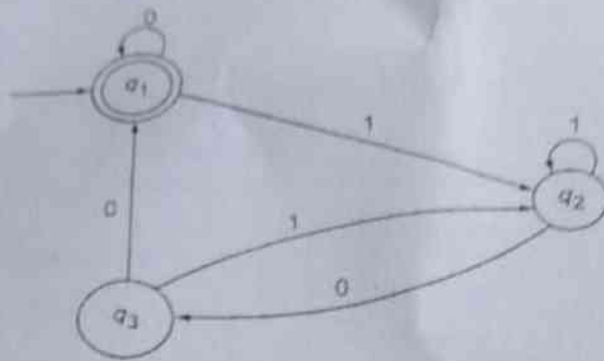
5. Convert the following FA to a Regular expression.

(10 M)



QP MAPPING

Q. No.	Module Number	CO Mapped	PO Mapped	PEO Mapped	PSO Mapped	Marks
Q1	1	1	1,2,3	PEO1, PEO4	PSO1, PSO2, PSO3	10
Q2	1	1	1,2,3	PEO1, PEO4	PSO1, PSO2, PSO3	10
Q3	1	1	1,2,3	PEO1, PEO4	PSO1, PSO2, PSO3	10
Q4	2	2	1,2,3	PEO1, PEO4	PSO1, PSO2, PSO3	10
Q5	2	2	1,2,3	PEO1, PEO4	PSO1, PSO2, PSO3	10



QP MAPPING

Q. No.	Module Number	CO Mapped	PO Mapped	PEO Mapped	PS M
Q1	1	1	1,3	1,4	1
	1	1	1,3	1,4	1
Q3	1	1	1,3	1,4	1
Q4	2	2	1,2,3	1,4	1
Q5	2	2	1,2,3	1,4	1

5. a) Find the regular expression for the language $L = \{\text{Set of odd number of 'a' follow by any number of b's followed by any number of c's}\}$ (3 Marks)
- b) Convert the following Regular expression into FA. (7 Marks)
- $R.E = (0+1)0^*101^*$

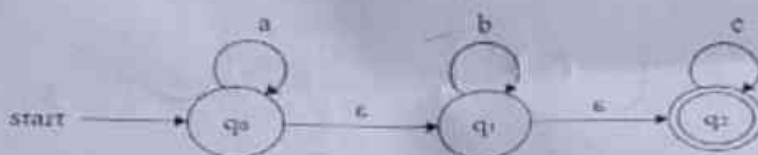
QP MAPPING

Q. No.	E/A/T	Module Number	Marks	BL	CO Mapped	PO Mapped	PEO Mapped	PSO Mapped
Q1	T	1	10	3	CO1	PO1, PO3	-	-
Q2	A	1	10	3	CO1	PO1, PO3	-	-
Q3	A	1	10	3	CO1	PO1, PO3	-	-
Q4	A	2	10	3	CO2	PO1, PO2, PO3	-	-
Q5	E	2	10	2	CO2	PO1, PO2, PO3	-	-

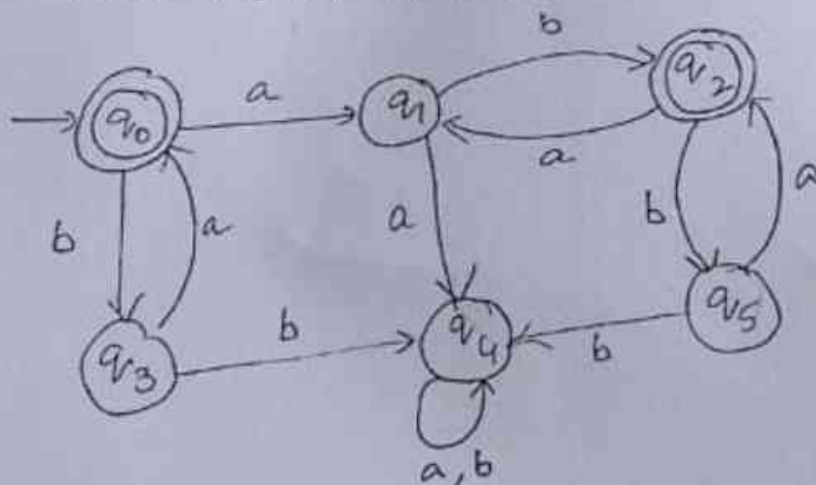
 VIT-AP UNIVERSITY	Continuous Assessment Test – Winter Sem(2024-25) -JAN 2025	
Course Code: CSE1008	Maximum Marks: 50	Duration: 90 Mins
Set No: 4	Course Title: Theory of Computation	School: SCOPE
Date: 27-01-25	Exam Type : Closed Book	Session: AN
Slot: A2 + TA2 + TAA2		
Keeping mobile phone/smart watch, even in 'off' position is treated as exam malpractice		
General Instructions if any Closed Book:		
1. "fx series" - non Programmable calculator are permitted: NO		
2. Reference tables permitted : NO		

PART – A: Answer any ALL Questions, Each Question Carries 10 Marks (5×10=50 Marks)

1. Consider a language L over {a, b}, in which each string has 'bba' as a substring. Design a non-deterministic finite automaton which recognizes L. Convert it to DFA. Write the tuple form, transition table, transition diagram. (10 M)
2. Convert the following ϵ -NFA to a DFA. (10 M)



3. Minimize the following DFA. Write the steps for minimization clearly (10 M)



4. Design a Finite Automata from the given Regular Expression $(0+1)^*(01+110)$. Write the step-by-step construction. (10 M)
5. Convert the following DFA to a Regular expression. (10 M)

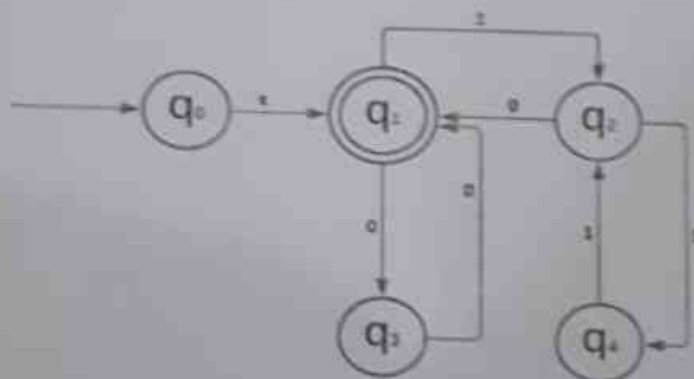
 VIT-AP UNIVERSITY	Continuous Assessment Test – Winter Sem(2024-25) -JAN 2025	
Course Code: CSE1008	Maximum Marks: 50	Duration: 90 Mins
Course Title: Theory of Computation	Set No: 5	Exam Type : Closed Book
Date: 23-11-24	Slot: A + T A1 + T A2	School: SCOPE
Keeping mobile phone/smart watch, even in 'off' position is treated as exam malpractice		
General Instructions if any Open Book/Open Notebook/Closed Book:		
1. "fx series" - non Programmable calculator are permitted : NO		
2. Reference tables permitted : NO		

PART – A: Answer any ALL Questions, Each Question Carries 10 Marks (5×10=50 Marks)

1. Design a DFA over $\{x, y, z\}$ that accepts all strings where:

The prefix of the string is xyz , suffix of the string is zyx and length of the string is at least 6.
The middle part of the string can contain zero or more occurrences of the characters a and b only. Write the Tuple form, Transition table, and Transition diagram. (3M+4M+3M)

2. Consider the following ϵ -NFA



- a. Compute the ϵ -closure of each state.
b. Convert the ϵ -NFA to NFA.

(3 M)

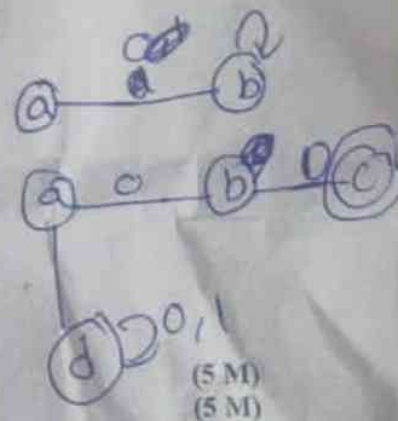
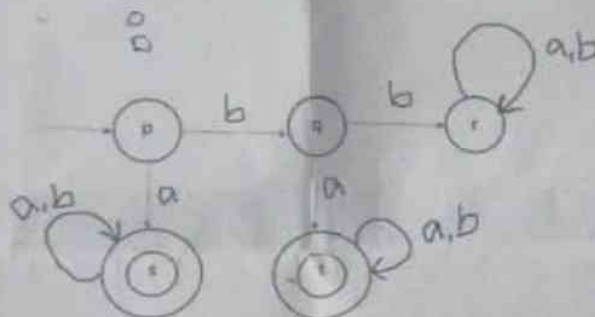
(7 M)

 VIT-AP UNIVERSITY	Continuous Assessment Test – Winter Sem(2024-25) -JAN 2025	
	Maximum Marks: 50	Duration: 90 Mins
Course Code: CSE1008	Course Title: Theory of Computation	
Set No: 2	Exam Type : Closed Book	School: SCOPE
Date: 28-01-25	Slot: B2 + TB2 + TB3	Session: AN
Keeping mobile phone/smart watch, even in 'off' position is treated as exam malpractice		
General Instructions if any Open Book/Open Notebook/Closed Book:		
1. "fx series" - non Programmable calculator are permitted : NO		
2. Reference tables permitted : NO		

PART – A: Answer any ALL Questions, Each Question Carries 10 Marks (5×10=50 Marks)

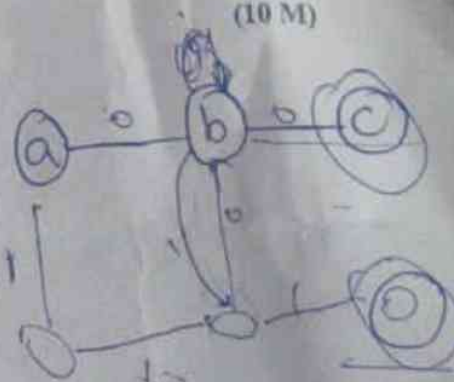
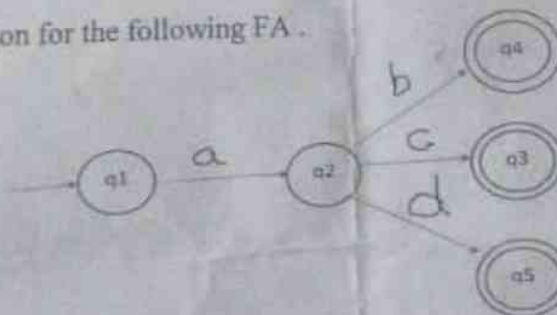
- ✗ Design non-deterministic finite automata which accept 00 or 11 at the end of a string. String must contain 0, 1 in it, e.g., 01010100 but not 0001110101. (10 M)

- ✗ A deterministic finite automaton (DFA) with alphabet $\Sigma = \{a, b\}$ is given below. Find the minimal DFA (10 M)



- ✗ Construct a DFA over $\{0,1\}$ that accepts the following.
 ✗ Binary strings such that the third symbol from the right end is 1.
 ✗ Set of all strings with three consecutive 0's

- ✗ Find regular expression for the following FA.



- ✗ Given Regular language $L1 = ((a+b)(a+b)(a+b))^*$. Find the equivalent DFA.

1 10100
1 1011