



**PRESIDENCY UNIVERSITY
BENGALURU**

SET B

**SCHOOL OF ENGINEERING
END TERM EXAMINATION - JAN 2024**

Semester : Semester III - 2022

Course Code : CSE2018

Course Name : Theory of Computation

Program : B.Tech.

Date : 10-JAN-2024

Time : 9:30AM - 12:30 PM

Max Marks : 100

Weightage : 50%

Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and non-programmable calculator are permitted.
- (iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS

5 X 2M = 10M

1. Give Definition for alphabet, string, and language
(CO1,CO2) [Knowledge]
2. What are components used for Quin tuple representation of NFA with your own example
(CO3,CO2) [Knowledge]
3. Regular Expression for the set of strings over $\{0, 1\}$ that have atleast two consecutive zeros
(CO3,CO4) [Knowledge]
4. Push Down Automata differs from a Turing machine in terms of its memory elements. Justify this statement
(CO4,CO5) [Knowledge]
5. Is there any difference between Non deterministic Finite Automata and DFA in terms of its language acceptance process?
(CO5,CO1) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS

5 X 10M = 50M

6. Explain DFA minimization process with help of given example?

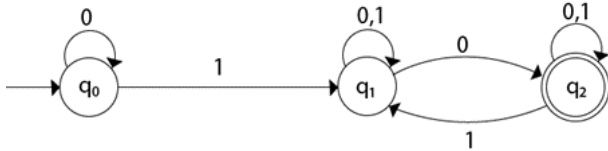
	0	1
→A	C	B
B	C	B
C	C	D
*D	D	D

(CO2,CO1) [Comprehension]

(CO3,CO2) [Comprehension]

7. Design Pushdown automata with final state to accept the language $L = \{a^n b^m : n \geq 0, m \geq 0\}$,

8. Construct equivalent DFA for the given machine



(CO5,CO4) [Comprehension]

9. List out all equivalent classes in the given machine? What is the significance of equivalence class in DFA

	0	1
→A	C	B
B	C	B
C	C	D
*D	D	D

(CO5,CO2) [Comprehension]

10. Write about DPDA in detail? Give your own example.

(CO4,CO3) [Comprehension]

PART C

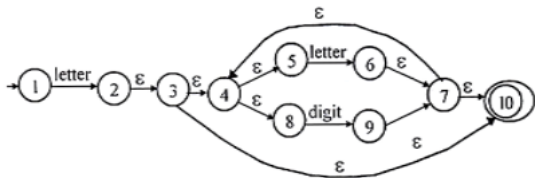
ANSWER ALL THE QUESTIONS

2 X 20M = 40M

11. Kiran have a block of cards in which he suppose to have equal number of black playing cards followed by red playing cards. Provide a suitable turing machine for kiran to validate the block of card with him

(CO4) [Application]

12. a) Represent Finite Automata equivalent to the regular expression $(ab + a)^*$
 b) Consider ϵ -NFA and identify E-closure of each state and find its equivalent DFA?.



(CO5) [Application]