PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

MID TERM EXAMINATION

Winter Semester: 2021 - 22

Course Code: CSE 2018

Course Name: THEORY OF COMPUTATION

Program & Sem: CSE,COM & 2nd

Date: 12/May/2022

Time: 10:00 AM – 11:30 AM

Max Marks: 50

Weightage: 25%

Instructions:

(i) Read the all questions carefully and answer accordingly.

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries TWO marks.   (3Qx 2M= 6M)

1. Define Positive Closure and Star Closure   (C.O.No.1) [Knowledge]

2. Define Automata. List the applications of Finite automata   (C.O.No.1) [Knowledge]

3. Define the following terms a) Language   b) Power of an alphabet

(C.O.No.1) [Knowledge]

Part B [Thought Provoking Questions]

**Answer all the Questions. Each question carries EIGHT mark.   (4Qx8M=32M)**

4. Design a DFA to accept the binary strings divisible by 4 and write the machine for the same.
(C.O.No-2) [Comprehension]

5. Define DFA. Construct the DFA accepting the language L={w101w| w belongs to (0+1)*}
(C.O.No-2) [Comprehension]

6. Define NFA. Construct the NFA accepting the strings of a's and b's having substring aba. Write the machine for the same.   (C.O.No-2) [Comprehension]

7. A password system accepts only the input symbols #,@ and $. The pattern for the password is it has to begin with # followed by any number of @,# and $ and has to end with $. The minimum length of the password is 3. Design an automaton which accepts the following pattern and also write the machine for the same.   (C.O.No-2) [Comprehension]

Part C [Problem Solving Questions]

Answer all the Questions. Each question carries TWELVE marks.   **(1Qx12M=12M)**

8. Convert the given NFA to DFA using Lazy Evaluation method.
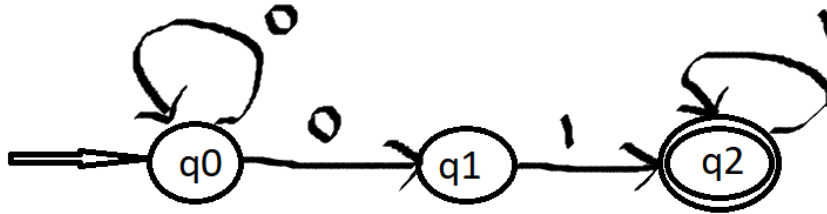
(C.O.No.2) [Application]

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF MANAGEMENT

END TERM EXAMINATION

Winter Semester: 2021 - 22

Course Code: CSE2018

Course Name: Theory of Computation

Program & Sem: BTech & II Sem

Date: 29th June 2022

Time: 01:00 PM to 04:00 PM

Max Marks: 100

Weightage:50%

Instructions:

(ii) Read the all questions carefully and answer accordingly.

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries FIVE marks.   **(4Qx 5M= 20M)**

1. Show LMD and RMD for the following grammar to generate the string aaabbabbba

    (C.O.No.3) [Application]

$$S \rightarrow aB / bA$$
$$A \rightarrow aS / bAA / a$$
$$B \rightarrow bS / aBB / b$$

2. Design an NFA that accept strings having aba as substring $\sum=\{a,b\}$

    (C.O.No.2) [Application]

3. Define PDA. Draw the block diagram of PDA   (C.O.No.4) [Knowledge]

4. Write down Regular Expression for the following Languages:

    a) $L=\{a^{2n}b^{2m+1} | m>=0,n>=0\}$
    b) Set of strings consisting of even number of 0's followed by odd number of 1's

    (C.O.No.3) [Application]

Part B [Thought Provoking Questions]

Answer all the Questions. Each question carries TEN marks.   **(5Qx10M=50M)**

5. Define DFA. Construct a DFA accepting the language L={w1011w| w belongs to (0+1)*}
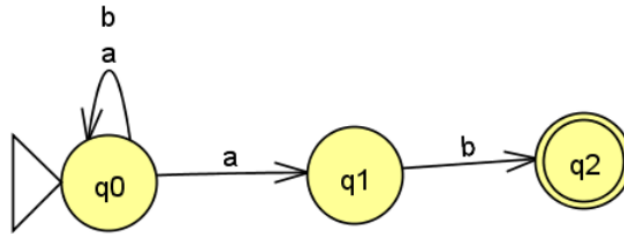
    (C.O.No. 2) [Application level]

6. Check whether the given grammar G is ambiguous or not for the string a+a*a:

    $E \rightarrow E+E | E*E |E| a$ (C.O.No.3) [Application]

7. Convert the following NFA to DFA   (C.O.No.2) [Application]

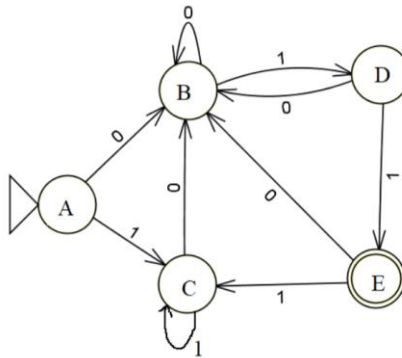8. State Pumping Lemma. Prove that the language $L=\{a^n b^n \mid n>=1\}$ is not regular.
                                                                 (C.O.No.3) [Application]

9. Minimize the following DFA.   (C.O.No.2) [Application]

Part C [Problem Solving Questions]

Answer both the Questions. Each question carries FIFTEEN marks.   **(2Qx15M=30M)**

10. Construct a PDA for the for the language $L= \{ ww^R, \quad w \in \{a,b\}^*$
                                                                 (C.O.No. 4) [Application]
11. Construct a Turing Machine for the language $L=\{ 0^n 1^n \quad , n>=1 \}$

                                                                 (C.O.No. 4) [Application]

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Instructions:

(iii) Read the all questions carefully and answer accordingly.

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries TWO marks.   **(3Qx 2M= 6M)**

1. Define Positive Closure and Star Closure   (C.O.No.1) [Knowledge]

2. Define Automata. List the applications of Finite automata   (C.O.No.1) [Knowledge]

3. Define the following terms a) Language   b) Power of an alphabet

     (C.O.No.1) [Knowledge]

Part B [Thought Provoking Questions]

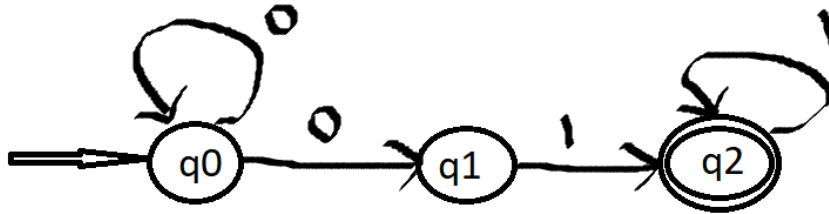**Answer all the Questions. Each question carries EIGHT mark.**   **(4Qx8M=32M)**

9. Design a DFA to accept the binary strings divisible by 4 and write the machine for the same.
     (C.O.No-2) [Comprehension]

10. Define DFA. Construct the DFA accepting the language L={w101w| w belongs to (0+1)*}
     (C.O.No-2) [Comprehension]

11. Define NFA. Construct the NFA accepting the strings of a's and b's having substring aba. Write the machine for the same.   (C.O.No-2) [Comprehension]

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Part C [Problem Solving Questions]

Answer all the Questions. Each question carries TWELVE marks.   **(1Qx12M=12M)**

13. Convert the given NFA to DFA using Lazy Evaluation method.

(C.O.No.2) [Application]