PARUL   UNIVERSITY
FACULTY   OF   ENGINEERING   &   TECHNOLOGY
BcTECH MIDSEM EXAMINATION
5th SEMESTER
ACY-2022-23 (ODD SEM)

Subject Name (Code): Formal Language & Automata Theory (203105305)   Branch: CSE

Date: *09/08/2022*   Time: 10:30 to 12:00   Total Marks: 40

Sr. No~	Marks

Q.1   (A) One line Questions   05

    1) Define Language

    2) What is Formal Language

    3) While applying Pumping lemma over a language, we consider a string w that belong to L and fragment it into   parts.
      .a) 2
      b) 5
      c) 3
      d) 6

    4) Let w= xyz and y refers to the middle portion and $|y| > 0$. What do we call the process of repeating y 0 or more times before checking that they still belong to the language L or not?
      a) Generating
      b) Pumping
      c) Producing
      d) None of the mentioned

    5) Which of the technique can be used to prove that a language is non regular?
      a) Ardens theorem
      b) Pumping Lemma
      c) Ogden's Lemma
      d) None of the mentioned

  (B) Compulsory Question   05

    1) What is the relation between DFA and NFA on the basis of computational power?
      a) DFA> NFA
      b) NFA > DFA
      c) Equal
      d) Can't be said

    2) The minimum number of states required to recognize an octal number divisible by 3 are/is
      a) 1
      b) 3
      c) 5
      d) 7

    3) Answer in accordance to the third and last statement in pumping lemma:
      For all   xyiz EL
      a) $i > 0$
      b) $i < 0$
      c) $i <= 0$
      d) $i >= 0$

4) Number of states require to accept string ends with 11.
   a) 3
   b) 2
   c) 1
   d) can't be represented.

5) Language of finite automata is.
   a) Type 0
   b) Type 1
   c) Type 2
   d) Type 3

Q.2   "Attempt any four(Short Questions)   12

(1) State Arden's Theorem

(2) State the Difference Between DFA and NFA

(3) Define Regular Expression and Regular Language

(4) Draw DFA and Transition Table for the String that Start and End with same symbol. Input Symbol is {O,I}

(5) Draw DFA and Transition Table for the String that Start and End with different symbol. Input Symbol is {O,1}

Q.3   Attempt any two   08

(1) Construct the DFA with Minimum number of State for the following diagram with all the steps by using Minimization ofDFA

(2) Write down formal definition of DFA with all 5 Tuples.

(3) Write down formal definition ofNFA with all 5 Tuples.

Q.4   (A) Construct DFA, which accepts set of all strings over {O, I} which interpreted as   05
binary number is divisible by 3.

(B) Draw DFA and Transition Table for the String that Contains even number of O's and   05
even number of 1'so Input Symbol is {O,l}

<center>OR</center>

(B) Conver the Following NFA to DFA   05