BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)

CLASS: BTECH/IMSC   SEMESTER: V
BRANCH: CSE/IT/MATHS   SESSION: MO/2022

SUBJECT: CS310 FORMAL LANGUAGES AND AUTOMATA THEORY
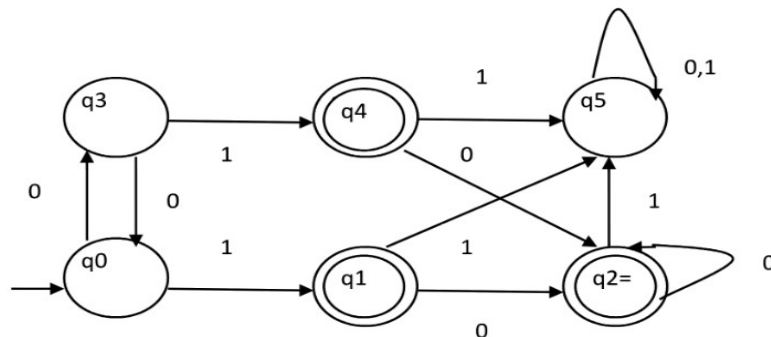
TIME: 2 HOURS   FULL MARKS: 25

INSTRUCTIONS:
1. The total marks of the questions are 25.
2. Candidates attempt for all 25 marks.
3. Before attempting the question paper, be sure that you have got the correct question paper.
4. The missing data, if any, may be assumed suitably.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL

Q1   Construct minimal DFA for the following languages that consist of strings of 0's   [5]   2   4
      and 1's where
   (a) Integer equivalent of the string is congruent to 2(mod 3)
   (b) Length of the string is divisible by 2 and not divisible by 3

Q2   Construct the Mealy machine that takes strings of a's and b's as input and   [5]   2   4
      produces a 1on appearance of "baa" in the string. Convert the Mealy machine
      to the corresponding Moore machine

Q3 (a) Minimize the following DFA with proper explanation   [3]   2   5

Q3 (b) Derive the corresponding regular expression from the minimal DFA   [2]   1,2   3

Q4   What do you mean by regular expression? Construct the regular expression for   [5]   1   2
      the languages consist of all string of a's and b's where
         a. The length of the string is at most 3.
         b. The length of string is congruent to (2 mod 5)
         c. Number of a's is at most 2
         d. At least one a and one b
         e. L={$a^n b^m$ | n+m is even}

Q5   Write regular expression for string ends with "011" and convert it to   [5]   1,2   3
      corresponding DFA

:::::: 27/09/2022 M ::::::