Chhattisgarh Swami Vivekanand Technical University

University Teaching Department

B. Tech (Honours) (Data Science/ Artificial Intelligence)

Class Test - I, May, 2023

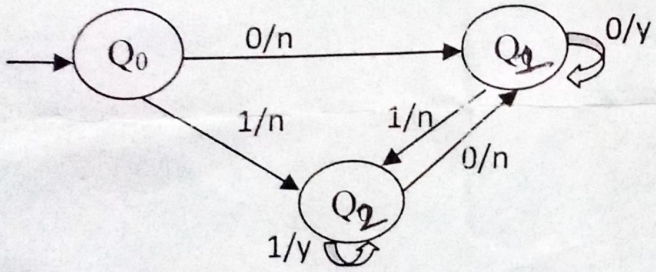
Subject: Theory of Computation **B127474 (022)**

Time Allowed: 2 hours *Maximum Marks:* 40

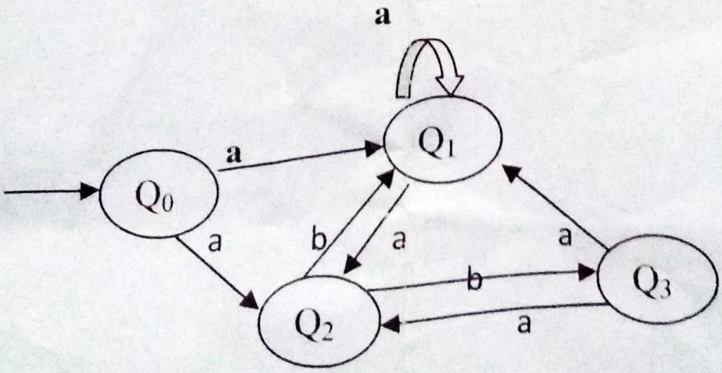
Minimum Pass Marks: 14

Note : *(i)* Each question contains four parts. Part (a) of each question is compulsory.
(ii) Attempt any two parts from (b), (c), and (d) of each question.
(iii) The figure in the right-hand margin indicates marks.

Q.1. (a) Construct an equivalent Moore machine:- [4]

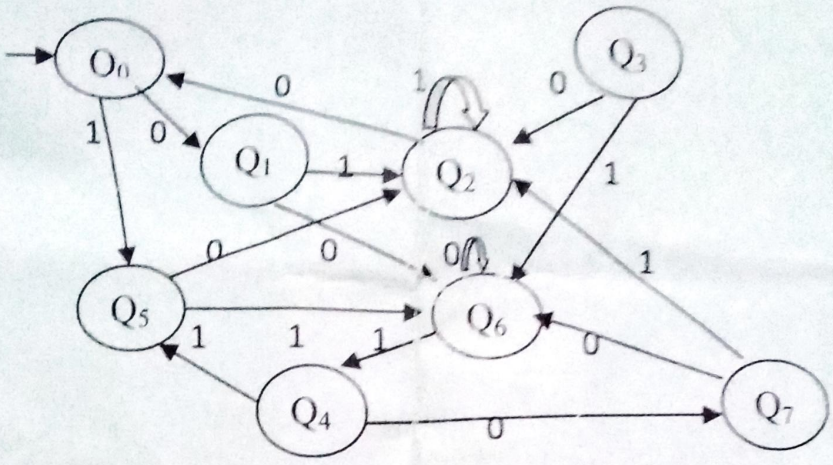


(b) Difference between NFA & DFA & design DFA for given NFA:- where Q_0 & Q_1 are final state. [8]



(c) Construct minimum state automaton equivalent to the finite. [8]

automaton given as :- where Q_2 is final state.



(d) Consider a grammar G whose production rules are: [8]

S->0B/1A, A->0/0S/1AA, B->1/1S/0BB

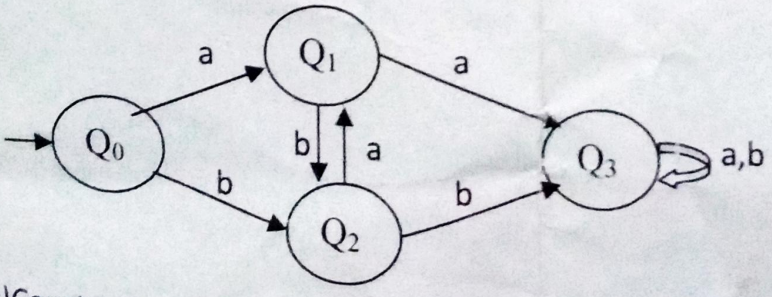
Find LMD & RMD for string 00110101 & construct a derivation tree.

Q. 2. (a) Define regular Expression with given example? [4]

Write the regular expression for the language starting with a but not having consecutive b's.

Write the regular expression for the language accepting all the string in which any number of a's is followed by any number of b's is followed by any number of c's.

(b) Find the regular expression for given diagram:- [8]
where Q_2 & Q_3 are final state.



(c)Construct a DFA with reduced states equivalent to the regular Expression R = (a+b)* (aa+bb)(a+b)* ? [8]

(d) Explain pumping lemma & prove that L= { a^p p is prime} is not Regular? [8]