Scottish Church College

Internal Assessment Examination,2022
Theory of Computation
Semester VI (Hons.)
CMSA
Paper: CC-14

Time: 1 Hour **Full Marks: 30**

Answer any Six (6) Questions.

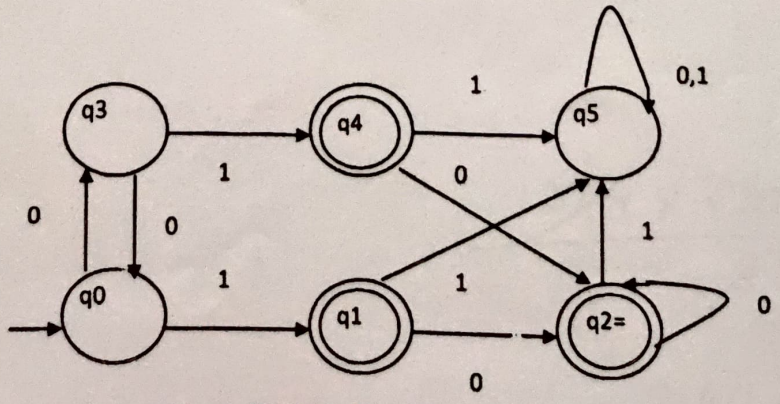
1. Describe the rules of operation of Turing Machine. [5]

2. Draw the transition diagram for the DFA and NFA with $\Sigma = \{0,1\}$ which accept all strings with a substring 01. [5]

3. Construct a Moore Machine from the given Mealy machine. [5]

Present State	Next State, Output			
	a=0		a=1	
	State	Output	State	Output
→q1	q3	0	q2	0
q2	q1	1	q4	0
q3	q2	1	q1	1
q4	q4	1	q3	0

4.



Minimize the above DFA by Equivalence method [5]

5. i. Define regular expression.
ii. Prove that the strings recognized are (a + a(b + aa)*b)* a(b + aa)*a [2 + 3]

6. [5]

Consider the following productions:

$S \rightarrow aB|bA$

$A \rightarrow aS|bAA|a$

$B \rightarrow bS|aBB|b$

For the string aaabbabbba, find leftmost derivation, rightmost derivation.

7. Find the grammar generating $L = \{0^n1^n2^n|n \geq 1\}$ [5]

8. Construct a transition system corresponding to the regular expression: a + bb + bab*a [5]