2019

MSc

2nd Semester Examination

COMPUTER SCIENCE (THEORETICAL COMPUTER SC)

PAPER – COS-202(M1)

Full Marks : 25

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their Own words as far as practicable.

Illustrate the answers wherever necessary.

1. Answer any ***TWO*** questions: 2x2=4

a) What do you mean by the Regular Expression (a/b) (a/b) ?

b) Define Mealy machine.

c) Define Pumping Lemma.

d) Write down the basic limitation of the finite state machine.

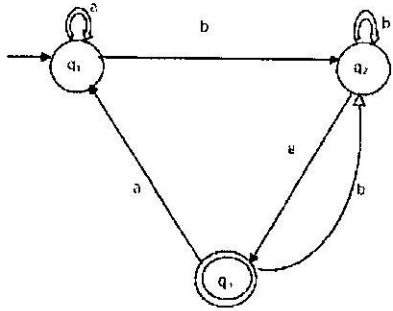
2. Answer any ***TWO*** questions: 2x4=8

a) Construct a DFA accepting all strings w over {a,b} such that the number of b's in w is divisible by 4. 4

b) Construct a Moore machine equivalent to the following Mealy machine. 4

	Next State			
Present State	a=0		a=1	
	State	Output	State	Output
q_1	q_1	1	q_2	0
q_2	q_4	1	q_4	1
q_3	q_2	1	q_3	1
q_4	q_3	0	q_1	0

c) Construct the regular expression corresponding to the following state diagram: 4



d) Construct a PDA which accepts the following context free language. 4

$L=\{a^n b^m a^n \mid m, n \geq 1\}$

3. Answer any **One** question: 1x8

a) i) Construct the grammar accepting

$L=\{a^n b^m c^m d^n \mid m, n \geq 1\}$ 4+4

ii) Classify grammar according to Chomsky. Give suitable example for each type.

b) i) Prove that $L=\{ww \mid w \in \{a,b\}^*\}$ is not regular .

ii) Construct a Turing machine that enumerates $\{0^n 1^n \mid n \geq 1\}$

[Internal Assessment: 05]