6E6023

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6E6023

B.Tech. VI Semester (Main &Back) Examination, April/May - 2017
Computer Sc. & Engg.
6CS3A Theory of Computation
CS,IT

Time : 3 Hours

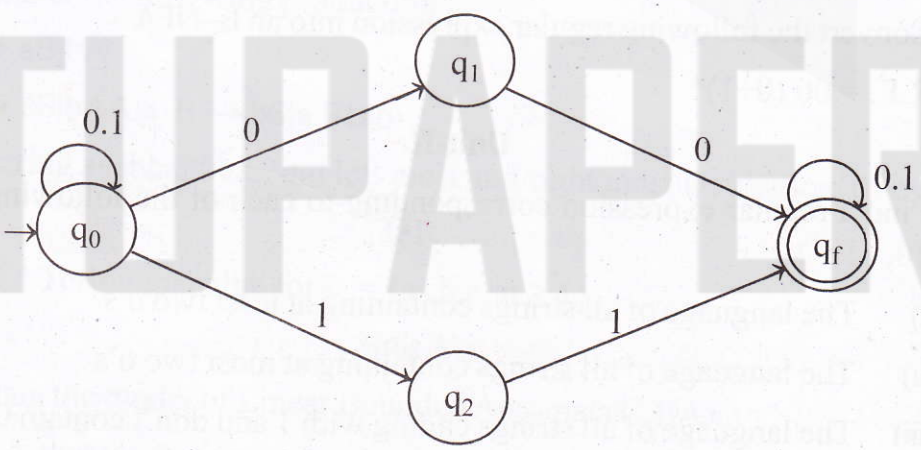
Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates:

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit-I

1. a) Differentiate between deterministic and non-deterministic finite automata. convert the following non-deterministic transition system into deterministic system. **(2+8=10)**

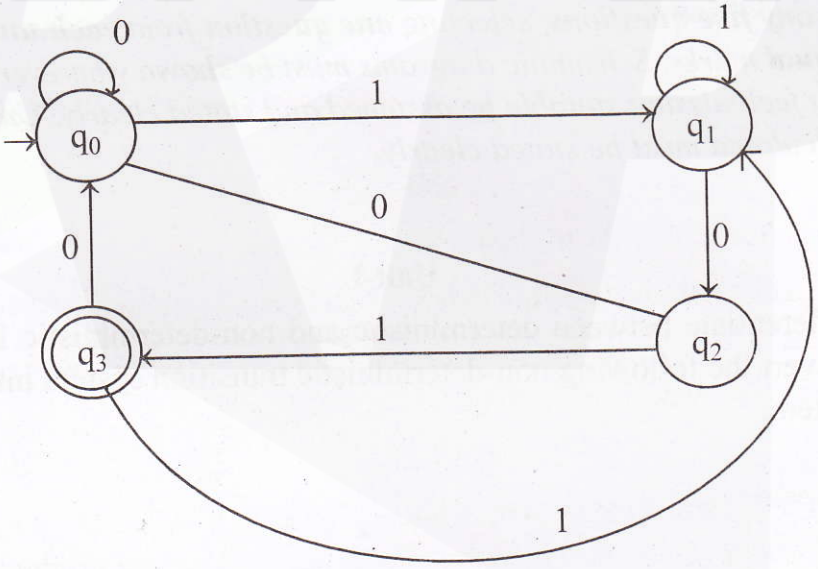


b) Construct a Moore machine equivalent to the Mealy machine M defined by the table given below : **(6)**

Present state	Next 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	1

OR

1. a) Construct a regular expression for the given below deterministic finite automata. **(12)**



b) Convert the following regular expression into an E–NFA **(4)**

R.E. = 00 (0+1)*

Unit-II

2. a) Find a regular expression corresponding to each of the following subset of {0, 1} **(3×4=12)**

i) The language of all strings containing at least two o's

ii) The language of all strings containing at most two o's

iii) The language of all strings ending with 1 and don't contain 00.

iv) The language of all strings in which both the number of o's and number of 1's are odd.

b) Construct a regular grammar for $L = \{a^m b^n | m, n \geq 1\}$ (4)

OR

2. a) Construct a DFA (Deterministic finite Automata) set of all strings over {0, 1} whose length is divisible by 3. (12)

b) Construct a finite automation recognizing L(G), where G is the Grammar. (4)

$S \rightarrow aS|bA$

$A \rightarrow aA|a$

Unit-III

3. a) Construct a push Down Automata (PDA) for language (12)

$L = \{a^n b^{n+m} a^m | n, m \geq o\}$

b) Show that the grammar (4)

$S \rightarrow a|ab\ Sb|aAb$

$A \rightarrow bS|aAAb$ is ambiguous

OR

3. a) Write a short notes on chomsky normal forms. (4)

b) Construct a Grammar in Greiback Normal Form (GNF) equivalent to grammar (12)

$S \rightarrow AB,\ A \rightarrow BS|b\ B \rightarrow SA|a$

Unit-IV

4. a) Given the Grammar $S \rightarrow AB, A \rightarrow a, B \rightarrow C|b, C \rightarrow D, D \rightarrow E, E \rightarrow a$ find an equivalent grammar which is reduced and has no unit production. (10)

b) Consider the following production : (6)

$S \rightarrow aB|bA$

$A \rightarrow aS|bAA|a\ \ B \rightarrow bS|a\ BB|b$

for string aaabbabbba, find left most and right most Derivation Trees.

OR

4. Construct a Turing machine for $L = \{a^n\ b\ c^n | n \geq 1\}$ (16)

Unit-V

5. a) Explain the model of Linear Bounded Automata (LBA). (6)

b) Find a context-free grammar for $L = \{a^n\ b^n\ c^n | n \geq 1\}$ (10)

OR

5. Write short notes on : (4×4=16)

a) Recursive and recursively enumerable language

b) Chomsky Hierarchy of languages

c) Variation of Turing machine

d) Properties of context-free language