Total No. of Printed Pages:2

SUBJECT CODE NO:- P-299
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(CSE/IT) Examination May/June 2017
Theory of Computation
(Revised)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q.No.1 and Q.No.6 are compulsory.
ii) Attempt any two questions from Q.No.2 to Q.No.5 and from Q. No.7 to Q. No. 10 of each section.
iii) Figures to the right indicate full marks.

Section A

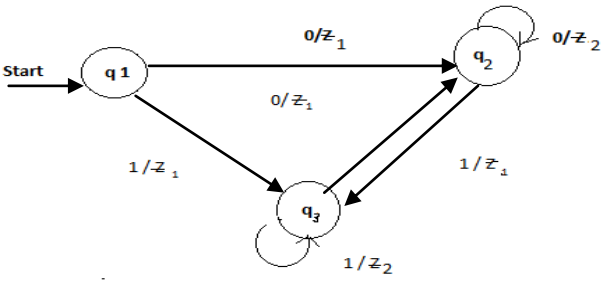
Q.1 Attempt any five from the following :- 10

1. Define Mealy and Moore machine model with an example.
2. What is acceptability of a string by FA?
3. Define deterministic Finite Automata with suitable example.
4. What is ambiguity in grammar, give an example?
5. Explain types of derivation tree in CFG.
6. Construct transition diagram of following regular expression a*b + b*a
7. What is CFG? Give an example.
8. Define type 2 -production.

Q.2 a) Consider M=($\{q_1, q_2, q_3\}$ $\{0,1\}\delta, q_1, \{q_3\}$) a nondeterministic finite automation where δ *is given by.* 08

$\delta(q_1, 0) = \{q_2, q_3\}$ $\delta(q_1, 1) = \{q_1\}$
$\delta(q_2, 0) = \{q_1, q_2\}$ $\delta(q_2, 1) = \phi$
$\delta(q_3, 0) = \{q_2\}$ $\delta(q_3, 1) = \{q_1, q_2\}$
Construct an equivalent DFA

b) Construct a Moore machine which is equivalent to the mealy machine described by the following transition diagram. 07



Q.3 a) Construct a DFA with reduced states equivalent to the regular expression. 08
(0+1)* (00+11) (0+1)*

b) What is pumping lemma for regular languages? Show that the set L={a' | p is prime} is not regular. 07

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Q.4 a) Construct the minimum state equivalent DFA for the DFA given by The following transition table. 08

States	Inputs	
	0	1
$\rightarrow q_1$	q_2	q_3
q_2	q_3	q_5
q_3	q_4	q_3
q_4	q_3	q_5
q_5	q_2	q_5

07

b) The grammar is
G=({s}, {a, b, +, *} P, S) where P consists of S → $S + S|S * S|a|b$ show that the grammar is ambiguous.

Q.5 Write short notes on following:- 15

1. Applications of FA
2. Ambiguity in grammars.
3. Chomsky class faction of languages.

Section B

Q.6 Attempt any five from the following 10

1) What are possibilities of a TM when processing an input string?
2) Define CNF and GNF.
3) Define null production in CFG with an example.
4) Define instantaneous description of PDA
5) What is halting problem of TM?
6) What is universal Turing machine?
7) What is a linear bounded automata?
8) Explain the language of a PDA.

Q.7 a) Consider the grammar G S → $AB, A \rightarrow a, B \rightarrow C|b, C \rightarrow D, D \rightarrow E$ nad $E \rightarrow a$. Eliminate UNIT productions and get an equivalent grammar. 08

b) Explain the two normal forms for the grammar. 07

Q.8 a) Explain in detail PDA and acceptance by PDA. 08

b) Construct a POA A equivalent to the following context free grammar S→ $OBB, B \rightarrow OS|IS|O$. Test whether $O|O^4$ is in N (A). 07

Q.9 a) Explain the Turing machine model in brief. Explain its representation by ID and transition Table. 08

b) Design a Turing m/c to recognize all strings consisting of an even number of 1's. 07

Q.10 Write a short note on following. 15

1. Programming techniques for TM.
2. Deterministic pushdown automata
3. Pumping lemma for CFL.

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