Total No. of Questions – [4] Total No. of Printed Pages 02

G.R. No.	

Paper Code: U359-122(T1) / U359-142(T1)

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T. Y. B. TECH. (COMPUTER ENGINEERING /INFORMATION TECHNOLOGY)

(SEMESTER -I)

COURSE NAME: THEORY OF COMPUTATION

COURSE CODE: CSUA31172/ITUA31172

(PATTERN 2017)

Time: [**1Hour**] [Max. Marks: **30**]

() Instructions to candidates:

1) **Answer Q.1 OR Q.2 and Q.3 OR Q.4.**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed**
4) **Use suitable data whereever required**

Q.1) a) Define Deterministic Finite Automata and Construct a DFA over $\sum = \{0,1\}$ for accepting language where strings are having number of 1's as multiple of 3 [6]

b) Construct a non-deterministic finite automata over $\sum = \{ a, b \}$ that accepts strings ending with 'ab' and convert it to its equivalent DFA [6]

c) Define Moore & Mealy machines with example [4]

OR

Q.2) a) Minimize the following DFA (Fig.1) to its equivalent automata with minimum number of states. [6]

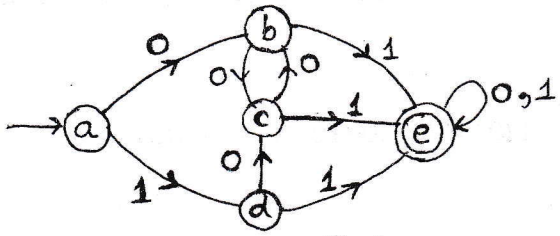

Fig. 1

b) Convert the following ϵ- NFA (Fig. 2) to its equivalent NFA without ϵ transitions [6]

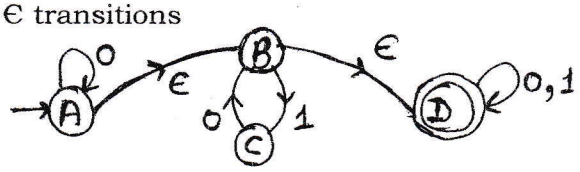

Fig. 2

c) Construct a DFA for language L = {$a^n b^m$ | n, m>=0 } [4]

Q.3) a) Represent the following sets by Regular Expressions [6]

1. The set of all strings over {a, b} beginning and ending with'a'.
2. The set of all strings over {0, 1} ending with 00 and beginning with'1'.
3. The set of all strings over {a, b} with three consecutive b's.

b) Construct a finite automaton for the regular expression (a+b)*abb [4]

c) Construct a regular expression corresponding to the state diagram(Fig.3) using ARDEN's Theorem [4]

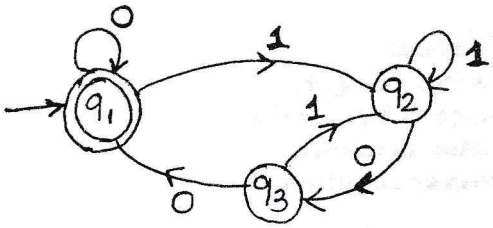

Fig. 3

OR

Q.4) a) Describe, in English language, the sets represented by the following regular expressions [6]

1. a(a + b)*ab
2. a*b + b*a
3. (aa + b)*(bb + a)*

b) Using pumping lemma show that the set L = {a^p | p is a prime} is not regular [4]

c) Prove or Disprove [4]
(1+00*1) + (1+00*1) (0+10*1)*(0+10*1) = 0*1(0+10*1)*