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

G.R. No.	

paper code: U859-122(T1) / U859-142(T1)

OCT 2019/INSEM (T1)

T. Y. B. TECH. (COMPUTER / IT) (SEMESTER -I)

COURSE NAME: Theory of Computation

COURSE CODE: CSUA31172 / ITUA31172

(PATTERN 2017)

MARKING SCHEME

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

Q.1) a) Define Deterministic Finite Automata - 2 marks [6]
Construct a DFA over $\sum$= {0,1} for accepting language where strings are having number of 1's as multiple of 3 - 4 marks

b) Construct a non deterministic finite automata over $\sum$ = { a, b } [6]
that accepts strings ending with 'ab' - 2 marks
and convert it to its equivalent DFA - 4 marks

c) Define Moore & Mealy machines with example - 2 marks for [4]
each

OR

Q.2) a) Minimize the following DFA (Figure 1) to its equivalent automata [6]
with minimum number of states. - stepwise solution expected for 6 makrs

b) Convert the following ϵ- NFA (Figure 2) to its equivalent NFA [6]
without ϵ transitions - E-closure for each state - 1 mark , step wise solution expected for 6 marks

c) Construct a DFA for language L = $\{a^n b^m \mid n, m>=0\}$ 2 marks for [4]
correct diagram & 2 marks for transition table

Q.3) a) Represent the following sets by Regular Expressions - 2 marks [6]
each
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 marks for correct stepwise solution [4]

c) Construct a regular expression corresponding to the state diagram using ARDEN's Theorem- 4 marks for correct stepwise solution [4]

OR

Q.4) a) Describe, in English language, the sets represented by the following regular expressions - 2 marks each for correct answer [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 - 2 marks for correct definition of lemma & 2 marks for proof [4]

c) Prove or Disprove - 4 marks for stepwise solution [4]
(1+00*1) + (1+00*1) (0+10*1)*(0+10*1) = 0*1(0+10*1)*