Total Pages: 2

Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIFTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2017

Course Code: IT303

Course Name: THEORY OF COMPUTATION (IT)

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks. Marks

1 a) Define the following (3)

(i) Language
(ii) Finite Automata
(iii) Transition diagram

b) Design a moore machine which count the number of occurrence of substring aab in a given string (7)

c) Prove that L is accepted by an NFA if and only if L is accepted by DFA (5)

2 a) Discuss about Chomsky classification of language (5)

b) Prove the equivalence of moore and mealy machine (5)

c) Construct a DFA that accepts all strings on {0,1}, except those containing the substring 001. (5)

3 a) Minimize the following DFA (7)

	0	1
A	B	C
B	D	E
C	F	G
*D	D	E
E	F	G
*F	D	E
*G	F	G

b) Prove that L is accepted by an NFA-εif and only if L is accepted by NFA (5)

c) Define the following (3)

(i) Kleene star
(ii) Concatenation
(iii) Reversal

PART B

Answer any two full questions, each carries 15 marks.

4 a) What is a regular expression? Write a regular expression that accept all strings on {0,1} such that it accepts at most one pair of consecutive 1's (5)

b) What is ambiguous CFG ? Show that the grammer (5)

$$E \rightarrow E + E|E * E|(E)|I$$

$I \rightarrow a|b|c$ is ambiguous

c) Design a PDA to accept L={$0^n1^m0^m1^n$ |m,n≥ 1} (5)

5 a) State pumping lemma for regular languages. Use pumping lemma to show that L={a^p|p is a prime} is not regular (8)

b) Convert the grammer $S \rightarrow AB$, $A \rightarrow BS|b$, $B \rightarrow SA|a$ into GNF (4)

c) Construct the PDA equivalent to the following grammer (3)

$$S \rightarrow 0BB, B \rightarrow 0S|1S|0$$

6 a) Use pumping lemma to show that a^n | n is a perfect cube is not a CFL (5)

b) Prove that regular expression is closed under homomorphism (5)

c) Give CFG for the following regular expression (0+11)*(011)1* (5)

PART C

Answer any two full questions, each carries 20 marks.

7 a) Write note on variants of Turing Machine. Show that multi tape TM is equivalent to single tape TM. (9)

b) Design a TM which finds 2's complement of a given number. (8)

c) Prove that the complement of recursive language is recursive. (3)

8 a) What is Linear Bound Automata? (5)

b) Construct T.M which accepts the language L={$a^nb^nc^n$|n≥ 1} (8)

c) Prove that the halting problem is undecidable. (7)

9 a) Explain post correspondence problem. (5)

b) Prove that universal language is recursively enumerable. (8)

c) Construct T.M which reverse a string (7)

****