

SVKM's NMIMS
MUKESH PATEL SCHOOL OF TECHNOLOGY MANAGEMENT & ENGINEERING

Programme: B. Tech (Computer)

Year: III

Semester: V

Batch: 2014-15/ 2015-16

Academic Year: 2017-2018

Subject: Theoretical Computer Science

Date: 02 June 2018

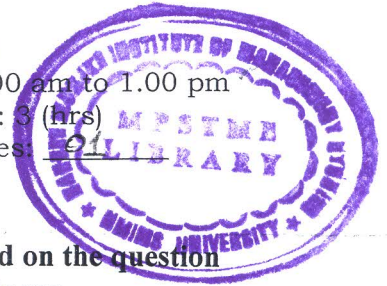
Marks: 60

Time: 10.00 am to 1.00 pm

Durations: 3 (hrs)

No. of Pages: 04

Re-Examination



Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

- 1) Question No. 1 is compulsory.
- 2) Out of remaining questions, attempt any 4 questions.
- 3) In all 5 questions to be attempted.
- 4) All questions carry equal marks.
- 5) Answer to each new question to be started on a fresh page.
- 6) Figures in brackets on the right hand side indicate full marks.
- 7) Assume suitable data if necessary.

- Q.1. a. Explain the various steps for converting a given grammar in to its equivalent Chomsky Normal Form Grammar [06]
b. Design a post machine for accepting a language $\{WcW | W \in (a+b)^*\}$ [06]
- Q.2. a. Justify "Deterministic Push Down Automata cannot be constructed for $L = \{0^n 1^m 2^n | n, m > 0\} \cup \{0^n 1^m 2^m | m, n > 0\}$." [08]
b. Differentiate between the types of Finite Automata with Output. [04]
- Q.3. a. Design Deterministic Finite Automata for the language L over $\{0+1\}^*$, such that
1. Number of 1's is divisible by 03 and number of 0's are divisible by 04. [06]
2. It contains not more than 03 zeros (0's). [02]
b. Compare between Pushdown automata and Post Machine. [04]
- Q.4. a. Design a Turing machine for accepting a language $L = \{WCW^R | W \in (0+1)^* \text{ \& } W^R \text{ is reverse of } W\}$. Justify your answer. [08]
b. Prove that "The complement of recursive language is recursive". [04]
- Q.5. a. Find Regular Expression for representing all the string over an alphabet $\{0, 1\}^*$ such that
i. Ends with "001". [02]
ii. Containing "010". [02]
iii. Starting with "000". [02]
iv. Containing even number of 0's. [02]
b. Construct Mealy machine for printing '1' if the given input ends with "aba" over an alphabet $\{a, b\}$. [04]
- Q.6. a. Explain the variations in Turing Machine. [08]
b. Give Context Free Grammar for
i. $L = \{a^n b c^n d^m | m, n > 0\}$. [02]
ii. $L = \{x^m y^n z^o | m, n, o > 0\} \cup \{x^n y^n | n > 0\}$. [02]
- Q.7. Write short note on :
a. Post Correspondence Problem. [04]
b. Chomsky Hierarchy. [04]
c. Decision problems in CFLs. [04]