Printed Pages: 01 **Subject Code: MTCS-101**

Paper Id: 210101 **Roll No:** | | | | | | | | | | |

M TECH
(SEM-I) THEORY EXAMINATION 2018-19
FOUNDATION OF COMPUTER SCIENCE

Time: 3 Hours ***Total Marks: 70***

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 7 = 14

a. DefineStack?
b. What you meant by Push Down Automata?
c. What is P and NP Class?
d. What is Queue?
e. Explain Red Black Tree.
f. Explain Binary Search.
g. Explain Hash Table.

SECTION B

2. Attempt any *three* of the following: 7 x 3 = 21

a. Explain insertion and deletion algorithms in Red-Black trees with examples.
b. Explain insertion and deletion of elements in suffix trees with suitable examples.
c. What are Binomial Heaps? What are its applications?
d. Explain single ended priority queue operations.
e. What is the average successful search time taken by binary search on a sorted array of 10 data items?

SECTION C

3. Attempt any *one* part of the following: 7 x 1 = 7

(a) A natural merge sort is to be used to sort the file of integers: 12, 37, 42, 9, 5, 7, 50, 40, 45, and 92. What is order of the numbers after one pass of the sort?
(b) What language is represented by the regular expression: b (a + b) ∗ + (b + a) ∗a?

4. Attempt any *one* part.of the following: 7 x 1 = 7

(a) Prove that the language L = {a n | n is prime} is not regular.
(b) Design a DFA which accepts precisely the set of all binary strings having odd number of 0s and odd number of 1s.

5. Attempt any *one* part of the following: 7 x 1 = 7

(a) With suitable examples, explain the optimal page replacement and most recently used page replacement algorithms. .
(b) Explain FIFO page replacement algorithms.

6. Attempt any *one* part of the following: 7 x 1 = 7

(a) Discuss the methods for OS audit.
(b) Write note on virtualization technique for security.

7. Attempt any *one* part of the following: 7 x 1 = 7

(a) Write Short Notes on Following: (i) Parallel & Distributed Database (ii) Emerging Database Techniques.
(b) Explain Object Oriented & Object Relational Database methodology.