Printed Pages: 1 **Sub Code: MTCS 201**

Paper Id: 210219 **Roll No.** | | | | | | | | | | |

M TECH
(SEM II) THEORY EXAMINATION 2018-19
MULTI CORE ARCHITECTURE AND PROGRAMMING

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

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

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

a. Discuss the motivation for concurrency in software.
b. Differentiate between symmetric memory architecture and distributed memory architecture.
c. What do you understand by Task Decomposition and Data decomposition?
d. Discuss the 2 atomic operations performed on a 'lock'.
e. Define convoying.
f. Classify the synchronization primitives.
g. How threads overhead can be minimized?

SECTION B

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

a. Illustrate Flynn's classification in detail with neat and clean diagram.
b. Write a note on Data Flow Decomposition and its implications.
c. Generalize on Semaphores and Barrier.
d. Discuss the four schedule schemes in OpenMP.
e. Tabulate the difference between deadlock and livelocks. Write the conditions to avoid dataraces.

SECTION C

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

(a) Explain Amdahl's law and Gustafson's Law in detail with limitations of each.
(b) What is thread? Summarize the need and how threads communicate inside OS.

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

(a) Discuss the challenges that we face while managing simultaneous activities.
(b) Discuss Error Diffusion Algorithm with C-language code.

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

(a) Discuss threading APIs for Microsoft .NET Framework.
(b) Compare and contrast Mutual Exclusion (mutex) and locks.

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

(a) Write a note on
(i) OpenMP Library Functions
(ii) OpenMP Environment Variables
(b) Generalize on how data and functional parallelism are handled in shared memory programming with OpenMP.

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

(a) Discuss the Current IA-32 architecture. Also state the methods to avoid pipeline stalls on IA-32.
(b) Define Deadlock. Write the conditions under which a deadlock situation may arise. Also discuss the synchronization primitives in parallel program challenges.