Printed Pages:02 **Sub Code: MTCS201**

Paper Id: 238222 **Roll No.** | | | | | | | | | | |

M.TECH
(SEM II) THEORY EXAMINATION 2022-23
MULTICORE ARCHITECTURE AND PROGRAMMING

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) Define Convoying.
(b) What do you mean by Error diffusion?
(c) Explain barrier and Nowait in OpenMP.
(d) Discuss the motivation for concurrency in software.
(e) Define Semaphores.
(f) Explain the term Live-Locks.
(g) How threads overhead can be minimized.

SECTION B

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

(a) Explain Amdahl's Law. Also discuss its performance criteria and its limitations in parallel computing.
(b) What do you mean by decomposition? What are the implications of different types of decompositions?
(c) Explain the term parallel programming. Also discuss about why we need parallel programming in our architecture.
(d) Explain ABA problem in multicore programming with suitable example. Also give solution to ABA problem.
(e) What is data race condition? Also explain how you can manage the shared and private data.

SECTION C

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

(a) Describethe concept of Multithreading on Single Core and on Multi-core platforms.
(b) Explain Flynn's Taxonomy for Parallel Computing.

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

(a) Demonstrate Error Diffusion algorithm? Illustrate how it can be parallelized in multi-threaded environment.
(b) Illustrate different types of parallel programming patterns.

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

(a) Explain the threading API's 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) What are the challenges in threading a loop? Explain each with an example

(b) What is OpenMP. Explain OpenMP library functions and environment variable.

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

(a) Explain Current IA-32 Architecture in detail.

(b) Describe types of common parallel programming problems.