**Printed Pages : 1** **Roll No.** | | | | | | | | | | | **MTCS-201**

# M. TECH.

## THEORY EXAMINATION (SEM–II) 2016-17

## MULTI CORE ARCHITECTURE & PROGRAMMING

***Time : 3 Hours*** ***Max. Marks : 70***

***Note :*** *Be precise in your answer. In case of numerical problem assume data wherever not provided.*

### SECTION- A

**1** **Attempt all parts of this Section** **7×2=14**

**(a)** Explain Amdahl's law.

**(b)** What do you mean by Error diffusion?

**(c)** Explain the thread synchronization issues.

**(d)** Explain the Data copy-in and copy-out mechanism with example.

**(e)** Explain how you will avoid pipeline stalls in IA-32.

**(f)** What do you mean by loop scheduling and partitioning?

**(g)** What is data-level parallelism?

### SECTION- B

**2** **Attempt any three parts of the following** **3×7=21**

**(a)** What do you mean by multiprocessor? Explain how parallel computing can be achieved in multiprocessor.

**(b)** Differentiate the terms task and data decomposition with a suitable example.

**(c)** What is deadlock? Also explain Flow Control-based concept.

**(d)** Explain the following OpenMP runtime library routines

(i) subroutine omp_set_num_threads(*num_threads*)

(ii) integer function omp_get_num_procs()

(iii) logicl function omp_get_dynamic()

(iv) logical function omp_get_nested()

(v) subroutine omp_unset_lock(*lock*) integer (kind=omp_lock_kind)::*lock*

(vi) double-precision function omp_get_wtick()

(vii) double-precision function omp_get_wtime()

**(e)** What is the difference between false sharing and cache line ping-ponging?

### SECTION- C

**3.** **Attempt all questions in this section.** **5×7=35**

**(a)** Explain the difference between the Multi-core Architectures from hyper- threading technology with a suitable example.

**OR**

What is thread? Explain thread lifecycle inside the OS. Also explain how thread works in case of hardware.

**(b)** What do you mean by decomposition? What are the implications of different types of decompositions?

**OR**

Explain how thread level decomposition will help the programmer in achieving parallelism with a suitable example.

**(c)** Explain how threading API for Microsoft .NET framework will work. Give suitable example for creating thread and also discuss about how an thread priority set.

**OR**

What do you understand by the term parallel programming? Also discuss about why we need parallel programming in our architecture.

**(d)** What is data race condition? Also explain how you can manage the shared and private data.

**OR**

What are the challenges in threading a loop? Explain each with an example

**(e)** What do you mean by heavily contended locks? Using a Heavily contended locks are beneficial or not in a multicore programming if yes then justify your answer if not then suggest the solution for heavily contended locks problem.

**OR**

Explain ABA problem in multicore programming with suitable example. Also give solution to ABA problem.