Printed Pages: 2 **Sub Code: NMCAE14**

Paper Id: 214418 **Roll No.** | | | | | | | | | | |

MCA

(SEM IV) THEORY EXAMINATION 2017-18

ADVANCED COMPUTER ARCHITECTURE

Time: 3 Hours ***Total Marks: 100***

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

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

a. What do you mean by parallel processing?
b. Specify CPU performance equation.
c. Explain the concept behind pipelining.
d. What is ILP?
e. What is fine coarse multi-threading?
f. What do you mean by distributed memory?
g. What do you mean by prefix sums?
h. Define preorder traversal.
i. Define condition compilation.
j. What is sleep-wait protocol?

SECTION B

2. Attempt any *three* of the following: 10 x 3 = 30

a. Discuss various classifications of parallel processing mechanisms in uniprocessor computers.
b. Elaborate various types of hazards and indicate how each is controlled?
c. Write down parallel algorithms for SIMD matrix multiplication. Compare time complexities of SISD and SIMD matrix multiplication algorithms.
d. Devise a PRAM algorithm to sort a given array of an element using bubble sort.
e. Explain combined parallel work- sharing constructs.

SECTION C

3. Attempt any *one* part of the following: 10 x 1 = 10

(a) Discuss static and dynamic dataflow architecture models.
(b) Elaborate Flynn's classification.

4. Attempt any *one* part of the following: 10 x 1 = 10

(a) Discuss various advanced pipelined techniques.
(b) Discuss the superscalar and superpipelined processing. Also estimate the performance of superpipelined superscalar processor of degree (m, n).

5. Attempt any *one* part of the following: 10 x 1 = 10

(a) Discuss the functional architecture of SIMD multi-processor systems.
(b) Explain array computers and pipeline computers.

6. Attempt any *one* part of the following: 10 x 1 = 10

(a) Explain the Bidirectional Gaussian elimination for solving a set of linear algebraic equation.

(b) Discuss various models of computation in PRAM model. Also explain how theoretically parallel algorithms are analysed.

7. Attempt any *one* part of the following: 10 x 1 = 10

(a) Explain parallel execution environment routines.

(b) Explain busy-wait versus sleep-wait protocols for sole access of a critical section associated with fast and efficient synchronization schemes on a shared memory multiprocessor.