MCSE/MSE-103

M.E./M.tech. (First Semester)

Examination, Dec-2011

(Grading /Non Grading System)

ADVANCED COMPUTER ARCHITECTURE

Time: three hours Maximum Marks: GS: 70 NGS:100

Note: Attempt any Five questions ,All questions carry equal marks.

1 (a) Give the classification criteria of parallel computers suggested by Handler.
(b) Differentiate between a vector processor and an array processor from the view of their characteristics.

2 (a) Describe the following terminology associated with pipeline computers:

(i) Simple cycle (ii) Greedy cycle (iii) Forbidden latency (iv) Bottleneck

(b) Suppose you have 25 magnetic tapes each containing 40 GB . Assume that you have enough readers to keep any network busy. how long will it take to transmit the data over a distance of 1 KM ? Assume the choice are category 5-twisted pair wire at 100 MBPS. multimode fiber at 1000 Mbps and Single mode fiber at 2500 Mbps.

3 Consider the following pipeline reservation table:

	1	2	3	4	5	6
S1	x					x
S2		x		x		
S3			x			
S4				x	x	

(i) What are the forbidden latencies and initial collision vector?
(ii) Draw the State transition diagram for scheduling pipeline.
(iii) Determine the minimal average latency associated with the shortest greedy cycle.
(iv) Determine the pipeline throughput corresponding to the MAL and given p.

4. Explain the following terminology associated with SIMD computers.
(i) Lock- Step Operation (ii) Masking of processing elements (iii) shuffle exchange functions
(iv) Recalculating networks (v) Cube routing functions (vi) Adjacency search (vii) Bit serial associative processor

5 (a) Describe the type of pipeline for efficiency computing matrix multiplication.
(b) Explain the difference among UMA, NUMA, COMA and NORMA architecture.

6 (a) Consider an Omega network with N inputs and N outputs where $N=2^m$. Describe how to set the exchange switches so that every input i is connected to output j where j differ from i by 2^k for some fixed K<M, $O \leq i \subset N-1$.
(b) Describe at least four characteristics of MIMD multiprocessor that distinguish them from multicomputer systems or computer networks.

7(a) Write a parallel algorithm to implement the concurrent quick sort algorithm.
(b) Give parallel version of any typical serial algorithm and propose the architecture to implement the same.

8 Describe the following terminology associated with multiprocessor system:
(i) A cluster of computer modules (ii) Private cache versus shared cache.
(iii) Semaphore for synchronization (iv) Multiport Memory
(v) Master-Slave Operating system (vi) Floating supervision System
(vii) Explicit parallelism (viii) Computation communication trade-offs