

## ADCA / MCA (III Year)

## Term-End Examination

December, 2008

## CS-12 : COMPUTER ARCHITECTURE

Time : 3 hours

Maximum Marks : 75

*Note : Question number 1 is compulsory. Answer any three questions from the rest.*

1. (a) Explain the two common problems caused by asynchrony and communication latency in massively parallel processing environment. 10
- (b) Comment on the use of interleaved memory system. Explain the low order and high order interleaving discussing their merits and demerits. Can these schemes be clubbed together ? Support your claim with a suitable example if the answer is yes. 10
- (c) Make a data flow graph for the following expression evaluation. 5
- $f = (a + b) * (a - c) / (d - e).$

- (d) A workstation uses 20 MHz processor with claimed 10 MIPS rating to execute a given program mix. Calculate the effective CPI of this computer if there is a one-cycle delay for each memory access. 5
2. (a) Explain Bernstein conditions based on which two processes can execute in parallel. Detect the parallelism in the following instructions of a program using Bernstein's conditions. 8
- P1 :  $C = D \times E$   
P2 :  $M = G - C$   
P3 :  $A = B + C$   
P4 :  $C = L - M$   
P5 :  $F = G \div E$
- (b) "In the ideal case, the computer performance should be linearly scalable with an increasing no. of processors employed in implementing the algorithms". In support to the above statement identify and discuss the basic metrics affecting the scalability of a computer system for a given application. 7
3. What are static connection networks ? Describe their topologies in terms of network parameters and comment on their relative merits in relation to communication and scalability. 15

4. (a) Explain the two superpipeline architecture to improve the pipeline performance using the base scalar pipeline as a reference machine. Give an example architecture in support. How does the change effect speedup and efficiency factor as compared to in base scalar matching. 8
- (b) Discuss the Chang and Smith's classification of language features for parallel programming according to their functionality. 7
5. Explain the following terms associated with cache design : 15
- (a) Write-through Vs write back caches
  - (b) Cacheable Vs non cacheable data
  - (c) Private caches Vs shared caches
  - (d) Cache flushing policies
  - (e) Factors affecting cache hit ration.

