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**Second Semester M.Tech. Degree Examination, June / July 2014**  
**Advances in Computer Architecture**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions.**

- 1 a. Define computer architecture. Illustrate the seven dimensions of an ISA. (08 Marks)  
 b. Explain Amdahl's law. (05 Marks)  
 c. Given the following measurements :

Frequency of FP operations = 35%	Average CPI of FP operation = 5.0
Average CPI of other instructions = 2.33	Frequency of FPSQR = 3%
CPI for FPSQR = 30	

Assume that the two design alternative are to decrease the CPI of FPSQR to 2 or to decrease the average CPI of all FP operations to 2.5. Compare the two design alternative using the processor performance equations. (07 Marks)

- 2 a. What are the major hurdles of pipelining? Illustrate the Data hazards in detail. (06 Marks)  
 b. What are the different concepts and challenges in ILP? (10 Marks)  
 c. Give the Fallacies and Pit falls of advanced multiple issue processors. (04 Marks)
- 3 a. List and explain the advanced cache optimization techniques. (12 Marks)  
 b. Explain the features of RAID levels 0 to 6. (08 Marks)
- 4 a. Discuss on I/O performance, reliability measures and benchmarks. (10 Marks)  
 b. Suppose a processor sends 40 disk I/Os per second, these requests are exponentially distributed and the average service time of an older disk is 20ms. Assume the following question.  
 i) On average, how utilized is the disk?  
 ii) What is the average time spent in the queue?  
 iii) What is the average response time for a disk request, including the queuing time and disk service time? (06 Marks)  
 c. Give the I/O components connected to the FAS 6000 filer. (04 Marks)
- 5 a. Explain how to detect and enhance loop level parallelism in VLIW processor. (10 Marks)  
 b. Explain in brief the GCD test and software pipelining with examples. (10 Marks)
- 6 a. List the major advantages of message passing communication and shared memory communication. (10 Marks)  
 b. Explain the synchronization mechanism for large scale multiprocessors. (10 Marks)
- 7 a. Write a note on floating point addition. (10 Marks)  
 b. Discuss how can we speed up Integer addition operation in computer arithmetic operation. (10 Marks)
- 8 Write short notes on the following :  
 a. Queing analysis of output system.  
 b. DRAM technology.  
 c. IA – 64 processor.  
 d. Carry – look a head technique. (20 Marks)

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