M.Tech. Computer Science & Engineering CBCS Pattern Semester-I

# PCSS11 - Advanced Computer Architecture

P. Pages : 1 **GUG/W/23/10940**

Time : Three Hours * 6 0 3 0 * Max. Marks : 70

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Notes : 1. Solve **any five** questions.
2. Assume suitable data wherever necessary.
3. Illustrate your answers wherever necessary with the help of neat sketches.

**1.** a) List and explain 7 dimensions of an Instruction Set Architecture (ISA) in details. **8**

b) Compare and contrast the following terms. **6**
i) Implicit and explicit parallelism. ii) Static network and dynamic network.

**2.** a) Suppose we want to enhance the processor used for Web serving. The new processor is 10 times faster on computation in the Web serving application than the original processor. Assuming that the original processor is busy with computation 40% of the time and is waiting for I/O 60% of the time, what is the overall speedup gained by incorporating the enhancement? **8**

b) What are data dependencies? Explain name dependencies with example between two instructions. **6**

**3.** a) Explain in detail the hardware based speculation for a MIPS processor, Explain how multiple issue is handled with speculation. **8**

b) Explain the basic VLTW approach for exploiting ILP, using multiple issues. **6**

**4.** a) Explain the directory based cache coherence for a distributed memory multiprocessor system along with state transition diagram. **8**

b) Should the cache be made faster to keep pace with the CPU speed or should its size be made larger to overcome the widening gap between CPU and main memory? Which is optimal? **6**

**5.** a) Explain the concept of software parallelism and hardware parallelism. **8**

b) Write a note on vector super computers. **6**

**6.** a) What is data dependence? Explain with an example & what are the hazards that can happen in pipeline system because of the data dependence? **8**

b) Why it is difficult to implement a pipeline? **6**

**7.** a) Write short note on symmetric shared memory architecture. **8**

b) With suitable example, explain blocking and non-blocking networks. **6**

**8.** a) Discuss multiprocessor Architecture & its issues and approaches. **8**

b) Compare the followings :- **6**
i) Shared memories and distributed memories.
ii) Static network and dynamic network

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