Reg. No. : | | | | | | | | | | | |

T 3170

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2008.

Fourth Semester

(Regulation 2004)

Computer Science and Engineering

CS 1251 — COMPUTER ARCHITECTURE

(Common to Information Technology)

(Common to B.E. (Part-Time) — Third Semester — Regulation 2005)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. What are tri-state gate?

2. Why is the data bus in most microprocessors bidirectional while the address bus is unidirectional?

3. Perform 1010100 — 1000100 using 1's and 2's complement.

4. Define underflow and overflow.

5. What is pipelining and what are the advantages of pipelining?

6. What is the difference between hardwired control and micro programmed control?

7. List the differences between static RAM and dynamic RAM.

8. Define the terms : spatial locality and temporal locality.

9. What factors influences the bus design decisions?

10. What is priority interrupt?

PART B — (5 × 16 = 80 marks)

11. (a) (i) With a neat diagram explain Von-Neumann computer architecture. (12)

(ii) What are the major instruction design issues? (4)

Or

(b) (i) Explain various instruction formats in detail. (10)

(ii) What is a stack and what are the operations on stack? Give any three applications of stack. (6)

12. (a) (i) Design a 4-bit binary adder/subtractor and explain its functions. (8)

(ii) Give the algorithm for multiplication of signed 2's complement numbers and illustrate with an example. (8)

Or

(b) (i) Design an array multiplier that multiplies two 4-bit numbers and explain its operation. (8)

(ii) Write the algorithm for division of floating point numbers and illustrate with an example. (8)

13. (a) (i) What is branch hazard? Describe the methods for dealing with the branch hazards. (10)

(ii) With a suitable diagram describe the sequence of micro operations involved in fetching and executing a typical instruction. (6)

Or

(b) What is data hazard? Explain the methods for dealing with the data hazards. (16)

14. (a) (i) Describe the functional characteristics that are common to the devices used to build main and secondary computer memories, (6)

(ii) Explain various mechanisms of mapping main memory address into cache memory addresses. (10)

Or

(b) (i) Explain how the virtual address is converted into real address in a paged virtual memory system. (10)

(ii) Describe the working principle of a typical magnetic disk. (6)

15. (a) Draw the typical block diagram of a DMA controller and explain how it is used for direct data transfer between memory and peripherals. (16)

Or

(b) (i) Describe the working principles of USB. (8)

(ii) Briefly compare the characteristics of SCSI with PCI (8)