

Total number of printed pages – 7

B. Tech

BCSE 3309/BCSE 3303

Fifth Semester Examination – 2008

COMPUTER ARCHITECTURE AND
ORGANIZATION / - I

Full Marks – 70

Time – 3 Hours

Answer Question No. 1 which is compulsory
and any **five** from the rest.

The figures in the right-hand margin
indicate marks.

1. Answer all questions : 2×10
- (a) Write the basic difference between
computer architecture and computer or-
ganization.

P.T.O.

- (b) What do you mean by instruction format ?
- (c) What is a BUS ? Explain I/O bus of a computer.
- (d) Increasing the number of addressing modes improve the flexibility in writing assembly language programs but reduces the performance. Justify.
- (e) What program features justifies the use of cache memory in a hierarchical memory system ?
- (f) Explain the advantages and disadvantages of using microprogram and hardwired control unit.
- (g) Which register in CPU is responsible for sequencing the control of execution ?

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Contd.

Write its role when a branch instruction is encountered during execution.

- (h) Write the steps to retrieve a word from a memory location by the CPU.
- (i) Differentiate between page fault and cache miss.
- (j) How an interrupt service routine differs from subroutine used in high level language programs ?

2. (a) Explain in brief the Von Neumann architecture with a neat sketch. 5

(b) Give the advantages and disadvantages of single-bus and multi-bus organization. 5

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P.T.O.

3. (a) Explain the different memory device characteristics. 5
- (b) Explain the following : 5
- (i) Locality of reference
 - (ii) Thrashing
 - (iii) Address mapping.
4. (a) Explain the difference between bus arbitration using daisy-chaining, polling and independent requesting. Explain with schematic diagram. 5
- (b) What do you mean by a cache hit, cache hit time and cache miss penalty ? List and briefly explain the techniques used to improve each of this. 5

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Contd.

5. (a) Justify the use of a hierarchical memory system ? 5
- (b) What do you understand by virtual memory ? Distinguish between paging and segmentations. 5
6. (a) A CPU has 16 registers, an ALU with 16 logic and arithmetic functions and a shifter with 8 operations, all connected with a common bus system. 5
- (i) Formulate a control word to specify the various microoperations for the CPU.
 - (ii) Specify the number of bits for each field and give a general encoding scheme for each.

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(iii) Show the bits of a control word that specify the microoperatin $R7 - R1 + R14$.

(b) Design a 7-bit Combinational circuit incrementer for a microprogram sequencer.

5

7. (a) Write the Booth's Algorithm for multiplying two binary numbers in signed-2's complement representation. Give a flow chart scheme.

5

(b) Describe the addition and subtraction process of two decimal numbers in signed-magnitude representation. Suggest a scheme for hardware implementation.

5

8 Write notes on any two : 5×2

(a) 8-bit microprocessors

(b) Types of Instructions

(c) IEEE754s.