Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.TECH (IT-OLD/EEE-OLD)/SEM-4/CS-404/2012

2012

COMPUTER ORGANIZATION & ARCHITECTURE

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : 10 × 1 = 10

i) Booth's algorithm for computer arithmetic is used for

a) multiplication of numbers in sign magnitude form

b) multiplication of numbers in 2's complement form

c) division of numbers in sign magnitude form

d) division of numbers in 2's complement form.

ii) In fourth generation computers, the main technology used is

a) transistor b) SSI

c) MSI d) LSI & VLSI.

iii) Maximum n bit 2's complement number is

a) 2^n b) $2^n - 1$

c) $2^{n-1} - 1$ d) 2^{n-1}.

iv) $(\text{FAFAFB})_{16} = (?)_8$

a) 76767676 b) 76575372

c) 76737672 d) none of these.

v) Which logic gate has the highest speed ?

a) ECL b) TTL

c) RTL d) DTL.

vi) Subtractor can be implemented using

a) adder b) complementer

c) both (a) and (b) d) none of these.

vii) The technique of placing software in a ROM semiconductor chip is called

a) PROM b) EPROM

c) Microprocessor d) FIRMWARE.

viii) What is the 2's complement representation of – 24 in 16-bit representation ?

a) 0000 0000 0001 1000

b) 1111 1111 1110 0111

c) 1111 1111 1110 1000

d) 0001 0001 1111 0011.

ix) How many address bits are required for a 512 × 4 memory ?

a) 512 b) 4

c) 9 d) 16.

x) Overflow occurs when

a) data is out of range

b) data is within range

c) none of these

xi) How many RAM chips of size (256 k × 1 bit) are required to build 1M byte memory ?

a) 8 b) 10

c) 24 d) 32.

xii) Micro-instructions are kept in

a) main memory b) control memory

c) cache memory d) none of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. a) Explain how the real numbers are represented in computer memory ? 2

b) Describe IEEE 754 standard format for floating point representation. 3

3. a) Draw and explain the basic structure of a hard disk. 3

b) How are data retrieved and stored in a hard disk ? 2

4. a) Explain the reading and writing operations of a SRAM. 3

b) Differentiae between SRAM and DRAM. 2

5. a) Explain the difference between instruction pipeline and arithmetic pipeline. 2

b) What are the different hazards in pipeline ? 3

6. a) Explain the significance of Timing signals in a computer system. 3

   b) Explain why every computer system is associated with a set of general purpose registers. 2

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) Describe the function of major components of a digital computer with a block diagram. 10

   b) Describe the Von-Neumann concept. 5

8. a) Give the Booth's algorithm for multiplication of signed 2's complement numbers in flow chart and explain. 8

   b) Multiply – 3 by – 6 using Booth's algorithm. 7

9. a) Give the instruction code format and define opcode. 5

   b) Differentiate between direct and indirect instructions and also differentiate between register reference and input-output reference instructions. 5 + 5

10. a) Explain the concept of virtual memory. 4

    b) What do you understand by page fault ? 3

    c) What is control memory and control ward ? 5

    d) Why does a DRAM cell need refreshing ? 3

11. Write short notes on any *three* of the following : 3 × 5

    a) Bus organization using tri-state buffer

    b) Serial and parallel adders

    c) Magnetic recording

    d) Addressing modes.