53 (CS 301) COAR

2013

(May)

COMPUTER ORGANIZATION AND ARCHITECTURE

Paper : CS 301

Full Marks : 100

Pass Marks : 30

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions out of seven.*

1. *(a)* What is three state buffers ? Design 4-bit common bus using three state buffers. 10

   (b) Design a 4-bit adder-subtractor using 4-full adder. 8

   (c) Define micro-operation. Name out different categories of micro-operations. 2

2. *(a)* What is the difference between a direct and indirect address instruction ? How many references to memory are needed for each type of instruction to bring an operand into a processor register ? 8

(b) What is program interrupt ? Draw a flowchart for interrupt cycle. 8

(c) What are the meanings of the following instructions ? :– 4
(i) LDA *(ii)* STA *(iii)* BUN *(iv)* BSA

3. *(a)* What are the different types of CPU organization ? Explain them. 10

(b) Differentiate between RISC and CISC. 10

4. *(a)* Draw the flow chart for addition and subtraction operation with signed magnitude data. 10

(b) Show the step by step multiplication process using Booth Algorithm, when the following binary numbers are multiplied. Assume 5-bit registers that hold signed numbers. The multiplicand in both the cases is +15.
(i) (+15)×(+13) *(ii)* (+15)×(–13) 10

5. *(a)* Explain different modes of Data transfer between central computer and I/O devices. 10

(b) What is DMA ? Draw and briefly explain Block diagram of DMA controller. 10

6. *(a)* Write a short note on associative memory. Draw block diagram of associative memory. 10

(b) What is virtual memory ? Explain the concepts of page and frame. 8

(c) What is priority interrupt ? 2

7. *(a)* An address space is specified by 24 bits and the corresponding memory space by 16 bits.

(i) How many words are there in the address space ?

(ii) How many words are there in the memory space ?

(iii) If a page consists of $2K$ words, how many pages and blocks are there in the system ? 8

(b) What is pipelining ? Explain about 4-stages pipelining. (4-segment). 8

(c) Write short notes on following two addressing modes :

(i) Implied Mode

(ii) Immediate Mode 4