53 (CS 301) COAR

2013

(December)

COMPUTER ORGANIZATION & 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.*

1. *(a)* With a clear diagram discuss about the major components of computer system. 10

   (b) Consider *two* numbers $A = 139.785$ and $B = 2.13$. Using suitable floating point representation technique perform the addition of A with B. 10

2. *(a)* Consider the following instructions and represent them in three and two addressing instruction format 5+5

$$C = A + B$$

$$D = A/C$$

$$E = C + D$$

$$F = C + D - E$$

(b) With example discuss about the different addressing modes. 10

3. *(a)* Design a 3 bit arithmetic unit which is capable of performing 10

(i) add

(ii) add with carry

(iii) subtract with borrow (subtract with one's complement)

(iv) Subtract (subtract with two's complement)

(b) Design a 3 bit carry look ahead adder. Compare its performance with 3 bit ripple carry adder. 10

4. *(a)* Use restoring division algorithm to perform the following division $C=13/4$. 10

(b) Consider a computer where the size of RAM is 4096 blocks and the size of cache memory is 64 blocks. Each block consists of 32 words. Show the division of the address field in direct cache mapping technique. 5

(c) With a clear diagram discuss about the SRAM cell. 5

5. Consider a computer having six register's $\langle \gamma_0, \gamma_1, \gamma_2, \gamma_3, \gamma_4, \gamma_5 \rangle$ and it can perform the arithmetic operations like addition, subtraction, multiplication and division. The computer can also perform the logical operations like AND, OR, XOR, XNOR. Draw a diagram of the CPU. Identify all the control signals. State the status of the control signals using microprogrammed control unit for the following instruction

(i) $\gamma_2 \leftarrow \gamma_5$ (Contents of γ_5 copied to γ_2)

(ii) $\gamma_1 \leftarrow \gamma_2 + \gamma_5$ 20

6. *(a)* What are the advantages of interrupt driven *I/O* over programmed *I/O* ? 5

(b) With a clear diagram discuss about instruction pipelining. 5

(c) Write briefly on the hazards of the instruction pipelining. 10

7. Write briefly on : 4×5

(a) DMA

(b) read / write operations of CD

(c) error detection code

(d) TLB