2011

MCA

2nd Semester Examination

COMPUTER ARCHITECTURE & ORGANIZATION

PAPER—CS/MCA/203

Full Marks : 70

Time : 3 Hours

The figures in the margin indicate full marks.

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

Illustrate the answers wherever necessary.

Answer *Q. No. 1* and any *four* from the rest.

1. Answer any *five* questions : 2×5

(a) What are the differences between computer organization and computer architecture ?

(b) What are the differences between memory reference instruction and register reference instruction ?

(c) What do you mean by effective address?

(d) What are the functions of different terminals of a memory cell?

(e) What is microprogrammed control unit?

(f) What is Interrupt? What is interrupt service routine?

2. (a) What do you mean by cache memory mapping technique? Why mapping is needed?

(b) Explain set Associative Mapping with an example and state what are the advantages of their mapping technique over the other techniques.

(c) What do you mean by Hit Ratio and Miss. Penalty?

$(1\frac{1}{2}+2\frac{1}{2})+(6+2)+(1\frac{1}{2}+1\frac{1}{2})$

3. (a) What do you mean by flash memory?

(b) Draw and explain internal organization of Bit Cells in a memory chip. How memory write operation are performed?

(c) If hit ratio of a cach memory is .9, access times of the cache and main memory are respectively 20ns and 80ns. then find out the overall system speed up when such a cache memory is used. 2+5+4+4

4. What do you mean by Machine Cycle and Instruction Cycle? What is timing diagrams? Draw and explain Timing Diagrams to show the synchronous data transfer between main memory and CPU. What are the differences between shared Bus and Dedicated Bus? 3+1+8+3

5. (a) Simplify the following function using k-map and implement the ckt. using NAND gate.

$$F = AB + A\overline{B}C + AB\overline{C}$$

(b) What are the different Models of data transfer between the processor and the peripherals and compare relative advantages and disadvantages of those modes.

(c) Show the execution of X = (A – B)/(C + D * E) in three, two, one address machines. 3+(5+2)+5

6. (a) What is instruction format? What is operand address? What are the different categories of instruction?

(b) Explain, why instructions with short lengths are always more preferable than long length instruction? What are the advantages and disadvantages of variable length instruction set over a fixed length instruction set? What is integrated circuit?

(2+2+4)+3+3+1

7. (a) Explain pipeling and parallelism.

(b) What is virtual memory ? What are the advantages of virtual memory ?

(c) What is page and frame ? Why are they needed ? How mapping of a virtual address to a physical address is done ? 2+(2+2)+(2+2)+5

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