

2013

## COMPUTER ARCHITECTURE

Time : 3 hour akubihar.com

Full Marks : 70

## Instructions :

- (i) All questions carry equal marks.
- (ii) There are **TEN** questions in this paper.
- (iii) Attempt **FIVE** questions in all.
- (iv) Question No. 1 is compulsory.

## 1. Answer any seven questions :

- (a) What is the function of ALU?
- (b) What is cache memory?
- (c) Define interrupt and ISR.
- (d) What do you mean by effective address of data?
- (e) What are pseudo-operations?
- (f) What is instruction cycle?
- (g) What are sequential circuits?
- (h) Draw a diagram of half-subtractor.
- (i) What is RISC?
- (j) What is CSIC?

2. (a) Differentiate between hardwired control and microprogrammed control. Draw the block diagram of a basic hardwired control organization with two decoders, a sequence counter and a number of control logic gates.

(b) Explain the sequence that takes place when an interrupt occurs.

3. (a) Explain the Flynn's classification of computer system architecture.

(b) A two-way set associative cache memory uses blocks of four words. The cache can accommodate a total of 2048 words from the main memory. The main memory size is  $128\text{ K} \times 32$ .

(i) How many bits are there in the tag, index block and word fields of the address format?

(ii) What is the size of the cache memory?

4. How a virtual address does gets translated into a physical address? Explain in detail with a neat diagram. Explain the use of TLB.

5. Explain in detail the different instruction types and instruction sequencing.

6. Explain the different types of addressing modes with suitable examples.

7. (a) Why is read and write control lines in a DMA controller bidirectional? Under what condition and for what purpose are they used as inputs?

(b) Explain the different types of mapping procedures in the organization of cache memory with diagram.

8. Write a program to evaluate the arithmetic statement  $Y = (A - B + C) / (G + H)$ . (a) Using an accumulator-type computer with one-address instruction. (b) Using a stack organized computer with zero-address instructions.

9. Differentiate between the following :

- (a) Isolated I/O and Memory-mapped I/O
- (b) Source initiated and Destination initiated transfer using handshaking

10. (a) What is pipelining? Name the two pipeline organizations. Explain about the arithmetic pipeline with the help of an example.

(b) What are the hazards of instruction pipelining? How are these taken care of?

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