

Exam. Code : 107203

Subject Code : 2034

BCA Semester—III

COMPUTER ARCHITECTURE

Paper—I

Time Allowed—3 Hours]

[Maximum Marks—75

Note :—(1) Candidates are required to attempt FIVE questions.

(2) All questions carry equal marks.

1. (a) Explain the concept of main memory. Also differentiate between static and dynamic RAM.

7

(b) A computer uses RAM chips of 1024×1 capacity. How many chips are needed and how should their address lines be connected to provide a memory capacity of 1024 bytes ?

8

2. (a) Name various modes used to transfer the data between CPU and I/O devices.

7

(b) Explain Interrupt-initiated I/O mode in detail.

8

3. (a) Explain various instruction formats in detail. 8
- (b) The two word instruction at address 200, 201 is a "load to AC". Instruction with an address field equal to 500. The PC has the value 200 for fetching this instruction. The content of processor register R1 is 400 and the content of index register XR is 100. Calculate the effective address and the operand that must be loaded into AC for the following :
- Register indirect mode
 - Immediate addressing mode
 - Relative addressing mode
 - Auto increment mode.

Address	Memory	
200	Load to AC	Mode
201	Address = 500	
202	Next instruction	
399	450	
400	700	
500	800	
600	900	
702	325	
800	300	

7

4. (a) Differentiate between hard wired and micro program control unit. 8
- (b) Explain how the instruction pipeline works. What are the various situations where an instruction pipeline can stall ? What can be its resolution ? 7
5. (a) Explain instruction cycle in detail. Also draw the flow chart for the same. 8
- (b) Explain the control unit of basic computer. 7
6. (a) Explain virtual memory in detail. 7
- (b) A virtual memory has an address space of 8k words, a memory space of 4k words and page and block size of 1k words. The following page reference occurs during a given time interval. (If the same page is referenced again it is not listed twice.)

4 2 0 1 2 6 1 4 0 1 0 2 3 5 7

Determine the four pages that are resident in the main memory after each reference change if the replacement algorithm used is (a) FIFO
(b) LRU. 8

7. (a) Explain Set-associative mapping process. 7
- (b) The logical address space in a computer system consists of 128 segments. Each segment can have up to 32 pages of 4k words in each. Physical memory consist of 4k blocks of 4k words in each. Formulate the logical and physical address formats. 8

8. (a) Difference between RISC and CISC. 8
- (b) Explain the detailed organization of a CPU in digital computer. Define and differentiate between instruction interpretation and instruction sequencing. 7