

UG 4th - Semester Examination- 2021

Award: Bachelor of Computer Application (Honours)

Discipline: Computer Application

Course Type: Core

Course Code: BCAH403

Course Name: Computer Organization and Architecture

Full Marks: 80

Time: 4 Hours

The figures in the right hand margin indicate full marks.

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

Illustrate the answers wherever necessary.

1. Answer any ten questions.

10 X 1=10

- a) Name the first digital computer.
- b) What is one address instruction?
- c) What is the function of control bus?
- d) What is Accumulator?
- e) Which operations are used in zero address instructions?
- f) What is CAM?
- g) What is virtual address?
- h) What are the different types of ROMs used in computer?
- i) How many memory chips of 1024x8 bits are required to make up a 1 MB of memory?
- j) What is DMA?
- k) What is flash memory?
- l) What is PLA?
- m) What is the full form of CISC?
- n) Write the function of ALU.
- o) How many operand addresses are supplied in immediate addressing mode?
- p) How many instructions are there in RISC computer?

2. Answer any ten questions.

10 X 2 = 20

- a) What is the maximum number of addresses one might need in an instruction?
- b) What is stack pointer?
- c) Write the elements of a machine instruction.
- d) Intel 8085 is a 8 bit processor- what do you mean by this statement?
- e) What is three address instruction?
- f) What do you mean by addressing mode?
- g) What is stack addressing?
- h) What is memory hierarchy?
- i) What is associative memory?
- j) Differentiate between logical and physical memory address.
- k) What is tri-state device?
- l) What is the purpose of cache memory?
- m) Define bus arbitration.
- n) What is sequential access memory?
- o) A disk spins at 10000 rpm. What is the average rotational latency time of a request? If a given track on the disk has 1024 sectors what is the transfer time for a sector?
- p) A manufacturer wishes to design a hard disk with a capacity of 30GB or more. If the technology used to manufacture the disks allows 1024 bytes per sectors, 2048 sectors per track and 4096 tracks per platter, how many platters are required?

3. Answer any six questions.

6 X 5 = 30

- a) Draw the basic organization of a computer and briefly explain each of its components.
- b) What are the functions of L1 and L2 caches? What is cache coherence? 4+1
- c) What is pipelining system? Define speedup ratio. 2+3
- d) Describe different types of system buses with diagram.
- e) What do you understand by virtual address and physical address? A system has auxiliary memory of 8K and main memory of 4K- what are the widths of virtual address and physical address? 3+2
- f) What is CPU register? Write the functions of different CPU registers. 1+4
- g) Write the difference between RICS and CISC computer.
- h) Write the difference between SRAM and DRAM,

- i) Write the difference between direct and associative mapping.
- j) How many 128 X 8 RAM chips are needed to provide a memory capacity of 2048 bytes? How many lines of the address bus must be used to access 2048 bytes of memory? How many of these lines will be common to all chips? How many lines must be decoded for chip select? Specify the size of decoder. 1+1+1+1+1

4. Answer any two questions.

2 X 10 = 20

- a) Explain the instruction cycle state diagram with the function performed at each state of the cycle.
- b) Write programs to evaluate the following expression using zero-address, one-address, two-address and three-address instruction separately.

$$x = A.B + C^3$$
2.5 X 4
- c) Describe with diagram (any five): Direct-memory addressing, direct register addressing, indirect memory addressing, indirect register addressing, immediate addressing, relative/displacement addressing, indexed addressing, extended memory addressing. 2 X 5
- d) Write the structure of cache and main memory. What is need of L1, L2.....level of memory. 8+2
- e) Describe different types of memory mapping techniques with example.
- f) Describe Programmed I/O, Interrupt driven I/O, and DMA. 3+3+4

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