Computer Organization and Architecture (COA)

UNIT-I

SHORT ANSWER

1. Define digital computer?
2. What is Common Bus System
3. List various registers in a computer along with their purpose (basic computer registers)
4. What is direct and indirect address explains?
5. What is a control unit?
6. What is pipeline register? What is the use of it? Explain in detail?
7. How do you map micro operation to a micro instruction address?
8. List the register-reference instructions?
9. List the of memory reference instructions.
10. Draw the block diagram of control unit?

LONG ANSWER

1. Explain various arithmetic micro-operations with hardware configuration.
2. Discuss about arithmetic circuit with an examples.
3. Explain about Logic and Shift Micro Operations with suitable Diagrams.
4. Design arithmetic Logic Unit.
5. List and explain different types of computer instructions. Also provide their formats.
6. What is instruction cycle?

   (OR)

   Draw and explain about the instruction cycle state diagram.
7. List and explain the register-reference instructions.
8. With the help of examples, explain in detail various types of memory reference instructions.
9. Briefly explain instruction cycle and interrupt cycle.
10. Explain briefly about input-output configuration.
11. Draw the interconnection structure of commonly used register connected to common bus.
12. Explain the block diagram of a control unit.

UNIT-II

SHORT ANSWER

1. Explain immediate addressing mode with example?
2. Explain about the condition field of micro operation?
3. Explain about the branch field of micro operation?
4. Discuss the significance of micro program sequencer?
5. List different types of addressing modes.
6. Describe One address Instruction Format.
7. Describe two address Instruction Format.
8. Describe Three address Instruction Format.
9. Describe Zero address Instruction Format.
10. List out Data Transfer Instructions.
11. Explain Status Bit Conditions.

LONG ANSWER

1. Discuss about functioning of micro programmed control unit.
2. Diagrammatically, explain the process of selection of address for control memory.
3. Explain the following terms
    1. Control word
    2. Micro instruction
    3. Micro program
    4. Hardwired control
4. Explain the following terms
    1. Pipeline register
    2. Control address register
    3. Control memory
    4. Sequencer
5. With the help of a block diagram explain computer configuration
6. Explain about decoding of micro operation fields of micro instruction with diagram.
7. With the help of diagram, explain the organization of micro program sequencer for a control memory.
8. Discuss about various types of Instruction Formats.
9. What is Addressing Mode? Explain different types of addressing modes with example.
10. Explain about Data Transfer and Data Manipulation Instructions.

UNIT-III
SHORT ANSWER

1. What is floating point and fixed point representations?
2. Convert decimal 41. 6875 into binary
3. Explain about 9's and 10's Compliments.
4. Convert octal $(175)_8$ into Hexa –decimal
5. Convert octal 736.4 to decimal
6. Find (72532-03250) using 9's complements
7. Find the subtraction of 3250and 72532 using 10's complement
8. What is BCD?
9. Draw the flowchart for Addition and subtraction.
10. Draw BCD addition circuit
11. Draw BCD addition circuit
12. What is overflow and underflow?

LONG ANSWER

1. Explain about fixed point representations with example.
2. Define each of the following number system.
   a) Decimal
   b) Binary
   c) Octal
   d) Hexadecimal
3. Convert $(465.0647)_8$ into binary, decimal and hexadecimal equivalents.
4. Convert 1101101.1011 into its octal, decimal and hexadecimal equivalents.
5. Explain how a binary number can be converted to an octal and a hexadecimal number.
6. Convert $(19.625)_{10}$ into its binary, octal and hexadecimal equivalents.
7. Convert $(10A4.249)_{16}$ into its binary, octal and decimal equivalents
8. Convert the following numbers,
   a) 10101100111.0101 to Base 10
   b) $(153.513)_{10} = (\ )_8$
   c) Given that $(292)_{10} = (1204)_b$ determine 'b'.

9. What are the different types of complements? Explain.
10. Multiply 10111 with 10011 using Booth's algorithm.
11. Explain the addition and subtraction in BCD with hardware configuration.
12. Draw the flowchart for add and subtract operations and explain?
13. Explain the algorithm for adding and subtracting numbers in signed 2's complement representation?
14. Discuss the procedure for multiplication algorithm?
15. Discuss about Booth Multiplication algorithm with example.
16. Represent the flowchart for multiplication of floating point Numbers?
17. Discuss about Decimal Arithmetic Circuit with examples.

UNIT-IV
SHORT ANSWER

1. What is DMA?
2. What is the advantage of handshaking method over strobe control?
3. What is strobe control?
4. What is interrupt initiated mechanism in data transfer
5. What is daisy-chain method?
6. Explain I/O bus vs Memory bus
7. What is Isolated I/O vs Memory mapped I/O
8. What is priority interrupt?
9. What IOP? What is the use of it?
10. How many types of data transfer are there? What are their disadvantages?

LONG ANSWER

1. Explain the significance of input – output interface?
2. Explain the connection of I/O bus to input – output devices?
3. Explain the following

   a) I/O command b) data input command

4. Discuss the purpose of IOP?
5. What is the difference between isolated I/O and memory- mapped I/O? What are the advantages and disadvantages of each?
6. Explain the techniques used to achieve asynchronous data transfer?

7. Represent the block diagram and timing diagram for destination initiated strobe control for data transfer? Explain?
8. Explain the block diagram, timing diagram and sequence of events for destination initiated transfer using handshaking?
9. Explain daisy-chaining priority and parallel priority interrupt?
10. Discuss the block diagram of DMA controller with diagram?
11. Explain DMA transfer in a computer system?
12. Describe the block diagram of a computer with I/O processor?
13. How the communication occurs between CPU – IOP? Explain?

UNIT-V
SHORT ANSWER

1. Explain the memory hierarchy in a computer system?
2. What is meant by a bootstrap loader? Explain?
3. How many 128 * 8 RAM chips are needed to provide a memory capacity of 2048 bytes?
4. Discuss the typical ROM chip with a diagram?
5. How many chips are needed to provide a memory capacity of 16K bytes?
6. What is the significance of auxiliary memory devices?
7. Explain the memory address map for microcomputer?
8. Represent and explain associative memory of m word, n cells per word?
9. Explain the basic operations of the cache?
10. Explain the procedure of writing into cache?
11. Explain the Parallel Processing?
12. What is pipelining? Explain it?
13. Show space-time diagram for pipeline. Explain with an example?
14. Explain arithmetic pipeline?
15. Explain vector processing?
16. Explain Array Processors?
17. Describe the characteristics of multiprocessors?
18. Explain four segment pipelining?
19. What are the benefits of multiprocessor organization?
20. Give the timing diagram of instruction pipeline?

LONG ANSWER

1. What is meant by cache initialization? Explain?
2. Explain the block diagram of associative diagram?
3. Explain Instruction Pipeline?
4. What is meant by instruction pipeline? Explain four segment Instruction Pipeline
5. Explain RISC Pipeline Vector Processing?
6. What is pipelining? Explain pipeline processing with an example?
7. Explain RISC pipeline in detail?
8. Differentiate b/w Arithmetic Pipeline & Instruction Pipeline ?
9. Diff b/w Parallel Processing and RISC Pipeline Vector Processing?
10. Discuss the difference between tightly coupled multiprocessors and loosely coupled multiprocessors from the viewpoint of hardware organization and programming techniques?
11. What is meant by interconnection structures? Explain?
12. Explain how inter processor communication can be achieved?
13. Explain daisy-chain arbitration procedure?
14. Discuss the parallel arbitration procedure?