# COA(23CS304) OBJECTIVE QUESTIONS

## UNIT-I

**COA Multiple Choice Questions (20):**

**Digital Computers & Organization:**

1. Which of the following is NOT a component of a digital computer?
   a) Input Unit
   b) Control Unit
   c) Compiler
   d) Arithmetic Logic Unit
   **Answer: c**

2. The primary function of the Arithmetic Logic Unit (ALU) is?
   a) Control execution of instructions
   b) Perform arithmetic and logic operations
   c) Manage I/O operations
   d) Store data permanently
   **Answer: b**

3. Computer Organization deals with?
   a) The functional structure of a computer
   b) The physical design of circuits
   c) Programming languages
   d) Application software
   **Answer: a**

4. Computer Architecture focuses mainly on?
   a) Instruction Set Design
   b) Compiler design
   c) Networking protocols
   d) Operating system services
   **Answer: a**

5. Which of the following represents the **flow of data** in a digital computer?
   a) Input → ALU → Output
   b) Input → Memory → Output
   c) Input → Process → Output
   d) Input → Control → Output
   **Answer: c**

**Register Transfer Language & Micro-operations:**

6. Register Transfer Language (RTL) is used to describe?
   a) Hardware connections
   b) Data transfer and operations inside the CPU
   c) Operating system functions

d) Assembly instructions only
**Answer: b**

7. The symbol used in RTL for data transfer is?
   a) ←
   b) →
   c) =
   d) :
   **Answer: a**

8. The **bus** in computer organization is mainly used for?
   a) Data storage
   b) Data transfer between components
   c) Instruction decoding
   d) Error correction
   **Answer: b**

9. Which of the following is an example of **arithmetic micro-operation**?
   a) AND
   b) ADD
   c) OR
   d) SHIFT
   **Answer: b**

10. Which micro-operation shifts all bits of a register to the left or right?
    a) Arithmetic
    b) Logical
    c) Shift
    d) Register transfer
    **Answer: c**

11. The **Arithmetic Logic Shift Unit (ALSU)** performs?
    a) Only arithmetic operations
    b) Only logic operations
    c) Arithmetic, logic, and shift operations
    d) Data transfer operations
    **Answer: c**

12. In a bus system, control signals are required to?
    a) Activate memory or I/O devices
    b) Perform addition
    c) Store results in registers
    d) Execute programs
    **Answer: a**

**Basic Computer Organization & Design:**

13. Instruction code is a group of?
    a) Data bits
    b) Memory addresses
    c) Binary bits specifying an operation

d) Control signals only
**Answer: c**

14. The **Program Counter (PC)** holds?
    a) The current instruction
    b) The address of the next instruction
    c) The result of execution
    d) The base address of memory
    **Answer: b**

15. Which register stores the instruction currently being executed?
    a) PC
    b) MAR
    c) IR
    d) MDR
    **Answer: c**

16. The **Instruction Cycle** consists of?
    a) Fetch and Decode
    b) Decode and Execute
    c) Fetch, Decode, Execute
    d) Store and Load
    **Answer: c**

17. A memory-reference instruction requires?
    a) Access to I/O only
    b) Access to memory to fetch operands
    c) No memory access
    d) Access to accumulator
    **Answer: b**

18. Which signal is used by I/O devices to gain attention of the CPU?
    a) Control Signal
    b) Interrupt Signal
    c) Status Signal
    d) Memory Request
    **Answer: b**

19. Timing and control unit in CPU is responsible for?
    a) Performing arithmetic operations
    b) Synchronizing all activities
    c) Managing memory only
    d) Executing instructions only
    **Answer: b**

20. In a basic computer design, which register acts as a buffer between CPU and memory?
    a) PC
    b) MAR
    c) MDR
    d) IR
    **Answer: c**

**Fill in the Blanks (20)**

1. A **digital computer** processes information in the form of _____.
   **Answer: binary digits (0s and 1s)**
2. The **control unit** directs the flow of data between _____ and _____.
   **Answer: CPU, other units (memory/I/O)**
3. Computer Organization is concerned with the _____ structure of a computer.
   **Answer: operational**
4. Computer Architecture mainly focuses on the _____ set design.
   **Answer: instruction**
5. The symbol ← in RTL indicates _____.
   **Answer: data transfer**
6. In Register Transfer, the right-hand side specifies the _____, and the left-hand side specifies the _____.
   **Answer: source, destination**
7. The set of lines used for data transfer in a bus system is called _____.
   **Answer: data bus**
8. An example of a **logic micro-operation** is _____.
   **Answer: AND/OR/NOT/XOR**
9. A shift micro-operation that fills vacant bits with zeros is called _____ shift.
   **Answer: logical**
10. The unit that performs arithmetic, logic, and shift operations is called _____.
    **Answer: Arithmetic Logic Shift Unit (ALSU)**
11. The binary representation of an operation to be performed is called _____.
    **Answer: opcode (operation code)**
12. The register that contains the address of the next instruction to be executed is _____.
    **Answer: Program Counter (PC)**
13. The instruction currently being executed is stored in the _____ register.
    **Answer: Instruction Register (IR)**
14. The process of fetching, decoding, and executing an instruction is called the _____ cycle.
    **Answer: instruction cycle**
15. Memory-reference instructions operate on data stored in _____.
    **Answer: memory**
16. Input/Output devices communicate with CPU through _____ signals.
    **Answer: control**
17. The signal used by I/O devices to interrupt CPU processing is called _____.
    **Answer: interrupt**

18. The register that holds the address of a memory location is _____.
    **Answer: Memory Address Register (MAR)**

19. The register that holds the actual data fetched from or written to memory is _____.
    **Answer: Memory Data Register (MDR)**

20. The part of CPU responsible for synchronizing operations is the _____ unit.
    **Answer: control**

# UNIT-II

**Multiple Choice Questions (20)**

**Microprogrammed Control:**

1. The storage used to hold microprograms is called?
   a) Cache
   b) Control Memory
   c) Main Memory
   d) RAM
   **Answer: b**

2. In microprogrammed control, the control signals are generated by?
   a) Hardware circuits
   b) Software programs
   c) Microinstructions stored in control memory
   d) I/O devices
   **Answer: c**

3. The sequence of microinstructions to execute a single machine instruction is called?
   a) Instruction set
   b) Microprogram
   c) Macroinstruction
   d) Opcode
   **Answer: b**

4. Address sequencing in microprogram control is used to?
   a) Select the next memory location
   b) Determine the next microinstruction to execute
   c) Access stack memory
   d) Perform logic operations
   **Answer: b**

5. A microinstruction contains information about?
   a) Only opcodes
   b) Control signals to be activated
   c) Instruction format
   d) Data representation
   **Answer: b**

6. The control unit designed using microprogramming is?
   a) Faster but complex
   b) Slower but flexible
   c) Faster and flexible
   d) None of these
   **Answer: b**

7. Horizontal microinstructions use?
   a) Fewer bits and more decoding
   b) More bits and direct control
   c) Both a and b
   d) None of these
   **Answer: b**

8. The unit responsible for fetching microinstructions is?
   a) ALU
   b) Control Address Register (CAR)
   c) MDR
   d) IR
   **Answer: b**

9. A microprogram example typically demonstrates?
   a) Hardware wiring
   b) Sequence of micro-operations to execute a machine instruction
   c) Stack pointer design
   d) Data path optimization
   **Answer: b**

10. The control unit designed using hardwired logic is generally?
    a) Easier to modify
    b) Faster but less flexible
    c) Slower but flexible
    d) More memory efficient
    **Answer: b**

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**CPU Organization:**

11. General Register Organization provides?
    a) Single accumulator
    b) Multiple registers for data storage and processing
    c) Only program counter
    d) Cache memory organization
    **Answer: b**

12. The register that points to the top of the stack is called?
    a) PC
    b) MAR
    c) SP

d) IR
**Answer: c**

13. In stack organization, arithmetic expressions are evaluated using?
    a) Prefix notation
    b) Postfix notation
    c) Infix notation
    d) Binary notation
    **Answer: b**

14. An instruction format consists of?
    a) Opcode and operand fields
    b) Data and stack pointer
    c) Only opcode
    d) Microoperations
    **Answer: a**

15. The addressing mode that uses a constant operand inside the instruction is?
    a) Immediate
    b) Direct
    c) Indirect
    d) Indexed
    **Answer: a**

16. Which addressing mode uses the contents of a register plus a displacement to compute the effective address?
    a) Direct
    b) Indirect
    c) Indexed
    d) Immediate
    **Answer: c**

17. Data transfer instructions include?
    a) ADD, SUB
    b) MOV, LOAD, STORE
    c) JMP, CALL
    d) AND, OR
    **Answer: b**

18. Program control instructions include?
    a) Arithmetic operations
    b) Data transfer operations
    c) Branch and jump instructions
    d) Input-output operations
    **Answer: c**

19. A key feature of RISC architecture is?
    a) Complex instructions with many cycles
    b) Simple instructions executed in one cycle
    c) Large instruction set

d) Microprogrammed control only
**Answer: b**

20. Compared to CISC, RISC generally uses?
    a) Fewer registers
    b) More registers and simpler instructions
    c) Slower execution
    d) Complex microprogramming
    **Answer: b**

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**Fill in the Blanks (20)**

**Microprogrammed Control:**

1. Control signals in a microprogrammed control unit are generated by _____.
   **Answer: microinstructions**
2. The storage unit used for microinstructions is called _____.
   **Answer: control memory**
3. The register that holds the address of the next microinstruction is _____.
   **Answer: Control Address Register (CAR)**
4. The sequence of microinstructions to execute a single instruction is called a _____.
   **Answer: microprogram**
5. In horizontal microinstructions, control signals are specified _____.
   **Answer: directly**
6. In vertical microinstructions, control signals require _____.
   **Answer: decoding**
7. Microprogrammed control is _____ but _____ compared to hardwired control.
   **Answer: flexible, slower**
8. Address sequencing is used to select the _____ microinstruction.
   **Answer: next**
9. A microinstruction specifies a set of _____ to be activated.
   **Answer: control signals**
10. The unit that executes microinstructions is called the _____ unit.
    **Answer: control**

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**CPU Organization**

11. General Register Organization provides multiple _____ for temporary storage.
    **Answer: registers**
12. The register that always points to the top of the stack is _____.
    **Answer: Stack Pointer (SP)**

13. In stack organization, arithmetic expressions are usually represented in _____ form.
    **Answer: postfix (Reverse Polish notation)**
14. The binary code that specifies the operation to be performed is called _____.
    **Answer: opcode**
15. An instruction format consists of _____ and _____ fields.
    **Answer: opcode, operand**
16. The addressing mode in which the operand is part of the instruction itself is _____.
    **Answer: immediate addressing**
17. The addressing mode where the effective address is obtained by adding a constant to a register is _____.
    **Answer: indexed addressing**
18. Instructions that move data from one place to another are called _____ instructions.
    **Answer: data transfer**
19. Instructions that alter the sequence of execution are called _____ instructions.
    **Answer: program control**
20. RISC stands for _____.
    **Answer: Reduced Instruction Set Computer**

## UNIT-III

**Data Representation**

1. The binary system uses which base?
   a) 2
   b) 8
   c) 10
   d) 16
   **Answer: a**
2. The number of bits in a nibble is?
   a) 2
   b) 4
   c) 8
   d) 16
   **Answer: b**
3. The 1's complement of binary number 101100 is?
   a) 010011
   b) 101011
   c) 111000
   d) 110100
   **Answer: a**
4. The 2's complement of binary number 11001 is?
   a) 00110
   b) 11001

c) 00111
d) 11111
**Answer: c**

5. Fixed-point representation is mainly used to represent?
   a) Real numbers
   b) Integers
   c) Floating numbers
   d) Complex numbers
   **Answer: b**

6. Floating-point numbers are represented using?
   a) Sign, exponent, and mantissa
   b) Opcode and operand
   c) Address and data field
   d) Integer only
   **Answer: a**

7. In IEEE 754 single precision, the exponent field consists of?
   a) 4 bits
   b) 6 bits
   c) 8 bits
   d) 11 bits
   **Answer: c**

8. Normalization in floating-point representation ensures?
   a) Smaller exponent
   b) Unique representation
   c) More mantissa bits
   d) Faster computation
   **Answer: b**

9. The main disadvantage of floating-point representation is?
   a) Low precision
   b) Limited range
   c) Hardware complexity
   d) Easy overflow
   **Answer: c**

10. Which data type is most suitable for storing characters?
    a) Integer
    b) Floating-point
    c) Boolean
    d) ASCII/Character encoding
    **Answer: d**

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**Computer Arithmetic:**

11. In binary addition, 1 + 1 = ?
    a) 0 with carry 1

b) 1 with carry 0
c) 2
d) 11
**Answer: a**

12. In 2's complement subtraction, subtraction is performed as?
    a) A – B = A + (1's complement of B)
    b) A – B = A + (2's complement of B)
    c) A – B = A – (2's complement of A)
    d) A – B = A XOR B
    **Answer: b**

13. Which multiplication algorithm is commonly used in computers?
    a) Newton's method
    b) Booth's algorithm
    c) Dijkstra's algorithm
    d) Divide-and-conquer
    **Answer: b**

14. Restoring and non-restoring methods are used for?
    a) Addition
    b) Subtraction
    c) Multiplication
    d) Division
    **Answer: d**

15. Floating-point addition requires?
    a) Aligning the exponents
    b) Aligning the mantissas
    c) Both exponents and mantissas aligned
    d) No alignment
    **Answer: a**

16. When two floating-point numbers with very different exponents are added, the result may suffer from?
    a) Overflow
    b) Underflow
    c) Loss of significance
    d) Rounding error only
    **Answer: c**

17. Decimal arithmetic operations are usually implemented using?
    a) ASCII codes
    b) BCD (Binary-Coded Decimal)
    c) Hexadecimal codes
    d) Floating-point registers
    **Answer: b**

18. A decimal arithmetic unit is mainly used to?
    a) Perform logical operations
    b) Perform arithmetic on BCD numbers

c) Perform binary multiplication
d) Convert binary to octal
**Answer: b**

19. Overflow occurs when?
    a) The result exceeds the word size
    b) There is no carry bit
    c) Mantissa is normalized
    d) Decimal unit fails
    **Answer: a**

20. Which algorithm is used to perform efficient multiplication with signed numbers?
    a) Restoring algorithm
    b) Booth's algorithm
    c) Euclidean algorithm
    d) Shift-add algorithm only
    **Answer: b**

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**Fill in the Blanks (20)**

**Data Representation:**

1. A group of 8 bits is called a _____.
   **Answer: byte**

2. The 1's complement of a binary number is obtained by replacing 0 with _____ and 1 with _____.
   **Answer: 1, 0**

3. The 2's complement is obtained by taking 1's complement and adding _____.
   **Answer: 1**

4. Fixed-point representation is used to represent _____ numbers.
   **Answer: integers**

5. Floating-point representation consists of three parts: _____, _____, and _____.
   **Answer: sign, exponent, mantissa**

6. In IEEE 754 single precision, the mantissa field contains _____ bits.
   **Answer: 23**

7. In IEEE 754 double precision, the exponent field contains _____ bits.
   **Answer: 11**

8. Floating-point numbers are usually stored in _____ notation.
   **Answer: normalized**

9. The base of the binary number system is _____.
   **Answer: 2**

10. Characters are represented in computers using _____ codes.
    **Answer: ASCII/Unicode**

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**Computer Arithmetic:**

11. In binary addition, 1 + 1 results in a sum of _____ and a carry of _____.
    **Answer: 0, 1**
12. Subtraction using complements is performed by adding the _____ complement of the subtrahend.
    **Answer: 2's**
13. The multiplication algorithm used in most computers for signed numbers is _____.
    **Answer: Booth's algorithm**
14. Division in computers can be performed using _____ and _____ algorithms.
    **Answer: restoring, non-restoring**
15. In floating-point addition, the first step is aligning the _____.
    **Answer: exponents**
16. Loss of precision in floating-point arithmetic is called _____.
    **Answer: loss of significance**
17. Decimal arithmetic in computers is generally handled using _____ representation.
    **Answer: BCD (Binary-Coded Decimal)**
18. The arithmetic unit that handles decimal operations is called _____.
    **Answer: Decimal Arithmetic Unit**
19. Overflow in binary arithmetic means the result cannot be represented within the available _____ size.
    **Answer: word**
20. When the result of a floating-point operation is too small to be represented, it is called _____.
    **Answer: underflow**