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# BRAINWARE UNIVERSITY

Term End Examination 2023-2024

Programme – MCA-2021/MCA-2022/MCA-2023

Course Name – Computer Architecture and Microprocessor

Course Code - MCA103

( Semester I )

Full Marks : 60

Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

## Group-A

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :
  - (i) Choose the register used to store the flags
    - a) Status register
    - b) Flag register
    - c) Log register
    - d) Test register
  - (ii) Choose the area where a program is divided into operable parts
    - a) Frames
    - b) Segments
    - c) Pages
    - d) Sheets
  - (iii) Select the computer architecture, developed in the 1950s, introduced the concept of stored programs and is the foundation of modern computer design?
    - a) Harvard Architecture
    - b) RISC Architecture
    - c) CISC Architecture
    - d) Von Neumann Architecture
  - (iv) Select which is not a common type of hard disk interface?
    - a) SATA
    - b) USB
    - c) SCSI
    - d) IDE
  - (v) Determine the register that holds the current instruction being executed is known as the:
    - a) Program Counter (PC)
    - b) Instruction Register (IR)
    - c) Accumulator
    - d) Memory Address Register (MAR)
  - (vi) How many lines does a typical data bus have in a computer system?
    - a) 8
    - b) 16
    - c) 32
    - d) 64
  - (vii) Which instruction is commonly used for conditional branching in assembly language programming?
    - a) ADD
    - b) SUB
    - c) JMP
    - d) MOV
  - (viii) The control unit in a CPU is responsible for:
    - a) Performing arithmetic operations
    - b) Storing data temporarily

- c) Managing memory addresses
- (ix) Which CPU component temporarily stores data and instructions that are frequently used by the CPU?
- a) RAM (Random Access Memory)  
 b) Hard Disk Drive (HDD)  
 c) L1 Cache  
 d) Optical Drive (CD/DVD)
- (x) What is the next stage after the instruction is fetched?
- a) Execution  
 b) Decode  
 c) Fetch  
 d) Write-back
- (xi) The difference circuit in full subtractor is implemented using
- a) XOR  
 b) AND  
 c) OR  
 d) NOT
- (xii) The register is a type of \_\_\_\_\_
- a) Sequential circuit  
 b) Combinational circuit  
 c) CPU  
 d) Latch
- (xiii) What is the primary challenge of instruction pipelining?
- a) Achieving higher clock speeds  
 b) Handling hazards that can stall the pipeline  
 c) Increasing the number of pipeline stages  
 d) Reducing power consumption
- (xiv) What is the primary function of a microprocessor in a computer system?
- a) Display graphics  
 b) Store data  
 c) Execute instructions  
 d) Provide power
- (xv) What is the difference between RISC and CISC microprocessor architectures?
- a) RISC uses more complex instructions than CISC.  
 b) CISC uses a larger number of simple instructions, while RISC uses a smaller set of more complex instructions.  
 c) RISC processors are slower than CISC processors.  
 d) CISC processors are primarily used in mobile devices.

**Group-B**

(Short Answer Type Questions)

3 x 5=15

2. What is computer architecture, and why is it important in the field of computer science? (3)
3. Illustrate CISC. (3)
4. Explain the execution of a conditional branch instruction in the Intel 8085 microprocessor. (3)
5. Discuss the role of a memory management unit (MMU) in computer architecture. (3)
6. Summarize the addressing modes supported by the Intel 8085 microprocessor. (3)

**OR**

Summarize the Intel 8085 handle interrupts, and what are the types of interrupts it supports? (3)

**Group-C**

(Long Answer Type Questions)

5 x 6=30

7. How does the instruction pipeline enhance the throughput of instruction execution in a CPU? (5)
8. Classify the assembly language instructions of 8085 into different categories, such as data transfer, arithmetic, logical, and control instructions. (5)
9. Explain the importance of the accumulator as a central register in a basic computer architecture. (5)
10. Identify the role of an instruction pointer (IP) in the context of instruction-subroutine mapping. (5)
11. Articulate Secondary Memory. (5)
12. Write an overview of the architecture of a typical microprocessor, highlighting the CPU, registers, and the arithmetic logic unit (ALU). (5)

OR

Justify the significance of microprocessors in modern electronic devices and their historical evolution. (5)

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