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**AB-235550**

**M.Sc. (Semester-II) Examination, June-2025**

**( Regular/Backlog )**

**COMPUTER SCIENCE**  
**(Computer System Organization and**  
**Architecture)**

*Time Allowed : Three Hours*

*Maximum Marks : 70*

**Note :** This question paper is divided into four sections. All sections are **compulsory**. Attempt questions as per instructions given in each section. Distributions of marks is given in each section.

**SECTION-A**

**(Objective Type Questions)**

**Note :** Attempt any ten questions. Each question carries 1 mark. [10×1=10]

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**( 1 )**

**[P.T.O.]**

1. (i) Which of the following is an example of an arithmetic micro operation?
- (a) AND operation
  - (b) OR operation
  - (c) ADD operation
  - (d) NOT operation
- (ii) The part of the instruction that specifies the operation to be performed is called :
- (a) Address
  - (b) Opcode
  - (c) Operand
  - (d) Register
- (iii) An Interrupt is :
- (a) A signal from the CPU to the user
  - (b) A signal from a device to the processor
  - (c) A command to shutdown the system
  - (d) A software-generated exception

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- (iv) Which of the following is not true about machine language?
- (a) It is platform-dependent
  - (b) It is fast and efficient
  - (c) It is easy to understand and write
  - (d) It require no translation
- (v) Which of these is not a characteristics of machine language?
- (a) Fast execution
  - (b) Human-readable syntax
  - (c) Hardware-specific
  - (d) Binary format
- (vi) The number of address bits required to access 16 general purpose register is:
- (a) 2
  - (b) 3
  - (c) 4
  - (d) 5

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(vii) What is the main goal of parallel processing?

- (a) Reduce power consumption
- (b) Increase execution time
- (c) Minimize memory usage
- (d) Improve performance by executing task concurrently

(viii) Vector processor are particularly efficient for:

- (a) String manipulation
- (b) Recursive functions
- (c) Arithmetic on large dataset or matrices
- (d) Decision making in AI

(ix) In interrupt-driven I/O the CPU :

- (a) Is notified via an interrupt when an I/O operation is needed
- (b) Waits idle for the I/O operation to complete

(c) Continuously checks the I/O device status

(d) Transfer data without device involvement

(x) What is the main advantage of using DMA?

- (a) Increase software complexity
- (b) Reduces CPU instruction cycles
- (c) Slowdown data transfer
- (d) Requires no memory usage

(ix) What is the correct order of the memory hierarchy from fastest to slowest?

- (a) Cache → Main memory → Register → Hard disk
- (b) Register → Main memory → Cache → Secondary storage
- (c) Hard disk → Main memory → Cache → Register
- (d) Register → Cache → Main memory → Secondary storage

(xii) The Memory Management Unit (MMU) is responsible for :

- (a) Mapping virtual addresses to physical addresses
- (b) Handling keyboard input
- (c) Executing arithmetic operation
- (d) Rendering graphics on screen

#### SECTION-B

##### ( Very Short Answer Type Questions )

**Note :** Attempt **any five** questions. Each question carries **02** marks.(Word Limit : **25-30** words) [5×2=10]

2. (i) What are the four categories of micro operations?
- (ii) Define Instruction Cycle.
- (iii) What does a compiler do?
- (iv) What is a stack in computer organization?
- (v) What is the difference between parallel processing and serial processing?

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(vi) What is the function of an input device?

(vii) What is Cache Memory?

#### SECTION-C

##### ( Short Answer Type Questions )

**Note :** Attempt **any five** questions. Each question carries **04** marks. (Word limit : **250** words) [5×4=20]

3. (i) What is an arithmetic micro-operation?
- (ii) What are the main components of a computer instruction?
- (iii) What are the advantages and disadvantages of using assembly language?
- (iv) What is the difference between general-purpose and special-purpose registers?
- (v) What is Pipelining? How does pipelining improve the performance of a CPU?
- (vi) What are the primary functions of an I/O. interface?
- (vii) What is Auxiliary Memory? Explain any two examples of auxiliary memory device.

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## SECTION-D

### ( Long Answer Type Questions )

Note : Attempt **any three** questions. Each question carries **10** marks. (Word limit : **500** words) [3×10=30]

4. (i) Explain the structure of a computer instruction. Discuss the significance of the opcode and operand. Provide examples of different instruction formats.
- (ii) What are the Addressing modes? Discuss the importance of addressing modes in the execution of instructions. Provide examples of various addressing modes and how they affects instruction processing.
- (iii) What is Vector Processing? Discuss the difference between scalar and vector processing and highlight the advantages of vector processors in handling large scale data operations.
- (iv) What is Direct Memory Access (DMA), and how does it differ from traditional CPU-driven data transfer methods? Discuss the advantages of DMA in terms of performance and efficiency.