Roll No. ..... Total Pages : 3

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BT-5/D-25

COMPUTER ORGANIZATION AND ARCHITECTURE

Paper : PC-CS-307A

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *five* questions in all, selecting at least *one* question from each unit. All questions carry equal marks.

UNIT–I

1. (a) Discuss the Von Neumann Architecture with a neat diagram. Explain its main components and the flow of data and instructions during program execution. (8)

   (b) Describe fixed-point representation of numbers. Distinguish between sign–magnitude, 1's complement, and 2's complement representations. (7)

2. (a) Explain with an example how Booth's algorithm performs multiplication of signed binary numbers? (8)

   (b) What is virtual memory? Explain how it allows a computer to run programs larger than the physical memory? (7)

UNIT–II

3. (a) Describe the concept of stored program organization. How are instruction codes represented and executed in this model? (7)

   (b) Describe the working principle of a common bus system and explain how it enables data transfer between CPU registers? (8)

4. (a) Differentiate between register reference and memory reference instructions using suitable example. (8)

   (b) Describe the interrupt handling process in a CPU. How does the system ensure smooth program execution after servicing the interrupt? (7)

UNIT–III

5. (a) Describe the stack organization in a CPU. Explain how the stack is used for procedure calls, expression evaluation, and interrupt handling, with examples? (8)

   (b) Discuss the immediate, direct, and indirect addressing modes in a CPU. Illustrate each mode with examples and discuss their impact on instruction execution time. (7)

6. Explain the different instruction formats with examples. Discuss the advantages and disadvantages of each format. (15)

UNIT–IV

7. (a) Differentiate between I/O Bus and Memory Bus. Explain the significance of separate buses for data transfer and control in a computer system. (8)

   (b) Describe asynchronous serial transfer. How does it differ from parallel data transfer? (7)

8. Write short notes on :

   (a) DMA Controller.

   (b) Priority interrupt.

   (c) Input/Output Processor (IOP). (15)
