

[Total No. of Questions - 9] [Total No. of Printed Pages - 3]

Dec-24-0100 (CBCS/NEP)

CSPC-313 (Computer Organization and Architecture)

[CS, CSE, AILM, CS AIDS]

B.Tech. 3rd

Time : 3 Hours

Max. Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all, selecting one question each from section A, B, C and D. Section E is compulsory.

SECTION - A

1. (a) Define microoperations and explain their role in the execution of instructions within a CPU. Provide examples of different types of microoperations. (6)
- (b) Discuss the significance of control signals in Register Transfer operations. How do control signals govern the data flow in a computer system? (6)
2. (a) Explain the organization and function of the Memory Address Register (MAR) and Memory Data Register (MDR). How do these registers interact during a memory read and write operation? (6)
- (b) Describe the difference between synchronous and asynchronous buses. How do these bus q? (6)

SECTION - B

3. (a) Describe the working principle of a hardwired control unit. How does it differ from a microprogrammed control unit in terms of design complexity and flexibility? (6)
- (b) (i) List the types of micro operations, explain shift micro operation.

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- (ii) Write short notes on Input-Output and Interrupt. (6)
4. (a) How does the interrupt mechanism improve the efficiency of I/O operations compared to polling? (6)
- (b) Explain the design of micro program sequencer with logic truth table. (6)

SECTION - C

5. (a) Explain the process of binary division using the non-restoring division algorithm. Provide a step-by-step example to illustrate the algorithm. (6)
- (b) Explain the following:
 - (i) Isolated Vs Memory mapped I/O
 - (ii) I/O Bus Vs Memory Bus
 - (iii) I/O Interface
 - (iv) Peripheral Devices (6)
6. (a) Compare and contrast volatile and non-volatile memory. Provide examples of each and discuss their typical applications in a computer system. (6)
- (b) Explain the working of virtual memory. How does it enhance the effective use of physical memory in a computer system? (6)

SECTION - D

7. (a) Discuss the concept of superscalar architecture. How does it differ from a simple pipeline architecture in terms of instruction throughput? (6)
- (b) Explain pipeline for floating point addition and subtraction. (6)

[P.T.O.]

8. (a) What is pipeline? Explain space time diagram for pipeline. (6)
- (b) Discuss the role of vector processors in parallel processing. How do they differ from scalar processors in handling large datasets? (6)

SECTION - E (Compulsory)

9. Short Answer Questions.

- (a) What is the role of PC register?
- (b) Define the term 'interrupt' in the context of computer architecture.
- (c) What is an arithmetic overflow?
- (d) What is RISC pipeline?
- (e) What is the function of a superscalar processor?
- (f) Define von Neumann architecture. (6×2=12)