

Third Semester B.E. Degree Examination, Dec.2024/Jan.2025
Computer Organization

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. With a neat diagram, explain the basic operational concepts of a computer. (06 Marks)
- b. Explain the basic instruction types with example. (08 Marks)
- c. Explain Big Endian and Little Endian methods by addressing with proper example. (06 Marks)

OR

- 2 a. Define addressing mode. Explain the following addressing modes with suitable examples :
 - (i) Register
 - (ii) Direct
 - (iii) Indirect
 - (iv) Auto-Increment
 (10 Marks)
- b. Explain SPEC rating of a computer. (05 Marks)
- c. Write an assembly program to add numbers stored in consecutive memory locations as Num₁, Num₂,..... Num_n and store the result at location SUM by using branching technique. (05 Marks)

Module-2

- 3 a. What is DMA? Explain it's operation using registers in a DMA interface. (08 Marks)
- b. Explain the following interrupt nesting methods :
 - (i) Daisy chain.
 - (ii) Implementation of interrupt nesting.
 (06 Marks)
- c. What is DMA Bus Arbitration? Explain Distributed arbitration with neat diagram. (06 Marks)

OR

- 4 a. Explain the I/O interface for an input device (key board) interface to the processor with a neat block diagram. (08 Marks)
- b. Explain synchronous Bus with neat timing diagram. (06 Marks)
- c. With neat diagram, explain USB split bus operation. (06 Marks)

Module-3

- 5 a. With a neat diagram, explain the internal organization of 2M × 8 DRAM chip. (10 Marks)
- b. Explain Direct Mapping function. (05 Marks)
- c. Explain the read and write operation in a single SRAM cell with circuit diagram. (05 Marks)

OR

- 6 a. With neat diagram, explain the memory hierarchy with respect to speed, size and cost. (05 Marks)
 b. With neat circuit diagram, explain how data are written into ROM. (05 Marks)
 c. What is memory interleaving? Explain with a suitable example. (10 Marks)

Module-4

- 7 a. Explain the design of a 4-bit carry look ahead adder. Calculate number of gate delays for S_3 and C_4 . (08 Marks)
 b. With neat diagram, explain binary addition/Subtraction. (06 Marks)
 c. Multiply (+14) and (-6) using Booth's algorithm. (06 Marks)

OR

- 8 a. Perform bit pair recoding for -11 and +27 [(-11) multiplicand and (+27) multiplier]. (06 Marks)
 b. Perform the following operations on the 5-bit signed numbers using 2's complement representation system. Further indicate whether overflow has occurred :
 (i) $(-10) + (-13)$
 (ii) $(+10) - (+14)$
 (iii) $(+7) - (-15)$ (06 Marks)
 c. Perform $1100 \div 11$ using non restoring division algorithm. (08 Marks)

Module-5

- 9 a. With neat diagram, explain the working of single-bus organization of the datapath inside processor. (08 Marks)
 b. Write the sequence of control steps for the execution of an instruction Add (R_3), R_1 . (07 Marks)
 c. Write the control sequence for the execution of an unconditional branch instruction. (05 Marks)

OR

- 10 a. With neat diagram, explain the organization of Hardwired control unit. (07 Marks)
 b. What is pipelining? Explain the 4-stage pipeline. (05 Marks)
 c. With neat diagram, explain the Three-bus organization of the datapath. (08 Marks)

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