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Third Semester B.E. Degree Examination, Feb./Mar. 2022 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 different processor registers. (08 Marks)
- b. Explain the overall SPEC rating for the computer in a program suite. (04 Marks)
- c. Explain one address, two address and three address instruction with examples. Also, use any of these instructions to carry out $C \leftarrow [A] + [B]$. (08 Marks)

OR

- 2 a. What is an addressing mode? Explain the different addressing modes. With an example for each. (10 Marks)
- b. Explain shift and rotate operations, with example. (10 Marks)

Module-2

- 3 a. What is direct memory access, when it is used? Explain it with block diagram. (08 Marks)
- b. Define the terms 'cycle stealing' and 'burst mode' with respect to DMA. (04 Marks)
- c. Define bus arbitration. Explain in detail centralized bus arbitration. (08 Marks)

OR

- 4 a. With a block diagram, explain how the keyboard is connected to processor. (08 Marks)
- b. Explain the use of a PCI bus in a computer system with a neat sketch. (08 Marks)
- c. What are the design objectives of USB? (04 Marks)

Module-3

- 5 a. Draw a neat block diagram of memory hierarchy in a computer system. Discuss the variation of size, speed and cost per bit in the hierarchy. (08 Marks)
- b. Explain the working of a single transistor dynamic memory cell and internal organization of a 16 megabit DRAM chip configured as $2M \times 8$ cells. (12 Marks)

OR

- 6 a. Explain the different mapping functions used in cache memory. (12 Marks)
- b. What is replacement policy? Explain LRU replacement algorithm. (04 Marks)
- c. Explain memory interleaving with necessary diagram. (04 Marks)

Module-4

- 7 a. Perform the following operations on the 5-bit signed numbers using 2's complement representation system:
 - i) $(-10) + (-13)$
 - ii) $(-10) - (+4)$
 - iii) $(-3) + (-8)$
 - iv) $(-10) - (+7)$
 (10 Marks)
- b. In a carry look ahead addition, explain the generate G_i and propagate P_i functions for stage i . Using this design explain 4 bit carry look ahead adder. (10 Marks)

OR

- 8 a. Perform the signed multiplication of numbers +13 and -6 using booth multiplication and bit pair recording method. List the tables used. (10 Marks)
- b. Perform division of number 9 by 3 ($9 \div 3$) using the restoring division algorithm. Write the steps of algorithm used. (10 Marks)

Module-5

- 9 a. Draw and explain multiple bus organization. Explain its advantages. (10 Marks)
- b. Write and explain the control sequence for execution of an unconditional branch instruction. (10 Marks)

OR

- 10 a. Draw the block diagram of the control unit organization and describe. (10 Marks)
- b. Explain basic idea of instruction pipelining. (10 Marks)

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