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18EC35

## Third Semester B.E. Degree Examination, July/August 2021 Computer Organization and Architecture

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions.*

- 1
  - a. Explain following registers: (i) PC (ii) IR (iii) MAR (06 Marks)
  - b. Explain how user program and OS routine are sharing processor with printer. (08 Marks)
  - c. Explain basic performance equation. (06 Marks)
  
- 2
  - a. Perform using 2's complement arithmetic: (i)  $-5 + (-2)$  (ii) Subtract  $-5$  from  $-7$  (06 Marks)
  - b. Explain BIG-ENDIAN and LITTLE-ENDIAN assignment. (06 Marks)
  - c. Illustrate instruction execution and straight line sequencing for the program  $C \leftarrow [A] + [B]$ . [Assume that each instruction is 4 byte]. (08 Marks)
  
- 3
  - a. List the generic addressing modes with assembler syntax and addressing function. (10 Marks)
  - b. Explain shift and any two rotate instructions with relevant diagrams. (10 Marks)
  
- 4
  - a. Write assembly language program to add 'N' numbers and store the result in 'SUM'. Assume the following address:
    - (i) Program should start from '100'.
    - (ii) 'N' is stored at 204
    - (iii) Numbers are stored in memory from the address 208. Each number is 4 bytes.
    - (iv) 'SUM' is stored at 200
    - (v) Assume each instruction is 4 byte (08 Marks)
  - b. Explain stack concept with relevant diagrams. (08 Marks)
  - c. List the steps involved in 'CALL' and 'RETURN' instructions. (04 Marks)
  
- 5
  - a. Explain I/O interface for input device and also write the assembly program that reads the one LINE from the keyboard and echoes it back to the display. (10 Marks)
  - b. Explain methods used for enabling and disabling interrupts. (10 Marks)
  
- 6
  - a. Explain daisy chain method used for handling simultaneous interrupt request. (06 Marks)
  - b. Explain memory mapped I/O access. (06 Marks)
  - c. Explain use of DMA controller in computer system. (08 Marks)
  
- 7
  - a. Calculate number of address lines required to access following memory:
    - (i) 64 KB (ii) 512 MB (iii) 256 KB (iv) 8 GB (04 Marks)
  - b. Explain internal organization of  $2M \times 8$  dynamic memory chip. (08 Marks)
  - c. Explain different types of nonvolatile memory. (08 Marks)
  
- 8
  - a. Explain cache memory and its relevant terms. (08 Marks)
  - b. Explain virtual memory organization. (06 Marks)
  - c. Explain magnetic disk principles. (06 Marks)
  
- 9
  - a. Explain single bus organization of the data path inside a processor. (10 Marks)
  - b. List the steps involved in memory read operation and also draw corresponding timing diagram. (10 Marks)
  
- 10
  - a. Write the control sequence for execution of the instruction Add ( $R_3$ ),  $R_1$ . (06 Marks)
  - b. Explain block diagram of a complete processor. (06 Marks)
  - c. Explain micro programmed control concept. (08 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8=50, will be treated as malpractice.