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Fifth Semester B.E. Degree Examination, June/July 2024 Computer Organization and ARM Microcontroller

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 basic operational concepts of computer. (10 Marks)
- b. Explain in brief, the different types of key parameters that affect the processor performance. (06 Marks)
- c. Explain Single-BUS structure in computer. (04 Marks)

OR

- 2 a. Define Interrupt. Explain Interrupt hardware with neat diagram. (05 Marks)
- b. What is DMA? Explain the use of DMA controllers in a computer system with neat diagram. (05 Marks)
- c. What is Bus arbitration? Explain two approaches of bus arbitration with neat diagram. (10 Marks)

Module-2

- 3 a. Draw and explain the Internal organization of 2M × 8 Asynchronous DRAM chip. (10 Marks)
- b. With a neat diagram, explain virtual memory organization. (10 Marks)

OR

- 4 a. Discuss with neat diagram, the single bus organization of data path inside a processor. (10 Marks)
- b. Give the control sequences for execution of an instruction ADD (R₃), R₁ and explain each step in detail. (05 Marks)
- c. Write short note on Basic concepts of instruction pipelining. (05 Marks)

Module-3

- 5 a. With neat diagram, explain ARM embedded system hardware. (10 Marks)
- b. Distinguish between RISC and CISC. (04 Marks)
- c. Discuss how the embedded system software components used to control an embedded device. (06 Marks)

OR

- 6 a. Describe the ARM core dataflow model with neat diagram. (08 Marks)
- b. Write basic layout of a generic program status register. (04 Marks)
- c. With table, describe the various Interrupts and Exception along with the vector addresses. (08 Marks)

Module-4

- 7 a. Explain the following ARM instruction with an example for each : MVN, LSL, ROR, ADC, ORR. (10 Marks)
- b. Mention the Instructions/Syntax which are used for call a routine. (04 Marks)
- c. Explain how LOAD-STORE instructions transfer data between memory and process registers. (06 Marks)

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.

OR

- 8 a. Explain the following ARM Instruction with an example for each : LDR, SWI, SBC, SMULL and CLZ. (10 Marks)
- b. Mention the instruction used for accessing program status register, explain the same using suitable example. (05 Marks)
- c. Explain the saturation instructions used in ARM v 5E processor. (05 Marks)

Module-5

- 9 a. Discuss with an example code, the steps involved in ARM-Thumb interworking. (08 Marks)
- b. Explain the stack operations using PUSH and POP instructions in Thumb with suitable example. (06 Marks)
- c. Write an ALP to add the first 10 integer numbers. (06 Marks)

OR

- 10 a. Describe the Basic C Data types are available in ARM processor. (10 Marks)
- b. In C looping structure, explain loops with a first number of iterations with suitable example. (10 Marks)
