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21EC52

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 $2M \times 8$ 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 (R_3), R_1 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 Instuctions/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)**

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 $\vee$ 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)**

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