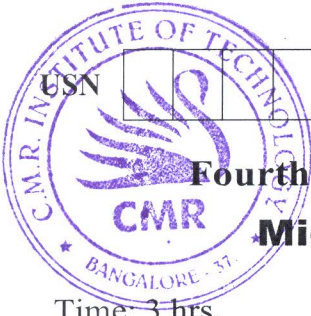


CBCS SCHEME

18CS44



Fourth Semester B.E. Degree Examination, June/July 2024

Microcontroller and Embedded Systems

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Explain the different processor modes provided by ARM7. (05 Marks)
- b. Explain the major design rules to implement the RISC philosophy. (05 Marks)
- c. Explain ARM core data flow model with neat diagram. (10 Marks)

OR

- 2 a. Explain the programmer's model of ARM processors with complete register sets available. (04 Marks)
- b. Describe conditional execution. Write the different code suffix. (06 Marks)
- c. What is pipelining? Explain in detail schematically. (10 Marks)

Module-2

- 3 a. With a neat diagram, explain Barrel Shifter. (06 Marks)
- b. Discuss the load and store instructions with respect to the Single Register Transfer. (08 Marks)
- c. How Register Allocation is done? Explain. (06 Marks)

OR

- 4 a. Explain about instruction scheduling. (04 Marks)
- b. Define instruction scheduling. Explain the rules summarizing the cycle timings for common instruction classes on the ARM9 TDMI. (06 Marks)
- c. Write notes on Profiling and Cycle Counting. (10 Marks)

Module-3

- 5 a. Differentiate Embedded Systems and General Purpose Computing Systems. (04 Marks)
- b. Write short notes on: (i) Real Time Clock (ii) Watch Dog Timer (06 Marks)
- c. Explain the system core of the Embedded Systems. (10 Marks)

OR

- 6 a. What are the different types of memories used in Embedded System Design? Explain the role of each. (10 Marks)
- b. Explain the different step modes for stepper motor. (10 Marks)

Module-4

- 7 a. Explain Quality Attribute in embedded system development. What are the different Quality Attribute to be considered in an embedded system design? (10 Marks)
- b. With the functional block diagram, explain the operation of washing machine as application specific embedded system. (10 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 with neat block diagram, how source file to object file translation takes place. (10 Marks)
- b. Explain two basic approaches for designing embedded firmware. (10 Marks)

Module-5

- 9 a. Explain Multi Threading. (06 Marks)
- b. Define the term Task, Process and Threads. Explain the process structure, process states and state transitions. (10 Marks)
- c. Explain different types of multitasking. (04 Marks)

OR

- 10 a. Explain the role of Integrated Development Environment (IDE) for Embedded Software Development. (08 Marks)
- b. Highlight the functional and non-functional requirements to be considered while choosing an RTOS for an embedded design. (08 Marks)
- c. Explain Round Robin process scheduling with interrupts. (04 Marks)

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