

CBCS SCHEME

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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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