C.M.R. INSTITUTE OF TECHNOLOGY
CMRIT
BANGALORE

CBCS SCHEME

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18CS44

Fourth Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Microcontroller and Embedded Systems

Time: 3 hrs. Max. Marks: 100

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

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.

Module-1

1 a. Explain ARM core data flow model with neat diagram. **(10 Marks)**

b. Explain the different processor modes provided by ARM 7. **(05 Marks)**

c. Explain the factors that makes ARM instruction set suitable for embedded application. **(05 Marks)**

OR

2 a. Describe conditional executives. Write the different code Suffix. **(06 Marks)**

b. What is pipelining? Explain in detail schematically. **(10 Marks)**

c. Explain the programmer's model of ARM Processors with complete register sets available. **(04 Marks)**

Module-2

3 a. What is inline barrel shifter? Describe the various operations barrel shifter support. **(06 Marks)**

b. Explain the various looping construct used in ARM. **(08 Marks)**

c. Summarize the cycle timings for common instruction classes on ARM TT.DM.1 **(06 Marks)**

OR

4 a. Write notes on Profiling and Cycle counting. **(10 Marks)**

b. Explain about instruction scheduling. **(04 Marks)**

c. Explain the following instructions with syntax and example.
i) MOV ii) SWI iii) MSR **(06 Marks)**

Module-3

5 a. What are the different types of memories used in Embedded System Design? Explain role of each. **(10 Marks)**

b. Explain the different step modes for stepper motor. **(10 Marks)**

OR

6 a. Differentiate embedded system and General Purpose computing Systems. **(04 Marks)**

b. Write short note :
i) Real Time Clock ii) Watch Dog Timer **(06 Marks)**

c. Explain the system core of the Embedded Systems. **(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)**

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b. With the functional block diagram, explain the operation of washing machine as application Specific Embedded System **(10 Marks)**

OR

8 a. Explain with neat block diagram, how source file to object file transaction takes place. **(10 Marks)**

b. Explain two basic approaches for designing embedded firm ware. **(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. List and explain five basic functions of Kernel of Real Time Operating System. **(10 Marks)**

b. What is Simulator? Explain features, advantages, disadvantages of simulator based debugging. **(10 Marks)**

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