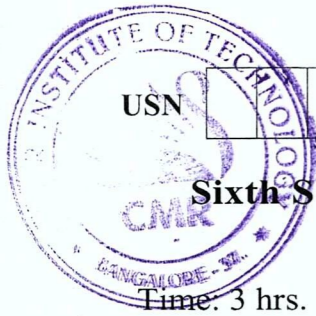


# CBCS SCHEME

18EC62



USN

18EC62

Sixth Semester B.E./B.Tech Degree Examination, Dec.2025/Jan.2026

## 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. With the help of block diagram, explain the architecture of ARM Cortex M3 processor. (08 Marks)
- b. Discuss operating modes of Cortex-M3 with state diagram. (06 Marks)
- c. Write a note on debugging support provided by Cortex-M3 processor. (06 Marks)

### OR

- 2 a. Draw and explain the register organization of Cortex-M3 processor. (10 Marks)
- b. Define stack and also explain the PUSH and POP operation with the help of diagram. (06 Marks)
- c. List out the applications of Cortex-M3 processor. (04 Marks)

### Module-2

- 3 a. Examine the operation of the following instructions:
  - i) LDMIA Rd!, <R0 – R3>
  - ii) PUSH {R0 – R3, LR}
  - iii) LSL R4, R2, #05
  - iv) BFI W R2, R0, #03, #05,
  - v) REVHS R3, R7(10 Marks)
- b. With a neat diagram, explain the organization of CMSIS and its benefits. (10 Marks)

### OR

- 4 a. Explain shift and rotate instructions available in ARM Cortex-M3 processor. (10 Marks)
- b. Write a program to blink LED using 'C' language. (04 Marks)
- c. Write a note on barrier instruction in Cortex-M3. (06 Marks)

### Module-3

- 5 a. List out and explain the classification of embedded system. (06 Marks)
- b. Compare :
  - i) RISC and CISC
  - ii) Big-Endian and little Endian(08 Marks)
- c. Describe the various purpose of embedded system. (06 Marks)

### OR

- 6 a. With a neat diagram, explain the elements of embedded system. (08 Marks)
- b. Distinguish between RAM and ROM. (04 Marks)
- c. Write a short notes on: i) I2C ii) Sensors (08 Marks)

### Module-4

- 7 a. Identify and explain the operational and non-operational quality attributes of an embedded system. (10 Marks)
- b. List out and explain the fundamental issues in an hardware software co-design. (10 Marks)

### OR

- 8 a. With a neat flow diagram, explain high level language to machine language conversion process. (08 Marks)
- b. Explain super loop and OS based approach of embedded firmware design. (06 Marks)
- c. Compare CDFG and DFG. (06 Marks)

### Module-5

- 9 a. Define process, explain process states and state transition along with diagram. (10 Marks)
- b. Write short notes on Simulator, Emulator and Debugging techniques. (10 Marks)

### OR

- 10 a. Identify and explain the basic functions of Real-Time Kernel. (06 Marks)
- b. Define deadlock and also explain the different conditions which favours a deadlock situation. (06 Marks)
- c. Write a note on functional and non-functional requirement in the selection of RTOS. (08 Marks)

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