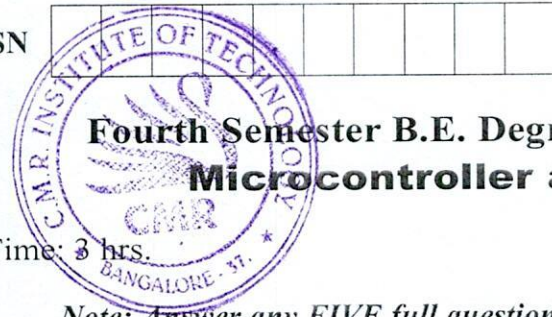


USN

18CS44



Fourth Semester B.E. Degree Examination, Dec.2024/Jan.2025
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. Differentiate between RISC and CISC processors. (06 Marks)
- b. Explain ARM core data flow model, with neat diagram. (08 Marks)
- c. Explain ARM registers used under various modes. (06 Marks)

OR

- 2 a. Explain the architecture of a typical embedded device based in ARM core, with a neat diagram. (08 Marks)
- b. Explain the various fields in the current program status register. (06 Marks)
- c. Discuss the following with diagram : (06 Marks)
 - i) Von Neuman architecture with cache.
 - ii) Harvard architecture with TCM.

Module-2

- 3 a. Explain Barrel Shifter Operation, with neat diagram. (06 Marks)
- b. Write an ALP using instruction to find out the factorial of a given number. (07 Marks)
- c. Write a program to add an array of 16 bit numbers and store the 32 bit result in internal RAM using ARM instructions. (07 Marks)

OR

- 4 a. Discuss the Load store instructions with respect to single register transfer along with various addressing modes. (10 Marks)
- b. Write an ALP program to multiply two 16 bit numbers. (05 Marks)
- c. With example, explain the Swap Instructions. (05 Marks)

Module-3

- 5 a. Differentiate between : (08 Marks)
 - i) Microprocessor and Microcontroller.
 - ii) Little Endian and Big Endian architecture.
- b. With neat block diagram, explain the elements of embedded system. (06 Marks)
- c. Mention the application of embedded system with example of each. (06 Marks)

OR

- 6 a. Explain the different On board communication interfaces in brief. (08 Marks)
- b. Write a note on : (06 Marks)
 - i) Reset circuit
 - ii) Watch dog timer.
- c. Explain how program memory are classified. (06 Marks)

Module-4

- 7 a. Explain the Operational and non operational attributes of an embedded systems. (10 Marks)
- b. Explain the different 'Embedded firmware design' approach in detail. (10 Marks)

OR

- 8 a. With a neat block diagram, explain design and working of Washing Machine. (10 Marks)
- b. With FSM model, explain the design and operation of automatic tea/coffee vending machine. (06 Marks)
- c. Explain Super loop based approach of embedded firmware design. (04 Marks)

Module-5

- 9 a. Define Process. Explain in detail the Structure of Memory Organisation and State transitions of the process. (10 Marks)
- b. Explain Multithreading, Multiprocessing and Multitasking. (10 Marks)

OR

- 10 a. Explain with neat diagram, the concept of 'Dead lock' and mention the different conditions which favour a dead lock situation. (10 Marks)
- b. With neat diagram, explain i) Binary Semaphore ii) Counting Semaphore. (10 Marks)
