

CBCS SCHEME

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18CS44

Fourth Semester B.E. Degree Examination, July/August 2022 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. Compare Microprocessors and Microcontrollers. (06 Marks)
- b. Discuss the ARM design Philosophy. (06 Marks)
- c. With a neat diagram, explain the four main hardware components of an ARM based embedded device. (08 Marks)

OR

- 2 a. Explain the ARM Core data flow model with a neat diagram. (08 Marks)
- b. Draw the basic layout of a generic program status register and briefly explain the various fields. (06 Marks)
- c. What is Pipelining? Illustrate it with a simple example. (06 Marks)

Module-2

- 3 a. Explain the different Data Processing Instructions in ARM. (10 Marks)
- b. Briefly explain the different Load – Store Instruction categories used with ARM. (10 Marks)

OR

- 4 a. Write a program for forward and backward branch by considering an example. (06 Marks)
- b. Explain Co – Processor Instructions of ARM processor. (06 Marks)
- c. Write a note on Profiling and Cycle Counting. (08 Marks)

Module-3

- 5 a. What is an Embedded System? Differentiate between general purpose computing system and embedded system. (06 Marks)
- b. List any four purposes of Embedded system with examples. (08 Marks)
- c. Write short notes on : i) Real Time Clock ii) Watch Dog Timer. (06 Marks)

OR

- 6 a. Briefly describe the classification of Embedded system. (08 Marks)
- b. Explain the following :
i) I²C Bus ii) S P I Bus iii) Reset Circuit iv) 1 – Wire Interface. (12 Marks)

Module-4

- 7 a. What are the Operational and Non – Operational Quality Attributes of an Embedded system? (10 Marks)
- b. Explain the different communication buses used in Automotive applications. (06 Marks)
- c. Design an FSM model for Tea / Coffee vending machine. (04 Marks)

OR

- 8 a. Explain the Fundamental issues in Hardware Software Co - design. (06 Marks)
b. Explain the Assembly language based Embedded firmware development with a diagram. (06 Marks)
c. With a neat block diagram, how source file to object file translation takes place in High level language based firmware development. (08 Marks)

Module-5

- 9 a. With a neat diagram, explain Operating System Architecture. (08 Marks)
b. Explain Multithreading. (06 Marks)
c. Explain the concept of Binary Semaphore. (06 Marks)

OR

- 10 a. Explain the role of Integrated Development Environment (IDE) for Embedded Software development. (08 Marks)
b. Write a note on Message passing. (08 Marks)
c. Explain the concept of deadlock with a neat diagram. (04 Marks)
