CBCS SCHEME

USN | | | | | | | | | **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) I 2 C 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

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.

18CS44

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)

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