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) 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

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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