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17EC62

Sixth Semester B.E. Degree Examination, Feb./Mar.2022
ARM Microcontroller & 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 a neat diagram, explain the architecture of ARM cortex M3 microprocessor. **(10 Marks)**
b. Explain the operation modes of ARM cortex M3. **(05 Marks)**
c. Explain the memory map of cortex M3. **(05 Marks)**

OR

2 a. With a neat diagram, explain the thumb-2 instruction set architecture in comparison with Thumb and ARM. **(06 Marks)**
b. Explain the two stack models of Cortex-M3. **(06 Marks)**
c. Explain the different special purpose registers of Cortex-M3. **(08 Marks)**

Module-2

3 a. Write an assembly level program to find the sum of first ten integers. **(06 Marks)**
b. With a neat diagram, explain the organization of CMSIS. **(06 Marks)**
c. With neat diagrams explain the operation of shift and rotate instructions. **(08 Marks)**

OR

4 a. Write a C program to toggle an LED with a small delay. **(10 Marks)**
b. Explain the following instructions:
(i) MSR (ii) ASR (iii) TST
(iv) LDR (v) RSB. **(10 Marks)**

Module-3

5 a. With illustrative examples, explain the various purposes of embedded systems in detail. **(12 Marks)**
b. Explain the operation of static and dynamic RAM cell. **(08 Marks)**

OR

6 a. Explain the components of a typical embedded system in detail. **(08 Marks)**
b. What are the different external communication interfaces? Explain in brief. **(12 Marks)**

Module-4

7 a. Explain the different characteristics of embedded system in detail. **(12 Marks)**
b. What are the different embedded firmware design approaches, explain in detail. **(08 Marks)**

OR

8 a. What is non-operational quality attribute? Explain the important non-operational quality attributes to be considered in any embedded system. **(10 Marks)**
b. Explain the different computational models in embedded system design. **(10 Marks)**

Module-5

9 a. What is a Kernel? What are the different functions handled by a general purpose kernel. **(10 Marks)**

b. Explain the different tools used for hardware debugging. **(10 Marks)**

OR

10 a. Explain the different techniques for embedding the firmware into the target board for a non-OS based embedded system. **(10 Marks)**

b. Explain the basic functions of a real time kernel. **(10 Marks)**

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