CBCS SCHEME

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18CS44

Fourth Semester B.E. Degree Examination, June/July 2024
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. Explain the different processor modes provided by ARM7. **(05 Marks)**
b. Explain the major design rules to implement the RISC philosophy. **(05 Marks)**
c. Explain ARM core data flow model with neat diagram. **(10 Marks)**

OR

2 a. Explain the programmer's model of ARM processors with complete register sets available. **(04 Marks)**
b. Describe conditional execution. Write the different code suffix. **(06 Marks)**
c. What is pipelining? Explain in detail schematically. **(10 Marks)**

Module-2

3 a. With a neat diagram, explain Barrel Shifter. **(06 Marks)**
b. Discuss the load and store instructions with respect to the Single Register Transfer. **(08 Marks)**
c. How Register Allocation is done? Explain. **(06 Marks)**

OR

4 a. Explain about instruction scheduling. **(04 Marks)**
b. Define instruction scheduling. Explain the rules summarizing the cycle timings for common instruction classes on the ARM9 TDMI. **(06 Marks)**
c. Write notes on Profiling and Cycle Counting. **(10 Marks)**

Module-3

5 a. Differentiate Embedded Systems and General Purpose Computing Systems. **(04 Marks)**
b. Write short notes on: (i) Real Time Clock (ii) Watch Dog Timer **(06 Marks)**
c. Explain the system core of the Embedded Systems. **(10 Marks)**

OR

6 a. What are the different types of memories used in Embedded System Design? Explain the role of each. **(10 Marks)**
b. Explain the different step modes for stepper motor. **(10 Marks)**

Module-4

7 a. Explain Quality Attribute in embedded system development. What are the different Quality Attribute to be considered in an embedded system design? **(10 Marks)**
b. With the functional block diagram, explain the operation of washing machine as application specific embedded system. **(10 Marks)**

OR

8 a. Explain with neat block diagram, how source file to object file translation takes place. **(10 Marks)**

b. Explain two basic approaches for designing embedded firmware. **(10 Marks)**

Module-5

9 a. Explain Multi Threading. **(06 Marks)**

b. Define the term Task, Process and Threads. Explain the process structure, process states and state transitions. **(10 Marks)**

c. Explain different types of multitasking. **(04 Marks)**

OR

10 a. Explain the role of Integrated Development Environment (IDE) for Embedded Software Development. **(08 Marks)**

b. Highlight the functional and non-functional requirements to be considered while choosing an RTOS for an embedded design. **(08 Marks)**

c. Explain Round Robin process scheduling with interrupts. **(04 Marks)**

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