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CBCS SCHEME

USN | | | | | | | | | | |

18CS44

Fourth Semester B.E. Degree Examination, Jan./Feb. 2023
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. Explain the factors that makes ARM instruction set suitable for embedded applications. **(05 Marks)**

b. Explain the core extensions of ARM processor with neat block diagrams. **(09 Marks)**

c. Explain Embedded system hardware with neat block diagram. **(06 Marks)**

OR

2 a. Explain the purpose of various fields of CPSR with neat diagram. **(05 Marks)**

b. Explain various functional units of ARM with the help of ARM core dataflow model. **(09 Marks)**

c. Explain the ARM design philosophy. **(06 Marks)**

Module-2

3 a. What is inline barrel shifter? Describe the various operations barrel shifter supports. **(06 Marks)**

b. Summarize the cycle timings for common instruction classes on ARM7TDMI. **(06 Marks)**

c. Explain the various looping constructs used in ARM. **(08 Marks)**

OR

4 a. What are the various logical instructions supported by ARM? Explain with examples for each. **(06 Marks)**

b. Summarize the scheduling of load instructions. **(06 Marks)**

c. Explain the following instructions with syntax and example :
   (i) MOV
   (ii) SWI
   (iii) MSR
   (iv) TST **(08 Marks)**

Module-3

5 a. List any four major application areas of embedded systems. Mention atleast two examples for embedded devices in each area. **(08 Marks)**

b. What is a relay? Explain transistor-based relay driving circuit with diagram. **(06 Marks)**

c. Explain brown out protection. **(06 Marks)**

OR

6 a. List four onboard communication interfaces. Explain any one in detail. **(08 Marks)**

b. Explain the purpose of embedded systems. **(06 Marks)**

c. Explain matrix keyboard interfacing. **(06 Marks)**

Module-4

7 a. Explain unique characteristics of embedded systems. **(06 Marks)**

b. What is sequential processing model? Draw a sequential processing model for car seat belt warning system using flow chart. **(08 Marks)**

c. Explain different types of serial interfaces buses deployed in automotive embedded application. **(06 Marks)**

OR

8 a. Explain operational quality attributes of embedded system design. **(06 Marks)**

b. Explain high level language based embedded firmware development. List the advantages and disadvantages. **(08 Marks)**

c. Explain Data flow graph and control data flow graph computational model with neat diagrams. **(06 Marks)**

Module-5

9 a. List and explain five basic functions of kernel of Real Time Operating System. **(10 Marks)**

b. What is a simulator? Explain features, advantages and disadvantages of simulator based debugging. **(10 Marks)**

OR

10 a. Explain JTAG Based boundary scan with diagram. **(10 Marks)**

b. What is a process? Explain the structure of process, process states and state transition. **(10 Marks)**

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