CBCS SCHEME

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15EC62

Sixth Semester B.E. Degree Examination, Aug./Sept. 2020
ARM Microcontroller and Embedded System

Time: 3 hrs. Max. Marks: 80

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Explain the architecture of ARM Cortex–M3 processor with the help of neat block diagram. **(08 Marks)**

b. Describe the memory map of Cortex–M3 with neat diagram. **(04 Marks)**

c. List the applications of ARM processor. **(04 Marks)**

OR

2 a. Discuss the operating modes of cortex-M3 at different privelege levels. Depict the operating modes with state diagram. **(06 Marks)**

b. Explain two stack model of cortex–M3 with diagrams. **(04 Marks)**

c. Describe the special function registers of cortex-M3. **(06 Marks)**

Module-2

3 a. Explain the working of following instructions : i) LDMIA ii) BFC iii) SXTB. **(06 Marks)**

b. Write on ALP to add two 64-bit numbers. **(04 Marks)**

c. Explain any two methods of accessing memory mapped resisters in C. **(06 Marks)**

OR

4 a. What is bit-band operations? With an example, explain assembler sequence to write a bit with and without bit-band. **(06 Marks)**

b. Write a C language program to toggle an LED with a small delay in cortex M3. **(05 Marks)**

c. Explain the working of TBB instruction. **(05 Marks)**

Module-3

5 a. Define the term RAM. Mention different types of RAM and explain any one with neat circuit diagram. **(06 Marks)**

b. With a neat interfacing diagram explain the SPI bus. **(06 Marks)**

c. Bring out differences between FPGA and CPLD. **(04 Marks)**

OR

6 a. Mention all the cores around which an embedded system is built. Discuss any two in detail. **(08 Marks)**

b. Write a note on embedded firmware. **(04 Marks)**

c. Explain the importance of brown out protection circuit with a neat diagram. **(04 Marks)**

Module-4

7 a. Discuss the 6 operation quality attributes of an embedded system. **(06 Marks)**

b. With FSM model, explain the design and operation of automatic seat belt monitoring system. **(06 Marks)**

c. Compare CDFG and DFG with an example. **(04 Marks)**

OR

8 a. With a neat flow diagram, explain high level language to machine language conversion process. **(05 Marks)**

b. With a block diagram, mention the components used in the design of a washing machine and also explain its working. **(06 Marks)**

c. Describe in brief the typical characteristics of an embedded system. **(05 Marks)**

Module-5

9 a. Define the term operating system. With a neat diagram explain the different function of operating system. **(08 Marks)**

b. Discuss the different techniques for embedding the fireware into the target. **(08 Marks)**

OR

10 a. Bring out difference between simulator and emulator. **(02 Marks)**

b. Describe a preemptive SJF scheduling. Determine average turnaround time and average waiting time, if process P1, P2 and P3 with estimated completion time of 1.2, 6, 7 milliseconds enter ready queue together and later P4 with a completion time of 2 msce enters ready queue after 2ms. **(07 Marks)**

c. Explain the terms process, task and thread. **(07 Marks)**

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