CBCS SCHEME

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

18EC62

Sixth Semester B.E. Degree Examination, July/August 2022
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 block Schematic, explain the function of various units in ARM cortex M3 processor architecture, in brief. **(10 Marks)**

b. Explain any 5 application of ARM cortex M3 based on its features. **(05 Marks)**

c. With diagram, explain 2 operation modes and 2 privilege levels in cortex M3, when exceptions are to be handled. **(05 Marks)**

OR

2 a. With tables, describe the various interrupts and exception along with the vector addresses. **(10 Marks)**

b. Explain Program Status Registers (PSRs) in cortex M3 along with the 2 instructions used for accessing PSRS, with a diagram. **(05 Marks)**

c. Describe the reset sequence with a diagram. **(05 Marks)**

Module-2

3 a. Explain the 16 bit instructions: CMP, ASR, SBC and LDMIA, with an example for each. **(08 Marks)**

b. Describe signed and unsigned saturation instructions with diagram and examples. **(08 Marks)**

c. Explain IT instruction with an example to convert a High level language instruction to its equivalent assembly instructions in cortex M3. **(04 Marks)**

OR

4 a. Explain the following 32 bit instructions with an example for each : ADC, BFC, LSL and PUSH. **(08 Marks)**

b. Describe CMSIS with diagram and its functions, organization and scope. **(08 Marks)**

c. Write an ALP to add the first 10 integer numbers using cortex M3 processor. **(04 Marks)**

Module-3

5 a. Describe the elements of an embedded system with a block diagram. **(10 Marks)**

b. Classify the embedded systems based on the complexities and give 2 examples for each category. **(06 Marks)**

c. Differentiate between RISC and CISC architectures. **(04 Marks)**

OR

6 a. Describe the functions of Optocoupler, I2C and IrDA for embedded system. **(10 Marks)**

b. Explain EPROM, EEPROM, FLASH, DRAM, NVRAM and Sensors required for embedded systems. **(06 Marks)**

c. Differentiate between Embedded and general computing systems. **(04 Marks)**

Module-4

7 a. Describe coin operated telephone system with a FSM, function of states and state transition diagram. **(08 Marks)**

b. Explain any 5 characteristics of embedded systems. **(05 Marks)**

c. With a block schematic, explain the ALP based embedded firmware design with its disadvantages. **(07 Marks)**

OR

8 a. Describe the sequential program model for seat belt warning system along with the operation of the system. **(08 Marks)**

b. Explain any 5 operational quality attributes of embedded systems. **(05 Marks)**

c. With a functional block diagram, explain the working of a washing machine. **(07 Marks)**

Module-5

9 a. With the state transition diagram, structure of a process and memory organization, explain the functions of status and the scheduler function for process management. **(10 Marks)**

b. With an example, describe preemptive SJF scheduling and calculate all the performance factors. **(10 Marks)**

OR

10 a. Describe out-of-circuit programming and In-system-programming. **(10 Marks)**

b. With a block diagram, explain the embedded system development environment with the functions of the components used in brief. **(10 Marks)**

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