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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