



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)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.



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)

* * * * *