



Sixth Semester B.E. Degree Examination, June/July 2025
Embedded Systems

Max. Marks: 100

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

Module-1

- 1 a. Explain the architectural features of Cortex M3 processor with block diagram. (08 Marks)
- b. Explain the general purpose registers and special registers of cortex M3 processor. (06 Marks)
- c. Explain operation modes of Cortex M3 processor. (06 Marks)

OR

- 2 a. Briefly describe the features of Built in Nested Vector Interrupt Controller (NVIC). (08 Marks)
- b. Write short notes on :
 - (i) Interrupts and exceptions supported by cortex M3 processor. (06 Marks)
 - (ii) Memory Map. (06 Marks)
- c. What is Stack? Explain Stack model in cortex M3. (06 Marks)

Module-2

- 3 a. Explain the structure of an ALP instruction format, with reference to the ARM processor. (06 Marks)
- b. List the different directives used in ARM processor and explain significance of directives. (06 Marks)
- c. Explain with an example 16 bit and 32 bit Arithmetic instructions with reference to ARM. (08 Marks)

OR

- 4 a. Explain pre indexing, post indexing memory access instructions. (06 Marks)
- b. Explain in detail shift and rotate instruction of ARM processor. (08 Marks)
- c. Explain working of following instructions :
 - (i) CMP
 - (ii) TST
 - (iii) REV
 (06 Marks)

Module-3

- 5 a. What is ES? Differentiate between general purpose and embedded computing system. (06 Marks)
- b. Explain in detail the purposes of ES. (06 Marks)
- c. With neat sketch, explain the typical building blocks of an ES. (08 Marks)

OR

- 6 a. Explain with all example Big Endian and Little Endian operation. (06 Marks)
- b. Explain in detail the realization of SRAM and DRAM operation. (08 Marks)
- c. Explain LOAD / STORE architecture. (06 Marks)

Module-4

- 7 a. List and explain important characteristics of an embedded system. (06 Marks)
- b. Explain the various serial bus interfaces used in Automotive Industry. (06 Marks)
- c. Describe different computational models used in ES. (08 Marks)

OR

- 8 a. Discuss the fundamental issues in Hardware and Software co-design of an ES. (06 Marks)
- b. Explain FSM (Finite State Machine) model for the design of an ES for driver or passenger seat belt warning system and timer as system requirements for ES. (08 Marks)
- c. Explain with neat sketch the following :
 - (i) Assembly language to machine language conversion. (06 Marks)
 - (ii) High level language to machine language conversion. (06 Marks)

Module-5

- 9 a. Explain in detail, the following :
 - (i) Threads (06 Marks)
 - (ii) Process (06 Marks)
 - (iii) Tasks (06 Marks)
- b. Explain in detail the process states and state transitions. (06 Marks)
- c. Explain functional and non functional requirements need to be considered during selection of an ES. (08 Marks)

OR

- 10 a. Explain Round Robin scheduling algorithm. (02 Marks)
- b. Three processes with P_1 , P_2 and P_3 as ID^8 with estimated completion time 10, 5, 7 msec respectively enter ready queue together. A new process P_4 with estimated completion time 2 ms enters ready queue after 2 msec. Calculate waiting time, turn around time and average turn around time with the help of preemptive SJF scheduling. (10 Marks)
- c. Describe the following :
 - (i) IDE
 - (ii) Dissassembler / Decompiler
 - (iii) Simulator / Emulator. (08 Marks)
