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10EC74

Seventh Semester B.E. Degree Examination, Aug./Sept.2020

Embedded System Design

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1 a. What is an embedded system? What is the purpose of a watchdog timer in an embedded application? (04 Marks)
b. Briefly describe the major elements of embedded system development life cycle. (08 Marks)
c. Discuss the basic computing engines of an embedded system with suitable diagrams for each. (08 Marks)
- 2 a. What is meant by arity of an instruction? Explain the terms one, two, three address instruction. (04 Marks)
b. Briefly describe the more commonly used addressing modes. (10 Marks)
c. Describe these operations of instruction cycle in ISA and RTL level:
(i) Fetch (ii) Execute (iii) Next (06 Marks)
- 3 a. List and explain the various types of memory. (06 Marks)
b. Explain an associative mapping cache implementation. (08 Marks)
c. Explain the following: (i) Swapping (ii) Overlays (06 Marks)
- 4 a. What is a product life cycle and explain briefly V life cycle and spiral mode. (08 Marks)
b. Write a hardware architecture and data and counter flow diagram of a counter system and explain briefly flow diagrams. (08 Marks)
c. What are the five steps to a successful design? (04 Marks)

PART – B

- 5 a. What is scheduling strategy? Define the three general categories of scheduling strategy. (06 Marks)
b. Explain the core responsibilities of operating system. (08 Marks)
c. Define thread. Enumerate the difference between a process and thread. (06 Marks)
- 6 a. What is context switching? Explain with neat diagram. (06 Marks)
b. Write the algorithm for a simple OS Kernel, using C language notation for 3 asynchronous tasks using TCB's only. The 3 tasks use a common data buffer for read, increment and display operations. (08 Marks)
c. With a suitable schematic and program, explain the task control block. (06 Marks)
- 7 a. Explain the purpose of the complexity analysis by suggesting a suitable algorithm for that. (08 Marks)
b. Write short notes on Big O notation. (05 Marks)
c. Discuss the design of a memory map used in the memory loading, with an example. (07 Marks)
- 8 a. Define response time. Describe the major components of response time analysis of (i) polled loop (ii) pre-emptive scheduling, in an embedded application. (08 Marks)
b. With suitable algorithm, explain the analysis of search and sort to determine their complexity. (08 Marks)
c. What are the common mistakes that might be made during performance optimization analysis? (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.