USN ☐☐☐☐☐☐☐☐☐☐   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)**

* * * * *