USN

Seventh Semester B.E. Degree Examination, July/August 2021
Embedded Computing System

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions.*

1   a.   What is an Embedded System? Explain Embedded System design process.   **(10 Marks)**
    b.   With neat diagram, explain sequence diagram for transmitting a control input of a model train controller.   **(10 Marks)**

2   a.   Bring out the differences between A Von Neuman architecture and A Harvard architecture.   **(05 Marks)**
    b.   Convert the following 'C' assignments into ARM instruction:
         i) $x = (a + b) - c$;
         ii) $y = a * (b + c)$;   **(05 Marks)**
    c.   With neat diagram, explain direct-mapped cache and set associative cache.   **(10 Marks)**

3   a.   Explain the basic building block of bus protocol with neat diagram and explain the bust read transaction with a timing diagram.   **(10 Marks)**
    b.   With neat diagram, explain architecture of a logic analyzer.   **(10 Marks)**

4   a.   Explain the components for embedded programs with examples.   **(10 Marks)**
    b.   With example explain loop optimization techniques.   **(10 Marks)**

5   a.   What is RTOS? List and explain basic functions of the Real Time Kernel (RTOS).   **(10 Marks)**
    b.   Define process. Explain the structure, states, state transition of a process.   **(10 Marks)**

6   a.   What is interprocess communication mechanism? Explain two major styles of interprocess communication.   **(10 Marks)**
    b.   Explain the functional and nonfunctional requirements, that needs to be analyzed in the selection of RTOS for an embedded design.   **(10 Marks)**

7   a.   Explain Ethernet CSMA/CD algorithm and packet format.   **(10 Marks)**
    b.   Explain the following:
         i) I^2C structure
         ii)   CAN Architecture   **(10 Marks)**

8   Write a short note on:
    a.   Simulators and Emulators
    b.   Multiprocessing and Multitasking
    c.   Watchdog Timer
    d.   Supervisor mode and Exception.   **(20 Marks)**

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