Code No: 07A80402 | R07 | | Set No. 2 |

IV B.Tech II Semester Examinations,April/May 2012
EMBEDDED AND REAL TIME SYSTEMS
Common to Electronics And Telematics, Electronics And Instrumentation
Engineering, Electronics And Communication Engineering

Time: 3 hours   Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) Explain Task scheduling and give some examples
   (b) Explain about the following scheduling algorithms
      i. First-in-First-out.
      ii. Round-Robin with priority.   [8+8]

2. (a) Write note on Wireless LAN.
   (b) Explain briefly about RS422/RS485. Differentiate between RS232 and RS485.
                                                                        [8+8]

3. (a) How do you describe a System as a State Machine?
   (b) Explain about QNX.
   (c) Explain briefly about Moore-type FSM.   [5+5+6]

4. (a) Write a small program in Embedded C that reads a file of integers and outputs their sum
   (b) Write a 'C' program that does not add the integers using built-in addition Operator of a programming language, but instead simulates addition by using an Addition function that converts each integer to a string of 0's and 1's, adds the String, Mimicking binary addition and converts binary results to an integer.
   (c) Compare the performance of native program to the performance of the simulator Program in a large file.   [6+5+5]

5. With suitable examples explain how to:
   (a) Post a message in a Message Queue
   (b) Read a message from message queue
   (c) Show queue waiting list.   [5+5+6]

6. (a) Explain briefly about SHARC architecture.
   (b) What is the use of Clock Circuitry in embedded Systems?   [8+8]

7. Design a single- purpose processor that outputs Fibonacci numbers upto n places. Start with a function computing the desired result, translate it into a state diagram and sketch a probable datapath.   [16]

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8. List the various Open source embedded operating systems and explain their features. [16]

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1. Write short notes on the following topics

   (a) Cache Memory
   (b) Pipelining
   (c) Addressing Modes
   (d) Register and Base address.   [4+4+4+4]

2. With suitable examples explain how to

   (a) Set time
   (b) Time delay (In system clock ticks)
   (c) Reset Timer.   [16]

3. (a) What is flip flop? Explain Master - Slave flip flop.
   (b) Explain about RT - Level sequential components and sequential logic design.
                                                                           [4+12]

4. (a) Explain about Synchronization among Processes.
   (b) Explain about Process Suspend, Resume and Join.   [10+6]

5. (a) Explain the importance of Semaphores in RTOS.
   (b) Explain the difference between Semaphores and Mutex.   [8+8]

6. With suitable examples explain how to:

   (a) Query a Mailbox
   (b) Post a message in a Mailbox
   (c) Read message from a Mailbox.   [5+6+5]

7. Show how to partition a single finite state machine into two smaller fine state
   Machines, which might be necessary to achieve acceptable synthesis tool in run
   time.   [16]

8. (a) What are the devices that can be connected through IEEE 1394 Bus? Explain
       its limitations.
   (b) What are Bluetooth devices? Explain how they can be used to setup Personal
       Area Networks?   [8+8]

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⋆ ⋆ ⋆ ⋆ ⋆

1. Taking suitable examples explain how to :

    (a) Create a Mutex
    (b) Delete a Mutex
    (c) Release a Mutex.   [5+5+6]

2. With suitable examples explain how to

    (a) Flush a queue
    (b) Post a message in front of Queue.
    (c) Broadcast a queue.   [5+6+5]

3. (a) Explain about hardware interface to RS 232 with all its hand shake signals.
   (b) Explain the features of USB.   [8+8]

4. (a) What is an interrupt? Why are they required in a computer? Explain clearly
       how multiple interrupts are handled by the computer.
   (b) Explain various design considerations that are common to broad range of
       Embedded Systems.   [8+8]

5. Write short notes on following:

    (a) Windows CE
    (b) QNX
    (c) Real - Time Systems
    (d) Message Passing.   [4+4+4+4]

6. Explain about the following two verification approaches and compare them.

    (a) Formal verification
    (b) Simulation   [8+8]

7. (a) What is Tornado development environment? Explain with neat block Dia-
       gram.
   (b) Explain the following states of VxWorks tasks

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      i. Ready

      ii. Pending

      iii. Delay

      iv. Suspend   [8+8]

8. (a) What is design metric?

    (b) List a pair of design metrics that may compete with one another, providing an intuitive explanation of the reason behind the competition?   [4+12]

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1. Explain about Synchronization among Processes. [16]

2. With suitable examples explain how you:

   (a) Resume a Task
   (b) Change priority of a Task
   (c) Query a Task. [5+5+6]

3. List the various commercially available embedded operating systems and Explain their features. [16]

4. (a) Explain the RS232 interface specifications.
   (b) Explain the protocol architecture of Ethernet LAN. [8+8]

5. With suitable examples explain how you:

   (a) Close a Pipe
   (b) Read a Message from the pipe
   (c) Write to the Pipe. [5+5+6]

6. Write short notes on the following.

   (a) Reset Circuitry
   (b) ASIPs
   (c) Programmable Array Logic/ PLD
   (d) Bus Handshaking. [4+4+4+4]

7. Design a circuit that multiplies two matrices A and B. A is 3×2 matrix and B is 2×3, matrix. The multiplication works as follows. [16]

$$
\begin{bmatrix} A & B \\ C & D \\ E & F \end{bmatrix} * \begin{bmatrix} G & H & I \\ J & K & L \end{bmatrix} = \begin{bmatrix} A^*G + B^*J & A^*H + B^*K & A^*I + B^*L \\ C^*G + D^*J & C^*H + D^*K & C^*I + D^*L \\ E^*G + F^*J & E^*H + F^*K & E^*I + F^*L \end{bmatrix}
$$

8. (a) Draw and explain Design cycles in the development phase for an embedded system

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(b) Describe complete specifications and system requirements of an embedded system. [10+6]

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