

Code No: L0421/R07

Set No. 1

IV B.Tech II Semester Regular Examinations, Apr/May 2013
EMBEDDED AND REAL TIME SYSTEMS
(Common to Electronics & Communication Engineering and Electronics & Instrumentation Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. Explain the following with diagram and truth table. [2 × 8]
 - (a) 2 input NOR gate
 - (b) 2 input NAND gate
 - (c) Inverter
 - (d) nMOS transistor
 - (e) pMOS transistor
 - (f) 2-4 line Decoder
 - (g) 2 input Exclusive - OR
 - (h) 2 input Exclusive - NOR.
2. Explain about various Input/ Output (I/O) Devices used in Embedded Systems. [16]
3.
 - (a) Explain using State Machines in Embedded Systems.
 - (b) Explain about Finite - State Machine with Datapath model. [8+8]
4.
 - (a) Explain about the role of Null Modem Cable Connection in connecting two RS232 ports.
 - (b) Explain briefly about RS422/RS485 and differentiate between RS485 and RS232. [8+8]
5. With suitable examples explain how do you : [5+5+6]
 - (i) Acquire a Semaphore
 - (ii) Release a Semaphore
 - (iii) Query a Semaphore.
6. With suitable examples explain how to:
 - (a) Close a Pipe
 - (b) Read a Message from the pipe
 - (c) Write to the Pipe. [5+5+6]
7.
 - (a) Explain various types of embedded operating systems and their differences.
 - (b) Explain the commonalities of the embedded systems. [8+8]
8. What is a Gajski Y chart? How this chart is important in the design of an embedded System. [16]

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1. Explain the important features of any two Embedded Systems belong to each of the following areas of application. [4+4+4+4]
 - (a) Consumer Electronics
 - (b) Missiles and Bombs in Military
 - (c) Data communication
 - (d) Wireless Communication
2. Create a table listing the address spaces for the following address sizes:
 - (a)
 - i. 8 - bit
 - ii. 16 - bit
 - iii. 24 - bit
 - iv. 32 - bit
 - (b) Explain the following
 - i. Data path
 - ii. Control unit. [2+2+2+2+4+4]
3. (a) Explain about Suspending and Resuming Processes.
(b) Explain how to synchronize consumer-producer problem using monitors. Write and explain the C Program for it. [6+10]
4. (a) Explain about the infrared communication.
(b) Explain briefly about IEEE 1394 along with its signals. [8+8]
5. (a) With suitable examples explain how do you Create and Delete a Semaphore
(b) With suitable examples explain how to
 - i. Create a Task
 - ii. Suspend a Task. [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]

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Set No. 2

7. (a) Analyze the out-put of following programs on Linux Machine

```
int main (void)
{
printf("Hello /n");
If(fork()==0)
printf("world /n");
}
```

- (b) If the above program is Redirected to a file, analyze how the output could be. [8+8]

8. List and describe three general approaches to improve designer productivity. [16]

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1. (a) What is a “market window” and why it is so important for products to reach the market early in this window?
(b) What is the design gap?
(c) What is a “renaissance engineer” and why it is so important in the current market? [8+4+4]
2. (a) Explain briefly how to test and debug an Embedded System.
(b) Compare two different vendor microprocessors of your choice and explain all aspects related to them with neat diagram? [8+8]
3. (a) Explain using State Machines in Embedded Systems.
(b) Explain about Finite - State Machine with Datapath model. [8+8]
4. Explain about Infrared Protocol Architecture and give brief description about each protocol. [16]
5. What are the Kernal services in any operating system. Briefly explain any three such services. [16]
6. (a) Explain how inter-task synchronization can be done through Mailbox.
(b) With suitable examples explain how to
 - i. Create Mailbox
 - ii. Delete a Mailbox. [8+8]
7. (a) Explain different timer management function calls.
(b) Explain different memory management function calls. [8+8]
8. (a) Explain the system Synthesis.
(b) Explain how emulators solve problems associated with simulators. [8+8]

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1. (a) Explain the specialties of Embedded Systems.
(b) Explain the recent trends in Embedded Systems. [8+8]
2. Give short note on the following topics
(a) Cache Memory
(b) Pipelining
(c) Addressing Modes
(d) Register and Base address. [4+4+4+4]
3. (a) Explain about PSM.
(b) Compare State Machine and Sequential Program Models. [8+8]
4. (a) Explain briefly about Pin Connections and signals for Ethernet Interface.
(b) Explain about IEEE 802.11. [6+10]
5. (a) Explain different states of tasks [8+8]
(b) Explain about the following scheduling algorithms
 - i. Primitive multitasking
 - ii. Shortest-job first.
6. (a) Explain different applications of Message Queues.
(b) Explain the procedure to create and delete a Message queue with examples. [8+8]
7. With suitable examples explain how Priority Inheritance provide a solution to Priority inversion problem. [16]
8. (a) Explain the system Synthesis.
(b) Explain how emulators solve problems associated with simulators. [8+8]
