

III B.Tech. I Semester Supplementary Examinations, May -2005**EMBEDDED SYSTEMS DESIGN****(Electronics & Computer Engineering)****Time: 3 hours****Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. Explain the general features of microprocessors and microcontrollers by giving one example for each. Discuss why micro controllers are preferred for embedded systems.
2. Suppose that a processor has 20 address lines and 8 data lines in addition to Memory Read and Memory write signal lines. Clearly show how to connect two ROM chips and two RAM chips whose sizes are as given below. Also design the part of the circuit that takes the address lines and produce the chip enable signals for each of these four memory parts.

	Size	Low Address	High Address
ROM	128 KB	00000H	1FFFFH
ROM	128 KB	20000H	3FFFFH
RAM	64 KB	80000H	8FFFFH
RAM	64 KB	90000H	9FFFFH

3. Explain the various hardware functional blocks of a typical micro controller.
4. What is a semaphore? Explain various uses of semaphores in a RTOS with examples.
5. Explain the important features of an operating system required for embedded applications.
6. Write short notes on the following
 - (a) Hard real-time systems
 - (b) Soft real-time systems
 - (c) Time-slicing
 - (d) Encapsulation
7. Explain the different phases of software development cycle for embedded systems.
8. Explain the important features of the following operating systems that are relevant to embedded applications.
 - (a) RT Linux
 - (b) Windows XP
 - (c) Win CE
 - (d) V_x works

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1. Write short note on the following hardware units used to build embedded systems.
 - (a) Microprocessors
 - (b) Microcontrollers
 - (c) DSP processors
2. Write Truth Table for the following types of gates and give one example for each type of gate where it can be used.
 - (a) 3-Input NAND gate
 - (b) 2-Input XOR gate
 - (c) 2-Input NOR gate
 - (d) NOT gate
3. What are the important features of Assembly Language? Explain the reasons why Assembly Language programming is preferred for some types of embedded systems.
4. For each of the following situations, discuss which of the three shared-data protection mechanisms most likely to be best and explain why.
 - (a) Task A and Task B share an 'int array' and each often must update many elements in an array.
 - (b) Task B shares a single 'char' variable with one of the interrupt routines.
5. What are events? Explain the role of events in RTOS.
6. Explain various design considerations that are common to broad range of embedded systems.
7. Explain the different phases of software development cycle for embedded systems.
8. Explain the important features of the following operating systems that are relevant to embedded applications.
 - (a) RT Linux
 - (b) Windows XP
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1. Explain the important features of any two examples of embedded systems belonging to each of the following areas of applications.
 - (a) Consumer electronics
 - (b) Tele communications
 - (c) Data communications
 - (d) Wireless communication
2. Write Truth Table for the following types of gates and give one example for each type of gate where it can be used.
 - (a) 3-Input NAND gate
 - (b) 2-Input XOR gate
 - (c) 2-Input NOR gate
 - (d) NOT gate
3. Explain the following terms in the context of an embedded application.
 - (a) Interrupt priority
 - (b) Interrupt masking
 - (c) Context switching
 - (d) Priority inversion
4. What is a semaphore? Explain various uses of semaphores in a RTOS with examples.
5. Why do we need timer functions in RTOS? Briefly discuss how they are provided.
6. Explain the hard real-time scheduling considerations.
7. Explain the following in the context of embedded systems.
 - (a) EPROM programmers
 - (b) In-circuit Emulators
 - (c) Monitor programs
 - (d) Flash memory

8. Why serial communication facility is required in embedded systems? What are the communication parameters and explain the steps involved in typical serial data transmit and receive programs with the help of flow charts.

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1. What are the various hardware functional blocks required to build a typical embedded system? Briefly explain their features and use.
2. Clearly explain how the speed of the Computer Bus is matched to that of the memory and I/o speed in a computer.
3. What is an interrupt? Why they are required in a computer? Explain clearly how multiple are handled by the computer?
4. Explain the characteristics of a 'reentrant' function. Where and why do we need 'reentrant' functions?
5. What are events? Explain the role of events in RTOS.
6. Discuss various methods adopted to reduce power consumption in embedded applications.
7. Explain the function and use of the following test equipment for embedded system development.
 - (a) Multimeter
 - (b) Oscilloscope
 - (c) Logic Analyser
 - (d) In-circuit Emulator
8. Describe the requirements of the following embedded applications with an example for each
 - (a) A protocol converter system
 - (b) An IP phone
