

III B.Tech I Semester Regular Examinations, November 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 different types of memory devices used in embedded systems with their relative merits and demerits. [4+4+4+4]
2. Briefly explain the various hardware functional blocks of a typical embedded system. [16]
3. What is an interrupt? Why they are required in a computer? Explain clearly how multiple are handled by the computer? [3+3+10]
4. Explain the functions of a scheduler in an RTOS and how does the scheduler carryout those functions. [8+8]
5. What are the rules to be followed by the interrupt routines in RTOS? Why? [8+8]
6. Discuss various methods adopted to reduce power consumption in embedded applications. [16]
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 [4+4+4+4]
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. [8+8]

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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. [16]
2. Explain the terms: 'power supply decoupling', 'open-collector output', 'Tristate output', 'fan-out' for TTL logic gates. [4+4+4+4]
3. Explain the various hardware functional blocks of a typical micro controller. [16]
4. Compare the characteristics of various software architectures for embedded applications. Explain how do you choose a particular architecture for your application. [8+8]
5. How memory management is done by an RTOS? Why is memory management not used in embedded systems? [8+8]
6. Explain the hard real-time scheduling considerations. [16]
7. What are the main goals of software development for embedded systems? Explain how an Host system meets these goals. [8+8]
8. Explain the important features of the following programming languages for embedded system development.
 - (a) Assembly language
 - (b) C-language
 - (c) C++
 - (d) Java[4+4+4+4]

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1. Write short note on the following.
 - (a) Serial data transfer standards
 - (b) Laboratory instruments for testing the embedded systems. [8+8]
2. What is DMA operation in a Computer? Why is it required in a computer? Clearly explain how it is implemented? [5+5+6]
3. What is an interrupt? Why they are required in a computer? Explain clearly how multiple are handled by the computer? [3+3+10]
4. Explain the characteristics of a 'reentrant' function. Where and why do we need 'reentrant' functions? [8+8]
5. Why do we need timer functions in RTOS? Briefly discuss how they are provided. [8+8]
6. Discuss various methods adopted to reduce power consumption in embedded applications. [16]
7. Why in general an Host machine is used for the developments of an embedded system software. Explain various software development tools provided by a Host system. [8+8]
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. [8+8]

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1. What are the challenges involved in the embedded system development? Briefly explain each of them. [8+8]

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. [16]

	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. What are the important features of Assembly Language? Explain the reasons why Assembly Language programming is preferred for some types of embedded systems. [8+8]

4. Discuss the relative merits and demerits of various shared-data protection mechanisms. [16]

5. What are the different methods by which an RTOS finds out that an interrupt routine is executing. Compare these methods with respect to the interrupt response time and ease of coding. [8+8]

6. Explain various design considerations that are common to broad range of embedded systems. [16]

7. What are the main goals of software development for embedded systems? Explain how an Host system meets these goals. [8+8]

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. [8+8]
