

IV B.Tech II Semester Regular Examinations, Apr/May 2008
EMBEDDED SYSTEMS
(Common to Electrical & Electronic Engineering and Electronics & Communication Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) What is an embedded system? Why is it so hard to define?
(b) List the applications of embedded systems. [8+8]
2. Design a 3-bit counter that counts the following sequence: 1,2,4,5,7,1,2,.. start from a state diagram, draw the state table, minimize the logic, and draw the final circuit. [16]
3. Explain the following three application specific instruction set processors.
 - (a) Microcontroller
 - (b) Digital signal processor
 - (c) Less -general ASIP environment. [6+5+5]
4. (a) Give the bus structure for digital signal processor.
(b) Explain the need for more buses in DSP architecture. [8+8]
5. Explain how to compute state machines in sequential programming language. [16]
6. (a) How to create and terminate processes.
(b) Explain the concept of mapping processes on processors. [8+8]
7. Design a circuit for the expression $F = abc'd' + a'cd + ab'cd$ with minimum gates using two level logic minimization. [16]
8. Explain in detail about intellectual property cores. [16]

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1. What is NRE cost? For a particular product determine the NRE cost and unit cost to be for the following three listed IC technologies:
FDGA: (\$10,000,\$50)
ASIC: (\$50,000,\$10)
VLSI: (\$200,000,\$5). [16]
2. Design a 3-bit counter that counts the following sequence: 1,2,4,5,7,1,2,.. start from a state diagram, draw the state table, minimize the logic, and draw the final circuit. [16]
3. Describe why a general-purpose processor would cost less than a single-purpose processor you design yourself. [16]
4. Explain the need of special architecture for pipelining and parallelism. [16]
5. Explain how to compute state machines in sequential programming language. [16]
6. Explain in detail how shared memory is used to provide communication among processes. [16]
7. List and describe three general approaches to improving designer productivity. [16]
8. (a) What is hardware/software co-simulation?
(b) What is a key method for speeding up such simulation? [8+8]

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1. Write short notes on the following:

- (a) Micro processors
- (b) Micro Controller
- (c) Digital Signal Processor. [6+5+5]

2. Design a 3-bit counter that counts the following sequence: 1,2,4,5,7,1,2,?... start from a state diagram, draw the state table, minimize the logic, and draw the final circuit. [16]

3. Write short notes on the following:

- (a) Debugger
- (b) Device programming
- (c) Instruction set
- (d) Emulators. [4+4+4+4]

4. Explain the need of special architecture for pipelining and parallelism. [16]

5. Briefly discuss three computation models commonly used to describe embedded systems and their peripherals. [16]

6. Explain in detail how shared memory is used to provide communication among processes. [16]

7. Design a circuit for the expression $F = abc'd' + a'cd + ab'cd$ with minimum gates using two level logic minimization. [16]

8. Write short notes on the following:

- (a) Instruction set simulator
- (b) HDL simulator
- (c) Simulators. [6+5+5]

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1. (a) Using the Revenue model, derive the percentage revenue loss equations for any rise angle, rather than just for 45 degrees.
(b) Using the Revenue model, derive the percentage revenue loss if $D=5$ and $W=10$. [8+8]
2. (a) What is a combinational circuit? Explain the procedure of combinational logic design?
(b) Take any logic expression and explain the combinational logic design. [8+8]
3. Describe why a general-purpose processor would cost less than a single-purpose processor you design yourself. [16]
4. Explain the need of special architecture for pipelining and parallelism. [16]
5. (a) Using sequential control model explain an elevator controller system.
(b) Define the following terms:
Finite state machines, concurrent processes, real-time systems, and real-time operating systems. [8+8]
6. (a) Explain the consumer-producer problem.
(b) Write a correct solution to the consumer-producer problem using mutex? [8+8]
7. Give overview of the various levels of synthesis with Gazki Y-chart. [16]
8. Write short notes on the following:
(a) Instruction set simulator
(b) HDL simulator
(c) Simulators. [6+5+5]
