

IV B.Tech II Semester Regular Examinations, Apr/May 2006
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. (a) What is a single-purpose processor? What are the benefits of choosing a single-purpose processor to against a general-purpose processor?
(b) Draw the basic architecture of single-purpose processor. [8+8]
3. (a) Define instruction? Explain the instruction set format?
(b) Explain different addressing modes with an example. [8+8]
4. Draw and explain architectural features of TMS 320C25. [16]
5. (a) What are the models commonly used for describing embedded systems?
(b) State differences between a computation model and a language, and also between a textual language and a graphical language. [8+8]
6. (a) Explain how to achieve synchronization among concurrently executing processes with monitors.
(b) Write a solution for consumer-producer problem with monitor. [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. (a) Describe the new challenges created by cores for processor developer.
(b) Describe the new challenges posed by cores to processor users. [8+8]

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1. (a) What is an embedded system? Why is it so hard to define?
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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. State the need for more functional units in digital signal processor. [16]
5. (a) What are the models commonly used for describing embedded systems?
(b) State differences between a computation model and a language, and also between a textual language and a graphical language. [8+8]
6. (a) Describe the concurrent process model with heart beat monitoring embedded system.
(b) Illustrate the Set top box embedded system. [8+8]
7. Explain the parallel evolution of compilation and synthesis with the co-design ladder. [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. (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. Explain the custom single purpose processor design with GCD example. [16]
3. (a) Explain the factors effecting selection of a microprocessor.
(b) Compare the general purpose processor, microcontroller and Digital signal processor. [8+8]
4. Explain the architectural features of ADSP 21065. [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) How to create and terminate processes.
(b) Explain the concept of mapping processes on processors. [8+8]
7. Explain the parallel evolution of compilation and synthesis with the co-design ladder. [16]
8. (a) What is hardware /software co-design?
(b) Explain temporal and spatial thinking in hardware/software co-design? [8+8]

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1. (a) What is an embedded system? Why is it so hard to define?
(b) List the applications of embedded systems. [8+8]
2. (a) How do NMOS and PMOS transistors differ?
(b) Explain the CMOS transistor working. [8+8]
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. Explain the architectural features of ADSP 21065. [16]
5. (a) What are the models commonly used for describing embedded systems?
(b) State differences between a computation model and a language, and also between a textual language and a graphical language. [8+8]
6. (a) How to create and terminate processes.
(b) Explain the concept of mapping processes on processors. [8+8]
7. List and describe three general approaches to improving designer productivity.[16]
8. Write short notes on the following:
(a) Instruction set simulator
(b) HDL simulator
(c) Simulators. [6+5+5]
