

IV B.Tech. I Semester Regular Examinations, November -2008
EMBEDDED SYSTEMS
 (Common to Computer Science & Engineering, Information
 Technology, Electronics & Control Engineering and Computer Science &
 Systems Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) What is an embedded computer system? Give an example.
 (b) Explain the characteristics of embedded computing applications. [8+8]
2. Draw the figure showing the connections between an 8051 and an external memory configuration consisting of 16k of EPROM and 8k of static RAM. Explain the timing associated with an external memory access cycle. [16]
3. (a) Why the programmer must know about the CPU in order to program in assembly language
 (b) Explain about various data addressing modes. [6+10]
4. (a) Explain in detail about different types of jump instructions with suitable examples.
 (b) Discuss about decimal arithmetic with example. [8+8]
5. (a) Explain Intelligent LCD display with appropriate diagrams.
 (b) Give a note on hardware circuits for multiple interrupts. [8+8]
6. (a) What is a reentrant function? Is the following function reentrant? Justify your answer.

```

int CErrors;
void vcount Errors (int CNewErrors)
{
  CErrors+=CNewErrors;
}

```


 (b) Compare and contrast various methods for intertask communication. [8+8]
7. Explain with an example the basic design of an embedded system using a Real time operating system. [16]
8. Write notes on:
 - (a) CAN bus
 - (b) SHARC Link ports. [8+8]

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1. (a) Explain the challenges in embedded computing system design.
(b) Briefly describe the distinction between specification and architecture. [10+6]
2. Give the formats of the following function registers of 8051.
 - (a) SCON
 - (b) PCON
 - (c) TCON
 - (d) TMOD [4+4+4+4]
3. (a) Identify four reasons to program a CPU in assembly language.
(b) Describe how data may be pushed and popped using a stack. [6+10]
4. (a) Write a program to count the number of IS in any number in register B and put the count in R5.
(b) Explain in detail about different types of jump instructions with suitable examples. [8+8]
5. (a) Determine why it is important to employ some kind of debounce subroutine in a keyboard program, particularly for interrupt-driven programs, even if keys with absolutely no bounce are used.
(b) Discuss about various network configurations with diagrams. [8+8]
6. (a) Explain the following intertask communication technique:
 - i. Message queues
 - ii. Mail boxes
(b) Explain with an example how semaphores solve the shared-data problem. [8+8]
7. Write notes on:
 - (a) Encapsulating semaphores
 - (b) Hard Real-time scheduling considerations
 - (c) saving memory space. [6+5+5]

8. (a) Explain in detail instruction level parallelism.
(b) Give a note on Internet-enabled systems.

[8+8]

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1. (a) What are the reasons for using microprocessor in digital systems?
(b) "External constraints are one important source of difficulty in embedded system design". Explain. [6+10]
2. Discuss in detail about the serial data communication circuit in 8051. [16]
3. (a) List four types of utility programs.
(b) What are the four addressing modes used to access data? Explain. [6+10]
4. (a) Write a program to multiply the data in RAM location 22h by the data in RAM location 15h; put the result in RAM locations 19h (low byte) and 1Ah (high byte).
(b) Discuss how the CPU uses the stack to store call opcode return addresses. [8+8]
5. (a) Discuss about various keyboard configurations in detail.
(b) Explain about the standard 8-bit VART mode. [8+8]
6. (a) Give a note on Timer functions.
(b) Explain different ways of protecting shared data. [8+8]
7. Explain in detail about Embedded software development tools. [16]
8. Write notes on the following:
(a) I²C Bus
(b) SHARC Link ports. [8+8]

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1. Explain in detail the embedded system design process. [16]
2. (a) Explain various Timer modes of operation of 8051.
(b) What is the function of IP function register? Specify the purpose of each bit in the register. [8+8]
3. (a) Explain the general structure of 8051 syntax.
(b) Discuss atleast four different methods to copy the byte in TCON to register R2. [8+8]
4. (a) Write a program to increment the contents of RAM locations 13h,14h and 15h using indirect addressing only.
(b) What are the sequence of events involved in CALL instruction. [8+8]
5. (a) Explain about the Seven Segment Numerical display.
(b) Explain why mode 0 is not suitable for 8051 communications. [8+8]
6. (a) What is a semaphore? What are the various operations on semaphores? How does semaphore make a function reentrant?
(b) Explain about memory management in RTOS. [8+8]
7. (a) Give a note on Linker/Locators for Embedded software.
(b) Give a brief note on ROM emulators. [10+6]
8. Explain in detail about distributed Embedded Architectures. [16]
