Code No: N0522 **R07** Set No. 1

IV B.Tech. I Semester Supplementary Examinations, March - 2013
EMBEDDED SYSTEMS
(Common to Computer Science & Engineering and Information Technology)

Time: 3 Hours **Max Marks: 80**
Answer any FIVE Questions
All Questions carry equal marks
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1. a) List the various complex systems available and explain their performance
   characteristics.
   b) Explain the formalisms for embedded system design. [8+8]

2. Discuss in detail about the serial data communication circuit in 8051. [16]

3. a) Explain how to understand the assembler program. Discuss about assembler directives.
   b) Explain different addressing modes of 8051 microcontroller with an example. [8+8]

4. a) Write an assembly language program to subtract the contents of RAM location 13h
   from RAM locations 2Bh and put the result in RAM location 3Ch. Place comments
   on each line of code.
   b) Discuss about decimal arithmetic with example. [8+8]

5. a) Design an interface to 8051 to display the alphanumeric characters on alphanumeric
   display unit by giving inputs through a Keyboard.
   b) Compare D/A and A/D Conversions. [12+4]

6. Compare semaphores, events and queues for implanting inter task communication with
   an example. [16]

7. Explain how memory organization of ARM processor is different from conventional
   general purpose processors memory organization. [16]

8. Write notes on:
   a) Encapsulating semaphores
   b) Hard Real-time scheduling considerations
   c) Saving memory space. [6+5+5]

Code No: N0522

R07

Set No. 2

IV B.Tech. I Semester Supplementary Examinations, March - 2013
EMBEDDED SYSTEMS

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Time: 3 Hours **Max Marks: 80**

Answer any FIVE Questions

All Questions carry equal marks

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1. a) What is an embedded system? Why is it so hard to define?
   b) List the various complex systems available and explain their performance characteristics. [8+8]

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) Explain how to understand the assembler program. Discuss about assembler directives.
   b) Describe how data may be pushed and popped using a stack. [8+8]

4. a) Explain with suitable example, how to perform increment and decrement the contents of registers and RAM using relevant mnemonics.
   b) Write an assembly language program to increment the contents of RAM locations 13h, 14h and 15h using indirect addressing. Place comments on each line of code.
   [8+8]

5. a) Explain interfacing of 8051 microcontroller with A/D Converter Using a relevant circuit diagram.
   b) Write a program to interface 8051 microcontroller with D/A Conveter. [8+8]

6. a) Explain with an example how semaphores solve the shared-data problem.
   b) Compare and contrast various methods for inter-task communication. [8+8]

7. a) What are events? Explain the role of events in RTOS.
   b) What is a CAN bus? Describe its functional features and applications. [8+8]

8. Explain with an example the basic design of an embedded system using a Real-time operating system. [16]

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Code No: N0522 **R07** Set No. 3

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EMBEDDED SYSTEMS
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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 in brief about five challenges commonly faced when designing an
      embedded system. [8+8]

2. a) Explain various Timer modes of operation of 8051.
   b) Discuss about SCON and PCON function registers relevant to serial data
      input/output in 8051 microcontroller. [8+8]

3. a) Add 05H to the register A using five different instructions.
   b) Write an Assembly language program to multiply 05H with 06H. [8+8]

4. a) Explain about the jump and call program ranges with suitable diagram.
   b) Write an assembly language program to put a random number in register R3 and
      Increment it till it equals E1h. [8+8]

5. Explain the different serial data communication modes of 8051 with examples. [16]

6. a) Explain how semaphores make a function reentrant with an example code using
      nucleus RTOS function prototypes.
   b) Write the merits and demerits of using multiple semaphores in an application. [8+8]

7. a) What is I^2C bus? Describe its functional features and applications.
   b) What is a CAN bus? Describe its functional features and applications. [8+8]

8. With respect to embedded RTOS compare among the following :
   a) Mailbox   b) Message queue
   c) Event Register   d) Pipes. [4x4]

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Code No: N0522 **R07** Set No.4

IV B.Tech. I Semester Supplementary Examinations, March - 2013
EMBEDDED SYSTEMS
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Time: 3 Hours Max Marks: 80
Answer any FIVE Questions
All Questions carry equal marks
****

1. a) What are the levels of abstraction in an embedded system design process?
   b) Explain why is the architecture of an embedded system important? [8+8]

2. Draw the block diagram of the 8051 microcontroller and describe in detail about its hardware features. [16]

3. a) Explain data transfer instructions of 8051.
   b) Explain how to perform testing programs on a single-board computer.
   c) What is importance of testing programs? [8+6+2]

4. a) Explain the concept of interrupts and returns with suitable example.
   b) Write an assembly language program to place any number in internal RAM location 3Ch and increment it until the number equals 2Ah using the necessary mnemonics. Place comments on each line of code. [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 do you understand by shared data problem? Explain with an example.
   b) Explain about memory management in RTOS. [8+8]

7. a) Write notes on encapsulating semaphores.
   b) Discuss the hard- real time scheduling considerations.
   c) Write notes on encapsulating queues. [5+6+5]

8. Write two applications of SHARC processor-based systems with functional block diagram for each application and explain its working. [16]

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