Set No. 1

Code No: N0522 /R07

IV B.Tech. I Semester Supplementary Examinations, February/March - 2011

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) Define the terms 'System' and an 'Embedded system'. Give the classification of embedded systems. [8]
   b) Discuss the role of the following processors in embedded systems. [8]
   (i) Digital signal processor (ii) ASSP

2. Explain the various operating modes of the UART and associated control registers. [16]

3. a) Illustrate the bit-level logical operations with suitable examples. [8]
   b) Write an assembly language program to OR the contents of port 1 and 2 and put the result in external RAM location 0100h. Also write comment on this. [8]

4. a) Explain about rotate and swap operations by taking into consideration of register A. [8]
   b) Write an assembly language program to add the byte in external RAM location 02CDh to internal RAM location 19h and put the result in to external RAM locations 00C0h (LSB) and 00C1h (MSB). Write comments on each line of the code. [8]

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5. With neat sketch explain the design approach for interfacing with keyboard Display unit to 8051 microcontroller based embedded system. Develop the relevant program. [16]

6. a) With an example, explain the concept of deadlock situation during multitasking execution. [8]
   b) Describe Inter Process Communication with suitable example. [8]

7. With an example, explain how laboratory tools are utilized for an embedded system design on Real Time Operating System environment. [16]

8. a) With neat sketch explain the memory organization of SHARC Processor. [8]
   b) Present the applications and specifications of CAN Bus and briefly discuss. [8]

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Set No. 2

IV B.Tech. I Semester Supplementary Examinations, February/March - 2011

EMBEDDED SYSTEMS

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

Answer any FIVE Questions
All Questions carry equal marks
****

1. a) Explain the importance of an embedded processor for a complex system. [8]
   b) List the software tools needed in designing an embedded system. Discuss about any one of them. [8]

2. a) Explain how can use the ports P0 and P2 for I/O when using external memory. [8]
   b) Discuss about special function registers and an internal ROM organization of the 8051 microcontroller.

3. a) Explain the Boolean bit-level operations with suitable examples. [8]
   b) Discuss about microcontroller programming languages. [8]

4. a) How to perform unsigned multiplication using relevant mnemonics. Give suitable example. [8]
   b) Write an assembly language program to add the byte in external RAM location 02CDh to internal RAM location 19h and put the result in to external RAM locations 00C0h(LSB) and 00C1h(MSB). Give the comments. [8]

5. With neat sketch explain the design approach for serial data communication with 8051 microcontroller based embedded system. Develop the necessary source code. [16]

6. a) Explain how tasks are different from functions. Write short notes on Interrupt Service Routines. [8]
   b) Explain how an error-handling task is executed on throwing the exception. [8]

7. a) Explain the Operating System units in an RTOS kernel. [8]
   b) What does embedded Software development mean? Explain in brief the different stages in the development and testing of an application. [8]

8. a) Illustrate the data transfer on the I^2C Bus with suitable timing diagrams. [8]
   b) Explain the Instruction level parallelism with an example. [8]

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

IV B.Tech. I Semester Supplementary Examinations, February/March - 2011

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
****

1. a) Draw and explain an embedded system design and development life cycle model. [8]
   b) Describe the design approach for Digital Signal processor based embedded system. [8]

2. a) Explain the concepts of serial data interrupts, data transmission and reception relevant to serial data input/output in 8051 Microcontroller. [8]

   b) Draw and explain the timer/counter logic in which the resultant timer clock is gated to the timer circuit. [8]

3. a) Explain the functions of Simulators and Debuggers relevant to development tools using in assembly language programming. [8]
   b) Write an assembly language program to double the number in register R2 and put the result in registers R3 (high byte) and R4 (low byte). Write comment on this. [8]

4. a) Explain how to perform unconditional jumps using relevant mnemonics. Give suitable example. [8]
   b) Find the address of the first two internal RAM locations between 20h and 60h which contain consecutive numbers. If so, set the carry flag to 1, else clear the flag. Place comments on each line of code. Write suitable assembly language source program for the data given. [8]

5. With neat sketch explain the design considerations for interfacing Digital-to-Analog converter to 8051 microcontroller based embedded system. Give the necessary source program. [16]

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6. What are the states of a task? Explain which is the entity controlling (Scheduling) the transitions from one state to another in a task. [16]

7. a) Explain how Queues are used for Intertask communications. [8]
   b)Explain the advantages of time slice scheduling by an RTOS. [8]

8. a) Write notes on Internet-Enabled Systems. [8]
   b) Discuss about the specifications of I^2C Bus Protocol. [8]

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

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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
****

1. a) Explain the importance of media processor in an embedded system. [8]
   b) List the various complex systems available and explain their performance characteristics. [8]

2. Describe the various operating modes of the UART and associated control registers. Draw the relevant diagrams. [16]

3. Explain the following terms, relevant to programming the 8051 microcontroller. [16]
   a) Lines of code
   b) Labels
   c) Instructions And
   d) Comments

4. a) Explain how to perform byte jumps using relevant mnemonics with suitable example. [8]
   b) Write an assembly language program to divide the number in RAM location 15h by the data in RAM location 16h and put the resulting quotient in external RAM location 7Ch. Place comments on each line of code. [8]

5. With suitable diagram, explain the design approach for interfacing the keyboard with Display unit to 8051 microcontroller based embedded system. Write down the necessary source program. [16]

6. a) Explain the priority Inversion problem with suitable example. [8]
   b) Explain in brief about the inter task communication mechanisms. [8]

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7. a) Illustrate the hard real-time Scheduling Considerations. [8]
   b) Explain the terms "Semaphores and Queues" relevant to RTOS in an embedded system. [8]

8. a) Explain the Memory organization of ARM Processor with suitable diagrams. [8]
   b) Explain the design approach of an Elevator Controller. [8]