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

IV B.Tech. I Semester Regular Examinations, November, 2012

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) Briefly describe the differences between requirements and specifications.
   b) Explain the structural description of system design. [4+12]

2. a) Explain the configuration of different port pins as inputs or outputs using relevant diagrams and explain the features of each port of 8051 microcontroller.
   b) Explain the concept of memory banks using relevant diagrams. [10+6]

3. a) Explain external addressing using MOVX and MOVC.
   b) Explain all possible addressing modes for data exchange instruction.
   c) Write an assembly language program to exchange the contents of SP and PSW. [6+6+4]

4. a) Explain the operation performed by the following instructions using an example and indicate the possible flags to be affected.
   i) ADDC ii) MUL
   iii) RLC iv) ACALL sadd.
   b) Random numbers are placed in registers R2 and R5. Write an assembly language program to increment R2 and decrement R5 until they are equal.
   c) Write an assembly language program to get the contents of DPTR to PC. [8+6+2]

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 A/D converter. [8+8]

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6. a) Explain shared data problems.
   b) What is a reentrant function? Check whether the function shown below is reentrant.

```
int strlen( char *p_sz)
    {int  iLength; iLength = 0;
        while(*p_sz !=0)
    {++iLength;
        ++p_sz;}
        Return iLength;}
```

   c) Compare RTOS with a standard operating system. [8+4+4]

7. a) Discuss the methods and strategies to save memory space in an embedded system.
   b) Describe the operation of ROM emulators.
   c) Write notes on cross-assemblers and tool chains. [8+4+4]

8. a) Discuss the features, examples and an application of internet enabled embedded system.
   b) Describe the structure of I^2C bus system.
   c) Describe the data frame format of a CAN bus.
   d) What is the requirement of distributed embedded system. [5+4+4+3]

Code No: N0522 **R07** **Set No. 2**

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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
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1. a) Briefly describe the differences between specification and architecture.
   b) Explain the behavioral description of system design. [4+12]

2. a) Draw the 8051 block diagram and explain the oscillator circuit and timing.
   b) Draw the contents of IE and IP registers explain how different interrupt functions are controlled by IE and IP registers. [8+8]

3. a) Explain PUSH and POP instructions considering an example stack .
   b) Write an assembly language program to copy program bytes 0100h to 0102h to internal RAM locations 20h to 22h.
   c) Write an assembly language program to copy the external code byte at address 007Dh to the SP. [6+6+4]

4. a) Explain the operation performed by the following instructions using an example and indicate the possible flags to be affected.
   i) DA ii) CPL A iii) RRC iv) AJMP sad
   b) Random unsigned numbers are placed in registers R0 to R4.Write an assembly language program to find the largest and place the result in register R6. [8+8]

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

6. Write in detail about Semaphores and shared data . [16]

7. a) Explain the goals of typical testing process.
   b) Discuss the methods and strategies to save power in an embedded system. [8+8]

8. With reference to design of elevator controller
   a) Write the theory of operation and requirements
   b) Write the specifications
   c) Discuss the architecture
   d) Brief testing. [5+5+4+2]

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

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1. a) Describe the characteristics of embedded computing system applications.
   b) Explain the architecture design of an embedded system including hardware and software architectures using an example. [6+10]

2. a) Explain different serial data transmission modes of 8051 microcontroller.
   b) Explain internal RAM organization of 8051 microcontroller. [10+6]

3. a) Explain direct and indirect addressing modes using relevant examples.
   b) Write an assembly language program to exchange both lower nibbles of registers R0 and R1.
   c) Write an assembly language program to store DPTR in external RAM locations 0123h (DPL) and 0124h (DPH). [8+4+4]

4. a) Explain the operation performed by the following instructions using an example and indicate the possible flags to be affected.
   i) SUBB ii) CPL C iii) SETB C iv) CJNE @Rp,#n,radd
   b) Write an assembly language program to put a random number in register R3 and decrement it till it equals E1h
   c) Write an assembly language program to count the number of zeros in any number in register R3 and put the result in register R5. [8+4+4]

5. a) Explain interfacing of 8051 microcontroller using any key board configuration using relevant circuit diagram.
   b) Write a program to interface 8051 microcontroller with D/A converter. [8+8]

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

6. a) Define task and explain different states in which a task can be in an RTOS.
   b) i) Explain the role of a scheduler in a RTOS environment.
   ii) How does a scheduler know when a task is blocked or unblocked?
   iii) How does a scheduler handle when all tasks are blocked
   iv) How does a scheduler handle when two tasks with same priority are ready. [8+8]

7. a) Describe the operation of PROM programmers.
   b) Write notes on cross-compilers.
   c) Write notes on encapsulating semaphores. [5+6+5]

8. Explain the following with reference to a CAN bus
   a) Physical and Electrical organization
   b) Data frame format
   c) Bus arbitration
   d) Error handling
   e) Architecture of a CAN controller [3+4+3+3+3]

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

IV B.Tech. I Semester Regular Examinations, November, 2012

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) Compare and contrast top-down and bottom-up design.
   b) Draw flow chart indicating the major levels of abstraction in the design process and explain in detail the requirements and specification levels. [4+12]

2. a) Explain different timer modes of 8051 microcontroller.
   b) What are different flags available in 8051 microcontroller? Indicate them in PSW register and explain the role of each bit in it. [10+6]

3. a) Explain immediate and register addressing modes using relevant examples.
   b) Write an assembly language program to exchange the contents of B register and external RAM address 02CFh.
   c) Write an assembly language program to copy the data at internal RAM location F1h to R0 and R3. [6+6+4]

4. a) Explain the operation performed by the following instructions using an example and indicate the possible flags to be affected.
   i) ORL ii) DIV iii) CJNE iv) JNB b, radd
   b) Explain the ranges of different jump instructions.
   c) Write an assembly language program to put a random number in register R3 and increment it till it equals E1h. [8+4+4]

5. a) Explain interfacing of 8051 microcontroller with seven segment display using a relevant circuit diagram.
   b) Write a program to interface 8051 microcontroller with seven segment display. [8+8]

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

6. a) Compare different methods of protecting shared data.
   b) Explain the rules which the interrupt service routines must follow in most RTOS environments.
   c) Compare different methods for inter task communication. [5+6+5]

7. a) Describe the operation of in-circuit emulators.
   b) Discuss the hard-real time scheduling considerations.
   c) Write notes on encapsulating queues. [6+6+4]

8. a) Explain the structure of an I^2C bus system.
   b) Explain the features of electrical interface to I^2C bus.
   c) Explain typical bus transaction on the I^2C bus using state transition graph, considering a format for address transmission. [4+4+8]