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06ES42

Fourth Semester B.E. Degree Examination, May/June 2010
Micro-Controllers

Time: 3 hrs. Max. Marks:100

Note: *1. Answer any FIVE full questions selecting at least TWO questions from each part.*
2. Standard notations are used.

PART – A

1 a. Give the basic block diagrams, of a microprocessor and a microcontroller and justify that a microcontroller is an onchip computer. **(08 Marks)**

b. What is Harvard architecture? Show that 8051 uses Harvard architecture. **(06 Marks)**

c. Briefly discuss the features of 8051 microcontroller. **(06 Marks**

2 a. Explain the following in brief, with respect to 8051 :
i) The pin that connects the external memory
ii) The port that has open-drain output
iii) Asynchronous input pins of microcontrollers
iv) The register that sequences the program execution
v) Program status word. **(10 Marks)**

b. Write the circuit diagram for Port1. Explain the input, output operations in 8051 using Port1. **(10 Marks)**

3 a. Give the mode word, (TMOD) and the control word, (TCON) values to perform the following operations :
i) Timer 0 in auto reload mode
ii) Timer 1 in mode1. **(06 Marks)**

b. Explain the serial data interrupts TI and RI in 8051. **(06 Marks)**

c. Name the addressing modes of the following instructions :
i) MOVC A, @ A + DPTR
ii) MULAB
iii) MOV B, #OFFh
iv) SUBB A, 45h. **(04 Marks)**

d. Explain any two data transfer instructions and any one arithmetic instruction in 8051. **(04 Marks)**

4 a. Name the instructions which perform bit level logical operations in 8051. Give an example to show bit level logic operation. **(06 Marks)**

b. Write an assembly program in 8051 to add two 16 bit numbers stored in external memory. After addition store the results in internal data memory. **(06 Marks)**

c. Write the result statement after execution of each instruction :
MOV 81 h, #30 h
MOV RO, #OAC h
PUSH 00
PUSH 00
POP 01
POP 80 h
MOV A, # OFF h
XRL A, 80 h
POP 82 h
POP 83 h
MOVX @ DPTR, A. **(08 Marks)**

PART – B

5 a. Write an assembly program in 8051 to convert a given two digit hexadecimal number to its equivalent decimal number and send the result on to port 2 byte by byte. **(06 Marks)**

b. How is a 'call' subroutine different from an interrupt service routine? Give an example to show call subroutine' operation in 8051. **(06 Marks)**

c. What are the final numbers in A, B and OV flag after the execution?

```
MOV A, # 7B h
MOV OFO, #02 h
MUL AB
MOV B, # OFE h
MUL AB.
```

(04 Marks)

d. Give the magnitude of different data types used in embedded 'C'. **(04 Marks)**

6 a. Write the block diagram to show mode 2 operation of timer 1, as a counter, also write the programming steps to perform the same. **(06 Marks)**

b. Find the delay generated by timer O in the following code. Calculate the delay generated excluding the instruction overhead. What count has to be loaded in TLO and THO if delay has to be increased to 25 msec?

```
        CLR P2.3
HERE : MOV TMOD, #01
       MOV TLO, # 3E h
       MOV THO, # 0 B8 h
       SETB P2.3
       SETB TRO
AGAIN : JNB TFO, AGAIN
        CLR TFO
        CLR TRO
        CLR P2.3.
```

(08 Marks)

c. What is asynchronous serial communication? Explain the different modes of serial communication in 8051. **(06 Marks)**

7 a. Write 8051 'C' program to receive bytes of data serially and put them in P1. Set the baud rate as 4800, 8 bit data and one stop bit. **(06 Marks)**

b. Explain the different interrupt vector addresses in 8051. **(04 Marks)**

c. Write a 8051 'C' program that continuously gets a single bit of data from P1.7 and sends it to P1.0, which creates a square wave of 200 μs period on pin P2.5. XTAL frequency = 11.0592 MHz. **(10 Marks)**

8 a. Interface LCD to 8051 and write a 8051 assembly /8051 'C' program to send 'M', 'A' 'S', 'T', 'E', 'R' to LCD display. **(10 Marks)**

b. Show the interfacing of a stepper motor to 8051 and write 8051 assembly/8051 'C' program to rotate stepper motor 2 rotations clockwise and one rotation anticlockwise with appropriate delay. **(10 Marks)**

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