Exam.Code:0928
Sub. Code: 6905

1059

B.E. (Electronics and Communication Engineering)
Fourth Semester
EC-402: Microcontrollers and Interfacing

Time allowed: 3 Hours Max. Marks: 50

NOTE: *Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.*

x-x-x

I. Attempt the following:-

a) What are Embedded systems? Give examples.
b) What is the role of assembler Directives DB and EQU?
c) What is the total maximum address range of internal RAM and ROM of 8051 and PIC18? Also what is the bit addressable memory range for both?
d) What is the difference between DECFSZ 0AAH, F, 1 and DECF 0AAH, F, 0 by giving example?
e) Write instructions to add 88H and 93H. Show the status of the various flags of PIC18F after the addition of 88H and 93H.
f) Compare the various 8051 family members from ATMEL.
g) What is the minimum frequency of square wave that can be generated using mode 2 with XTAL=15KHz?
h) What is the difference between .ASM and .LST files?
i) List all the pointers registers used to access ROM and RAM in PIC18F.
j) Draw the diagram showing signals required to interface External RAM and 8051. (10x1)

UNIT – I

II. a) Compare the relative advantages and disadvantages of HARVARD and VON NEUMANN architecture.

b) How RISC architecture is different from CISC architecture in terms of performance and applications?

c) Discuss the criteria of choosing a microcontroller.

d) Discuss various files generated during the compilation process. (3,2,2,3)

III. a) Write a program to load the accumulator with the value AAH and then complement the ACC 1000 times.

b) Using Diagrams of the internal circuitry discuss the working (as i/p and o/p) of port 1 and port 0 of 8051.

c) What are look-up tables? Store a look table consisting of 2's complement of first ten numbers in ROM starting from 40H. Write a program to find the 2's complement of all the five 8-bit numbers (all numbers are less than 10) stored in external RAM Locations from memory location 20H. Store the results in external RAM Locations from memory location 40H. Use look-up table approach to find the 2's complement and don't use any arithmetic and logical instructions. (3,4,3)

IV. a) By example, explain what are relative jumps and why they lead to Relocatable code?

b) Assume that the lower two bits of P2 are connected to two switches. Write a program to send the following ASCII characters to PO based on the status of the switches:

0 0 send 'a' to P0
0 1 send 'b' to P0
1 0 send 'c' to P0
1 1 send 'd' to P0

P.T.O.

c) Interface a sensor externally to 8051. Write a single program using to do the following simultaneously:
i) Generate a square wave with duty cycle 75% with ToN=3msec at Pl.O.
ii) Count 100 pulses generated by the sensor. After count reaches 100 set P0.5 to HIGH. Also show all calculations and all SFR's used in the program. Assuming that XTAL-11.0592Mhz. (3,3,4)

UNIT – II

V. a) Write a program using Timer interrupts and serial interrupts to do the following simultaneously:
i) Receive data serially and sent it to P3 and
ii) Transmit serially "I LOVE INDIA" repeatedly.
Assume that XTAL-11.0592 MHz Set the baud rate at 2400.

b) Discuss and compare different ways of connecting LED with 8051.

c) Interface 16*2 LCD to 8051. Write 8051 ALP to display NAMASTEY on first line and INDIA in the middle of second line. (4,2,4)

VI. a) Write PIC ALP to add ten 8-bit numbers stored in internal ROM from 500H. Store the result of addition and carry in internal RAM location 555H and 556H. Also send the result to any PORT.

b) Sketch hardware interfacing of ADC, Common Cathode Seven Segment Display and LM35 with microcontroller. Write ALP to display H on the SSD if the temperature sensed by LM35 is more than 20°C otherwise display C on SSD. Use approximate delay calculations.

c) List with general format all the arithmetic instructions of PIC18F. (4,4,2)

VII. a) Write PIC program to copy a block of 10 bytes of data from 35H to 610H.

b) Sketch the interfacing diagram of stepper motor connected to lower bits of port 1 of 8051. Write a ALP to rotate stepper motor continuously (using 4-step sequence) first 180° CW and then 90° CCW with a delay of more than 1sec after every step. Use approximate delay calculations Generate delay without using Timers. Assume that XTAL-11.0592Mhz.

c) Suppose a switch is connected to LSB of PORT A Write a program to check the status of SW and perform the following:
i) If SW=0, send letter 'x' to PORT B
ii) If SW=1, send letter 'y' to PORT C. (3,4,3)

x-x-x