2053
B.E. (Electronics and Communication Engineering)
Fourth Semester
EC-402: Microcontrollers and Interfacing

Time allowed: 3 Hours   Max. Marks: 50

NOTE: *Attempt <u>five</u> 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)   Differentiate between Microcontroller and Microprocessor.

b)   List all the important features of 8051.

c)   What are assembler directives?

d)   What is the difference between RLCF 07H, 0,1 and RLCF 07H, 1, 0.

e)   List all the SFR's related to 8051 Timers.

f)   Write Pie instructions to add What are embedded systems?

g)   Write instruction(s) to mask Timer 0 and external interrupt 1 while unmasks all others.

h)   Differentiate between HARVARD and VON NEUMANN architecture.

i)   Differentiate RISC and CISC architecture.

j)   How instruction INCFSZ works?   (10x1)

UNIT - I

II. a) Draw the pin diagram of 8051.

b) After the execution of the program, what are the contents of register A and flag register Also, allocate address to each instruction if the starting address is 3000H

      3000H   MOV B, #01H

                         MOV A, #20H

                         DIV AB

                         XRL A

                         CPI A

                         SETB C

                         ACI 0AAH

                         RR   A

c) Write 8051 ALP to count number of 1's in first ten integer numbers using Look-up table (LUT) approach i.e. without doing any counting. Store the ten counts in ROM location 400H onwards.   (3,4,3)

P.T.O.

III.   a) Explain with example, why short jump instruction are encoded as two byte instructions

b) In some Parking lot there is some sensor. Whenever a car passed across the sensor, a pulse is generated. Write 8051 ALP to count the number of cars entering the parking lot. When the count reaches 110, display E on SSD (Common Cathode). Show interfacing diagram.

c) Explain the following ORG, EQU, EA.   (3,4,3)

IV.   a) Write a sub-routine to generate a delay of 2 seconds. Assume that XTAL-12 MHz.

b) Write 8051 ALP to find the smallest number in a set of ten 8-bit numbers stored from ROM location 0400h onwards. Store the result in RAM location 60H. (4,6)

UNIT - II

V.   a) Draw the File register of PIC18.

b) Write PIC ALP to count number of zero's in file register location 005H.

c) Write instructions to load WREG with FEH, then add 04h to it. What are the contents of status register after addition.   (2,5,3)

VI.   a) Write 8051 ALP to transmit "I love India" serially at 19200 baud, 8-bit data with one stop bit. Assume crystal frequency=12MHz.

b) What is software debounce? Write 8051 ALP to identify and encode any key pressed on a 2×3 matrix keyboard interfaced to 8051 with rows and column interfaced to PORT 2 and PORT 3 respectively. Draw hardware interfacing diagram also.   (2x5)

VII.   a) Suppose some analog device is connected to ADC interfaced to 8051. Also, 16X2 Lcd is connected to 8051. The analog device is producing variable analog signal. Write ALP to display LOW on LCD, if the corresponding digital value of the analog input converted by ADC is less than 60H.

b) Draw hardware interfacing diagram of Stepper motor and 8051. Write 8051 ALP to rotate stepper motor with low power consumption and low torque (using wave drive mode) 360° anticlockwise with a delay after every step. Assume that step angle 2° and XTAL-12Mhz.   (2x5)