Exam. Code: 0928
Sub. Code: 33651

2055

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) What is embedded system?

b) Draw the File register of PIC18.

c) Calculate the step size of an 8-bit ADC with full scale input range of 5V.

d) What is the difference between INCFSZ 05H, 1, 1 and INFSNZ 05H, 1, 0?

e) What is the use of overflow flag in 8051?

f) Why 8051 microcontroller is called 8-bit microcontroller?

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

h) List all the bit addressable SFR's of 8051.

i) List important features of RISC architecture.

j) Princeton and Harvard architecture. (10x1)

<u>UNIT - I</u>

II. a) Discuss briefly about these files .ASM, .LST , .OBJ, .HEX

b) What happens after execution of each instruction? Find the contents of register A at the end of program. Also, allocate address to each instruction if the starting address is 1008H

```
1008H      MOV R0, #0AH
                                    MOV A, #55H
MOV R1,#35H
                                    XRL A, R0
                                    CPL A
                                    RL A
                                    CPL C
                                    ADDC A, R1
                                    JB 0E7H,SKI
SETB C
SWAP A
                          SKI:  RRC A
                          AHEAD:NOP
```

c) What happens after following statements

ORG 0200H

DB 10, 10H, "abc", '3'

How many memory locations will get consumed after above initialization? (4,4,2)

P.T.O.

III. a) Explain these pins briefly $\overline{INT0}$, TXD, T1, $\overline{EA}$, ALE.

b) A car parking lot with capacity of 120 cars having a sensor which generates a pulse signal every time a car is passed across it. Interface the sensor and led to 8051 (Show diagram). Write 8051 ALP to count cars passing across the sensor and when the count reaches 120, glow LED connected to 8051. Assume F_{osc}=12 MHz. (2x5)

IV. a) Write a delay sub-routine to generate a delay of 2 seconds. Assume F_{osc}=15MHz.

b) Write 8051 ALP to find how many times FFH is present in a set of ten 8-bit numbers stored from ROM location 0400h onwards. Store the count in RAM location 60H. (2x5)

UNIT - II

V. a) List important features of PIC18F. (2)

b) Suppose two random 8-bit numbers are stored in file register locations 200H and 201H respectively. Write PIC ALP to add the two numbers and store the result in file register location 203H. (5)

c) Suppose some random number is present in file register locations 505H. Write PIC ALP to check whether the number is FFH. If there is match then store 00H in file register locations 505H. otherwise store 11H. (3)

VI. a) Write 8051 ALP to transmit "Namasteybharat." serially at 4800 baud, 8-bit data with one stop bit. Assume crystal frequency=12MHz. (5)

b) Interface stepper motor having step angle 2.5 degrees to 8051. Write 8051 ALP to rotate the motor 25 steps in anti-clockwise direction with high torque (Full Drive Mode). Draw hardware interfacing diagram also. (5)

VII. a) Draw well-labelled diagram showing interfacing of A/D converter interfaced to 8051and LM35 is connected to some analog line ADC. Briefly explain all the ADC signals. (5)

b) Write 8051 ALP to generate a square wave of 75% duty cycle having frequency 1KHz at P1.7. Assume F_{osc}=12 MHz. (5)

x-x-x