

1058

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. 1 which is compulsory and selecting two questions each from Part.

x-x-x

- Q1: a. Differentiate between HARVARD and VON NEUMANN architecture.  
b. What is key debounce?  
c. What is the advantage of using BRA instruction over GOTO instruction of PIC?  
d. What is the difference between INCF 09H, F, 1 and INCF 0AAH, F, 0 by giving example.  
e. What is the use of GATE bit in TMOD register?  
f. With example explain the CPFSGT instruction of PIC.  
g. What is the range of internal ROM addresses of 8051 and PIC?  
h. How busy flag of LCD is useful?  
i. What is the size of TBLPTR register in PIC? How much ROM space it covers? (10\*1)  
j. Draw the diagram showing signals required to interface PC and 8051 through DB9 and max233.

Part-A

- Q2: a. List all the SFR's of 8051 with addresses. (2)  
b. Show with diagram the complete hardware interfacing and the signals used in interfacing external memory with 8051. (3)  
b. Write 8051 ALP to identify and encode any key pressed on the 2\*4 matrix keyboard. Sketch the Interfacing diagram neatly (5)

- Q3: a. Write a program to do the following simultaneously:  
(a) Receive data serially and sent it to P1,  
(b) Have P0 port read and transmitted serially, and a copy given to P2,  
(c) Make timer 1 generate a square wave of 5 kHz frequency on P0.1.  
Assume that XTAL=12Mhz.. Set the baud rate at 9600. (6)

- b. Explain the internal circuitry and working (as i/p and o/p) of port 0 of 8051. (4)

- Q4: a. Write 8051 ALP to transmit word "it's me" serially at 2400 baud, 8-bit data with one stop bit. Assume crystal frequency=11.0592MHz. (5)  
b. Show the hardware interfacing of LCD to 8051 and write 8051 ALP to display "India is my country" on the 2nd line of LCD. You can also use busy flag (5)

Part-B

- Q5: a. Write the salient features of PIC18\*\*\*. Also draw the well-labeled pin diagram of PIC18\*\*\*. (5)  
b. Write PIC ALP to check whether WREG register is divisible by 5. If yes load RAM location 05H with 00H otherwise with FFH. (5)
- Q6: a. Write PIC ALP to count even and odd numbers in an array of ten 8-bit numbers stored in some internal ROM area. Store the two counts in some internal RAM location. Choose the addresses yourself. (6)  
b. Sketch hardware interfacing of ADC0808 with microcontroller. What are the various programming steps required by to start conversion & getting data from ADC (4)
- Q7: a. Discuss the bit-addressable memory and instructions in PIC. Using bit-addressable instruction check various flags in status register. (5)  
b. Discuss the internal circuitry and interfacing of 4-phase stepper motor with 2<sup>0</sup> step angle to microcontroller. Write a ALP to rotate stepper motor continuously (using 4-step sequence) first 90<sup>0</sup> CW and then 30<sup>0</sup> CCW with a delay of 30msec after every step. You can use approximate delay calculations. Assume that XTAL=11.0592Mhz (5)