GANPAT UNIVERSITY

B.TECH SEM. VI - MECHATRONICS ENGINEERING
REGULAR EXAMINATION MAY/JUNE-2012
MC-604 MICROCONTROLLER

Total Marks: 70

Time: 3 Hours

Instructions:

1). All questions are **compulsory**.
2). Figures to the **right** indicate full marks.
3). Answers to the two sections must be written in **separate** answer books.
4). Assume **Crystal frequency = 11.0592 MHz.**
5). Assume all necessary data.

Section - I

Que:-1	**Attempt All.**	**[12]**

(A) Explain the 8051 programming model.
(B) Explain the crystal and ROM test.
(C) Explain the three different methods to generate the delay using 8051.

OR

Que:-1	**Attempt All.**	**[12]**

(A) Explain the port 3 pin configuration with circuit.
(B) Explain the PSW and TCON special function register.
(C) Explain the PC base lookup table concept with example for 8051.

Que:-2 (A) Draw the schematic to interface 2 X 2 (0-3) keyboard with 8051 and draw the flowchart and write an ALP for identify the which key is pressed and send its ASCII value on Port 0. **[07]**

(B) Draw the schematic to interface stepper motor with 8051 and write an ALP to rotate the Motor 64° in the clockwise direction. Motor has step angle 2°. **[04]**

OR

Que:-2 (A) Draw the schematic to interface the LCD with 8051 and write an ALP to receive string "I LOVE INDIA" serially and display on LCD.
(LCD of 8 bits per character, 2 rows of characters, and 5X10 dots/char). **[07]**

(B) Draw the schematic to interface DAC0808 with 8051 and write an ALP to generate Staircase waveform for 3 steps and the width of each step is 10 ms. **[04]**

Que:-3 **Attempt All.** **[12]**

(A) Write an ALP to get data from P_1 and sends it to P_2 continuously while simultaneously receive data serially from the serial port and store to memory location 20H onwards. Set baud rate 4800 and use mode 1.

(B) Switches are connected to $P_{3.2}$, and $P_{3.3}$. Both switches are not close and open simultaneously. Write an ALP

      i) If switch $P_{3.2}$ will close then transmit the massage "OK" serially.

      ii) If switch $P_{3.3}$ will close then get the data from P0 and send on P1.

(C) 1. Explain Vector table.

     2. What is difference between subroutine and interrupt service routine?

Section - II

Que:-4   **Attempt All.**   **[12]**

(A) Write an ALP to generate a square wave of 66% duty cycle and frequency of 1 KHz on $P_{1.5}$. Use timer 0 in mode 1.

(B) Write an ALP to swap every even numbered bit of register R_6 with the complement of the odd numbered bit. Swap bit 0 with complement of bit 1, bit 2 with complement of bit 3 and so on until bit 6 is swapped with complement of bit 7.

(C) Write an ALP to check the status of switch and perform the following.

        i). If switch = 0, send letter 'N' serially.

        ii). If switch = 1, send letter 'Y' serially.

(Note: - A switch is connected to pin $P_{1.7}$, 9600 baud rate, 8 bit data, 1 start & stop bit.)

OR

Que:-4   **Attempt All.**   **[12]**

(A) Write an ALP to provide the given ON/OFF time to LED continuously. The LEDs are turned ON/OFF by the data bits of P0 as shown bellow. Use timer 0 in mode 1 for delay.

LEDs	Data Bits	ON Time
Green	$P_{0.1}$	100 ms
Yellow	$P_{0.5}$	500 ms

(B) Ten bytes store in RAM location 30H to 39H. Write an ALP to skip prime no. from string.

(C) Write an ALP to check the status of switch and perform the following.

        i). If switch = 0, send letter 'L' serially.

        ii). If switch = 1, send letter 'H' serially.

(Note: - A switch is connected to pin $P_{1.7}$, 9600 baud rate, 8 bit data, 1 start & stop bit.)

Que:-5 **(A)** Assuming that clock pulses are fed into T1 pin, Write an ALP to count the pulses from 0 to 9 continuously and display on 7 segments which is connected with P0.   **[06]**

        (B) Put the random number in address 50H (LSB) and 21H (MSB) and increment them as if they were single 16 bits counter until they equal random number in R0 (LSB) and R1 (MSB).   **[05]**

OR

Que:-5 **(A)** Write an ALP to read the data from P0 then convert this binary data to ASCII   **[06]**
numbers and store MSB to LSB in location 30H, 31H and 32H.

    (B) Write an ALP to decrement DPTR.   **[03]**

    (C) Write an ALP to Generate 100 ms delay using "pure software time delay".   **[02]**

Que:-6 **Attempt All.**   **[12]**

    (A) Write an ALP to find factorial of number which is store in memory location 50H.
Store result in 10H (Higher byte) and 20H (Lower byte).

    (B) Write an ALP to

        1. Write a program to read content of P0 and store it to the same address
Contained by P0.

        2. Replace lower nibble of register A by complemented higher nibble of
register A.

    (C) 1. Calculate how many times following loops are executed.

        i)

```
            MOV R5, #100                        XRL A, 0E0H
       GO:  DJNZ R5,GO                     GO:  RLC A
                                                JNC GO
```

        ii)

    2. Calculate the delay when the following instructions are executed.

```
                MOV R1, #04H
       BACK_2:  MOV R0, #200
       BACK_1:  DJNZ R0, BACK_1
                DJNZ R1, BACK_2
```

END OF PAPER