Student Exam No._____

GANPAT UNIVERSITY

B. Tech. Semester: VI (Mechatronics) Engineering

Regular Examination April – June 2016

2MC604 Microcontroller

Time: 3 Hours

Total Marks: 70

Instruction: 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.

Section – I

Que:-1   Attempt All.   12
(A)   Explain the port 0 pin configuration with circuit.
(B)   Draw the schematic to interface stepper motor with 8051 and write an ALP to rotate the Motor 30° in the clockwise direction. The motor has step angle 2°.
(C)   Draw the timing diagram for 1 byte, 2 cycle instruction.

OR

Que:-1   Attempt All.   12
(A)   Draw the block diagram of 8051 and list out the features of it.
(B)   Explain the crystal and RAM test.
(C)   Explain the DPTR based look up table concept.

Que:-2   Attempt All.
(A)   Draw the schematic to interface ADC0808 and write an ALP to read the data from   6
ADC and display it on LEDs which are connected to P1.
(B)   Draw the hardware diagram to interface the 2 seven segment display with the 8051   5
and write an ALP to display the following counter sequence continuously with 1 sec
delay between each count.
00 – 11 – 22 – 33 – 44 – 55 – 66 – 77 – 88 – 99 and again start from 00.

OR

Que:-2   Attempt All.
(A)   Draw the schematic to interface DAC0808 with 8051 and write an ALP to generate   6
Sine wave form.
(B)   Draw the hardware diagram to interface the 2 seven segment display with port 1 of the   5
8051 and write an ALP to display 00 – 99 continuously with 1 sec delay between each
count.

Que:-3   Attempt All.   12
(A)   Draw the schematic to interface 4 X 4 (0-F) keyboard with 8051 and Draw the flow
chart and write an ALP for identify the which key is pressed and send its ASCII value
on Port0.
(B)   Draw the schematic to interface the 20X2 LCD with 8051 and write an ALP to
display massage as per shown in following 20X2 table.

							U	V	P	C	E								
	G	A	N	P	A	T		U	N	I	V	E	R	S	I	T	Y		

Que:-4   Attempt All.

(A)   Ten bytes are stored in RAM location 30H to 39H. Write an ALP to find maximum number from string and store that number in 50H memory location.

(B)   Ten bytes are stored in RAM location 60H to 69H. Write an ALP to store ODD number starting from RAM location 40h and EVEN number starting from 20H.

(C)   Write an ALP for
1.   Complement number stored in register R4 without using logical operation.
2.   Copy data of external ROM memory 0100H to 0103H to external RAM memory 0100H to 0103H.

<center>**OR**</center>
<center>12</center>

Que:-4   Attempt All.

(A)   Ten bytes are stored in external RAM location 3000H to 3009H. Write an ALP to add -ve number from string and store the result in RAM location 30H (LSB) and 20H (MSB).

(B)   Ten bytes are stored in RAM location 50H to 59H. Write an ALP to skip prime no. from string.

(C)   Write an ALP to
1.   Store the contents of RAM location 25H at the address contained in RAM location 08H
2.   Replace lower nibble of register A by complemented higher nibble of register A.

Que:-5   Attempt All.

(A)   Write a program to provide the given ON/OFF time to three traffic lights   6
continuously. The signal lights are turned ON/OFF by the data bits of P1 as shown below. Use timer 0 in mode 1 for delay.

Lights	Data Bits	ON Time
Green	P1.1	1 ms
Yellow	P1.5	0.5 ms
Red	P1.3	2 ms

(B)   Assume that the 8051 serial port is connected to COM port of the IBM PC, and on the   5
PC we are using the hyper terminal program to send and receive the data serially.P1 and P2 of 8051 are connected to LEDs and switches respectively. Write an ALP to
i) Send the message to PC from 8051 "READY"
ii) Receive any data sent by the PC put it on LEDs connected to P1 continuously
iii) Get data from switches connected to P2 and send it to the PC.
(Data send or receive at 9600 baud, 8 bit data and 1 stop bit)

<center>**OR**</center>

Que:-5   Attempt All.   6

(A)   Generate the following waveform on P1.0.use timer 0 in mode 2.
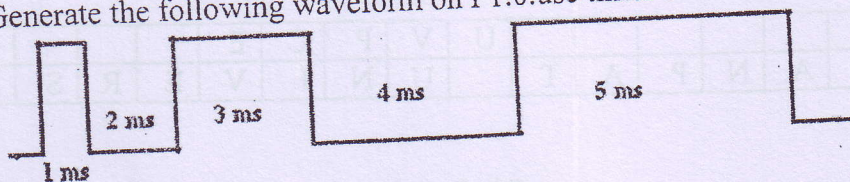
(B) Write a program to receive data serially at 19200 baud, 8 bit data and 1 stop bit. If the   5
data is less than 80H then save it on eternal RAM location 1010H, otherwise stop
receiving the data.

Que:-6   Attempt all.   12

(A) Explain addressing modes.

(B) Explain the PSW register. How to change register banks?

(C) Specify the register contents and the flag status as the following instructions are
executed.

	A	B	Z	CY

XRL A, 0E0H

MOV B, #84H

ADD A, 0F0H

SUBB A, #20H

(D) Calculate the delay when the following instructions are executed. (Machine cycles
required for MOV and DJNZ are 1 and 2 respectively).

```
           MOV R2, 10H
BACK_3:    MOV R1, #0FH
BACK_2:    MOV R0, #0FFH
BACK_1:    DJNZ R0, BACK_1
           DJNZ R1, BACK_2
           DJNZ R2, BACK_3
```

END OF PAPER