

GANPAT UNIVERSITY
B.TECH SEM. VI - MECHATRONICS ENGINEERING
CBCS REGULAR EXAMINATION MAY/JUNE-2013
2MC-604/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

[12]

Que:-1 Attempt All.

- (A) Write an ALP to rotate DPTR left side.
- (B) Draw the schematic to interface 4 X 4 (0-F) keyboard with 8051 and Draw the flow chart for identify the which key is pressed and send the its ASCII value on Port.
- (C) Draw the schematic to interface stepper motor with 8051 and write an ALP to rotate the Motor 30° in the clockwise direction. Motor has step angle 2°, number of rotor teeth are 45.

OR

[12]

Que:-1 Attempt All.

- (A) Write an ALP to find square of the contain of register R3 and store answer in 30H (lower byte) and 31H (higher Byte). (Use lookup table concept).
- (B) Draw the hardware diagram to interface the 4 seven segment display with the 8051 Draw the flow chart or write steps to display 0000 to 9999 on seven segments.
- (C) Draw the schematic to interface DAC0808 with 8051 and write an ALP to generate Staircase wave form for 15 steps.

- Que:-2** (A) Design a system (draw diagram) with 8051 with I/O like Four switches, two motors, a conveyor belt and an alarm. The switches S1, S2 and S3, S4 are connected to P0.0, P0.1 and P3.2 (INT0), P3.3 (INT1) respectively. The motors M1 and M2 and alarm are connected to P1.0, P1.1 and P1.7 respectively. Write an ALP to turn on the motor when S1 press then M1 and S2 press then M2. And either S1 or S2 is press the devices irrespective to the other switches status and turn on Alarm. And S4 (interrupt 1 generated) is press then again starts normal operation from initial. (S4 is always press after S3 to start the system again in normal operation.) [07]
- (B) Write a program to receive data serially continuously at 19200 baud, 8 bit data and 1 stop bit. [04]

OR

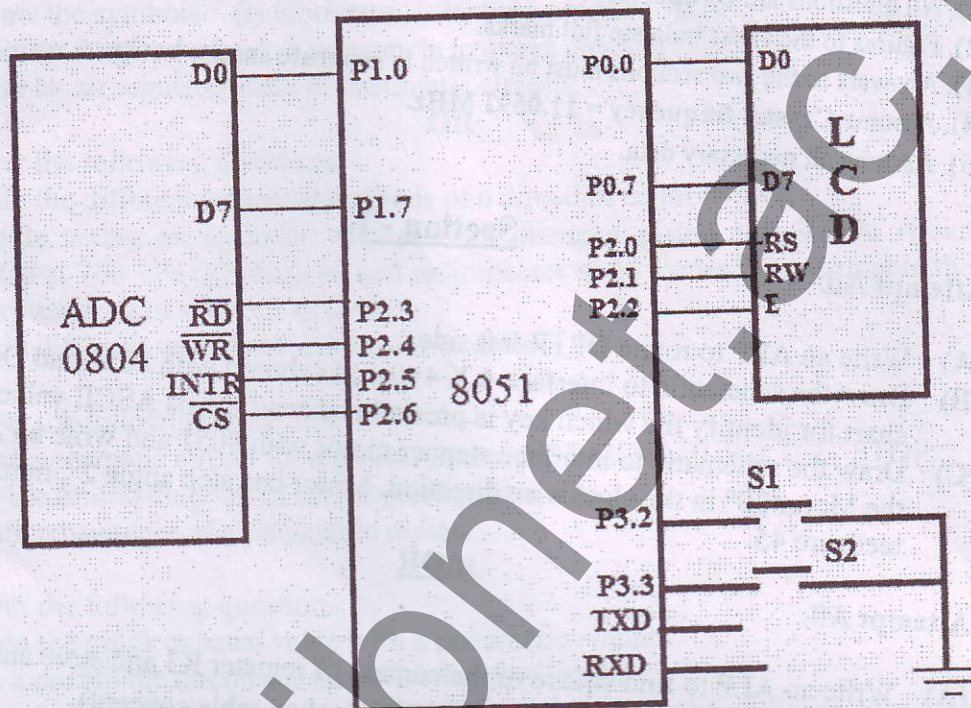
- Que:-2** (A) Write an ALP to multiply 12FDH with FD12H and store 32 bit answer in following way [06]

23H(MSB)	22H	21H	20H(LSB)
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- (B) Two ASCII values of unpacked BCD numbers are store in 20H (lower nibble) and 21H (higher nibble). Convert them in packed BCD and store in 22H. [02]
- (C) Write down all the alternate function of port 3 of 8051. [12]

Que:-3

Design a system with 8051 with I/O device like LCD, ADC and switches. Write a program in **assembly or C** to receive the data serially and display on LCD continuously but when switch S1 (P3.2) (INT0) is pressed (low) then display the data of ADC on LCD until S2 (P3.3) (INT1) is not pressed. When S2 is pressed then again starts to receive the data serially and display on LCD continuously.



Section - II

Que:-4 Attempt All. [12]

- (A) Explain expanding I/O using memory mapping for 8051.
 (B) Explain the SCON and TCON SFR.
 (C) Explain the PC base lookup table concept with example for 8051.

OR

Que:-4 Attempt All. [12]

- (A) Which port requires pull up register? Explain that port pin configuration with circuit.
 (B) Explain the crystal and ROM test.
 (C) What is difference between microprocessor and microcontroller?

- Que:-5 (A) Ten bytes store in RAM location C000H to C009H. Write an ALP to find average of these ten numbers. [04]
- (B) Write an ALP to find factorial of given no. (Note: - factorial may not be more than FFH.) [04]

- (C) Write an ALP to store the complement of high nibble of register A in the both the nibble of register A. (i.e. A=74H then A=88H.) [03]

OR

- Que:-5 (A) Write a program to provide the given ON/OFF time to three traffic lights continuously. [05]
The signal lights are turned ON/OFF by the data bits of P1 as shown bellow.

<u>Lights</u>	<u>Data Bits</u>	<u>ON Time</u>
Green	P _{1.1}	10 ms
Yellow	P _{1.2}	05 ms
Red	P _{1.3}	02 ms

- (B) Write an ALP to subtract the contents of R0 from 16 bit content stored in location R1 and R2. Put result in R6 and R7. [03]
(C) What is difference in von Neumann and Harvard architecture? And Which port hasn't alternate function for 8051? [03]

Que:-6 Attempt All. [12]

- (A) Write a program to calculate $\sum 1+2+...+n$; where n is the number stored in register R0. Do not use branching operation.

- (B) Calculate the delay when the following instructions are executed.

```
MOV R1, #10
BACK_2: MOV R0, #0FFH
BACK_1: DJNZ R0, BACK_1
NOP
DJNZ R1, BACK_2
```

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

i)	ii)	iii)
MOV A, #10	CLR 0E7H	MOV A, #02H
GO: DJNZ 0E0H, GO	GO: RLC A	GO: RRC A
	JC GO	JNC GO

- (D) Specify the contents of the registers and the flags status as following instructions are executed.

	A	R1	Carry
MOV A, #0FDH			
MOV R1, #10H			
ADD A, R1			
SUBB A, #20H			
MOV R1, #0E0H			
SUBB A, @R1			

END OF PAPER