

GANPAT UNIVERSITY
B.TECH SEM. VI - MECHATRONICS ENGINEERING
REGULAR EXAMINATION MAY/JUNE-2014
2MC604 - MICROCONTROLLER

Time: 3 Hours

Total Marks: 70

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) Write a program to find the average number of ten bytes which are stored in the external RAM locations 0100H to 0109H. Store answer in the external ROM location 0200H.
- (B) Write a program to swap the contents of register bank 2 with register bank 1 as – R0 of bank 2 with R0 of bank 1, R1 of bank 2 with R1 of bank 1 and so on. Use PUSH & POP instructions.
- (C) Explain the TMOD register.

OR**Que:-1 Attempt All.**

[12]

- (A) Assume that register A has 29H packed BCD, write a program to convert packed BCD to two ASCII numbers and place them in R2 and R6.
- (B) Swap the nibbles of R6 and R7 so that the low nibble of R6 swaps with the high nibble of R7 and the high nibble of R6 swaps with the low nibble of R7.
- (C) Write a program to decrement the contents of the external RAM locations 0123H to 01BDH.

Que:-2

- (A) Program timer 1 to generate a square wave of 3 KHz. Find the lowest square wave frequency that can be generated with the used timer mode. [06]
- (B) Program timer 1 to be an event counter. Use mode 1 and display the binary count on P1 and P2 continuously. Set the initial count to 30,000. [05]

OR**Que:-2**

- (A) Write a program to transfer the message "MECHA" serially at 4800 baud, 8-bit data, 1 stop bit. Do this continuously. [06]
- (B) Write a program to add BCD 289795H to 156739H and save the BCD result in RAM memory location starting at 20H. What would be the final BCD answer? [03]
- (C) Explain SBUF register. [02]

Que:-3 Attempt All.

- (A) (a) Which timer is used to set the baud rate in 8051?
 (b) Show the framing of the letter 'Z' (01011010), no parity, 1 stop & start bit.
 (c) What address is assigned to register R5 of bank 2?
 (d) Find the contents of register A after execution of the following code.

MOV A, #01111101 b

SWAP A

ANL A, #0F0H

- (B) (a) Find the time delay for the DELAY subroutine. Crystal frequency is 12 MHz.

Instruction	M/C cycle
DELAY: MOV R3, #100	1
GO: MOV R2, #200	1
UP: NOP	1
DJNZ R2, UP	2
DJNZ R3, GO	2
RET	1

- (C) Explain the role of the OV flag in signed number operation.

Section - II

Que:-4 Attempt All.

- (A) Draw the pin diagram of the 8051 microcontroller. What is the function of EA pin?
 (B) Describe the different methods of serial data communication
 (C) Explain all the addressing modes of the 8051 with one example of each.

[12]

OR

Que:-4 Attempt All.

- (A) Explain the RAM organization of the 8051.
 (B) What is the role of MAX 232 in serial data communication? Explain with diagram.
 (C) Explain CJNE instruction with an example.

[12]

Que:-5 (A) Draw the schematic to interface 4 X 4 (0-F) keyboard with 8051. Write a program to identify the which key is pressed and send the its ASCII value on Port [07]

(B) Draw the schematic to interface stepper motor with 8051. [04]

OR

Que:-5 (A) Draw the schematic to interface DAC0808 with 8051 and write an ALP to generate sine wave. [07]

(B) How many interrupts do we have in the 8051? Explain the priority of them. [04]

Que:-6 Attempt All.

- (A) What is the difference between interrupts and polling?
 (B) Explain the difference between mode 1 & mode 2 of the timer of 8051.
 (C) (a) How the 8051 would represent -34H?
 (b) The "MOV R5, #FFH" is valid or not. Give the reason if not valid.
 (c) Draw the PSW register.
 (d) Write the instruction to start & stop the timer 1.

[12]

END OF PAPER