

**GANPAT UNIVERSITY**  
**B.TECH SEM. V MECHATRONICS ENGINEERING**  
**REGULAR EXAMINATION NOV/DEC - 2012**  
**2MC505 - MICROPROCESSOR**

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). Consider system frequency is 3 MHz if it is not given.
- 5). Assume all necessary data.

**Section - I****Que:-1 Attempt All.**

- (A) Which operations can be performed with the data by the internal architecture of the 8085 microprocessor? [04]
- (B) Calculate the address lines required for an 8K-byte memory chip. [02]
- (C) What is the difference between the program counter and the stack pointer? [02]
- (D) Explain the need to demultiplex the bus AD<sub>7</sub>-AD<sub>0</sub>. [04]

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

- (A) Explain the address bus, the data bus and the control bus of the 8085 microprocessor. [04]
- (B) "The number of bytes of the instruction is not equal to the number of machine cycles of the instruction" – justify this statement by giving an example. [05]
- (C) Explain control signals IO/M and ALE, WR. [03]

- Que:-2** (A) How to find the memory address range of the R/WM chip with 2048 bytes of memory by using the 3-to-8 decoder? What is the advantage of this method over NAND logic? [08]
- (B) Explain the difference between the peripheral mapped and the memory mapped I/O. [03]

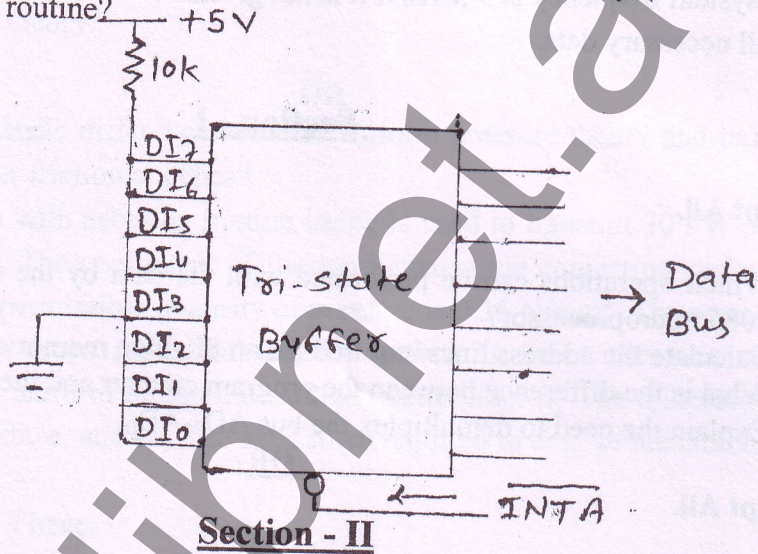
**OR**

- Que:-2** (A) Design a seven-segment LED output port with the device address F5H using a 74LS138 3-to-8 decoder, a 74LS20 4-input NAND gate, a 74LS02 NOR gate and a common-anode seven-segment LED. Write instructions to display **B** at the port. [08]
- (B) Write the instructions to enable all the interrupts in an 8085 system. [03]



Que:-3 Attempt All.

- (A) Draw timing diagram for the STA C750H instruction. [02]
- (B) The memory address of the last location of a 1K byte memory chip is given as FBFFH. Specify the starting address. [01]
- (C) If the clock frequency is 5 MHz, how much time is required to execute an instruction of 18 T-states? [01]
- (D) List the four operations commonly performed by the MPU. [01]
- (E) Specify the number of registers and memory cells in a 512 x 4 memory chip. [01]
- (F) (i) Identify the RST instruction in the below figure. [03]  
(ii) Specify the restart memory location when the microprocessor is interrupted.  
(iii) If the instruction in the monitor program at 0030H is JMP C0BFH and the service routine is written at C0D0H, what instruction is necessary (at C0BFH) to locate the service routine?



Que:-4 Attempt All.

- (A) A string of ten data bytes is stored starting from memory location C500H. Sort these data in descending order. [12]
- (B) Write an ALP to generate a rectangular wave of 25 ms of ON period and 50 ms OFF period on bit D6 of output port FDH.
- (C) Write an ALP to generate saw tooth wave. (Assume DAC is connected with port B of 8255).

**OR**

Que:-4 Attempt All.

- (A) A set of 10 bytes store in memory location C100H to C109H. Write a program to interchange the lower nibble and higher nibble then store from the memory location C600H. (Ex- 57H then store 75H). [12]

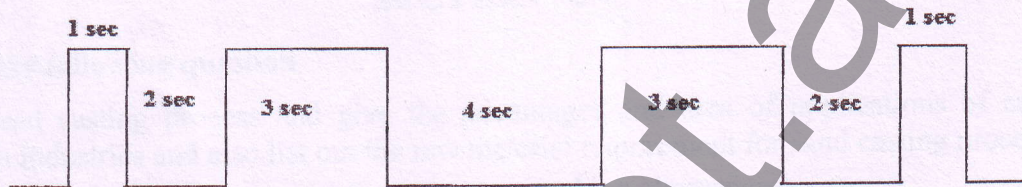


- (B) Write an ALP to generate a rectangular wave of 50 ms of ON period and 1 sec OFF period on bit D1 of output port F5H.
- (C) Write an ALP to generate a pulse every 5 ms. Use timer 2 of 8254.

- Que:-5** (A) Draw the block diagram of 8255 and Write an ALP to make decimal counter of single digit and display the count on port A of 8255. Take of 25 ms delay between each count. Use counter 0 of 8254 for delay and counter 1 of 8254 for count. [08]
- (B) Write an ALP to find the square of the content of memory location C200H and store the result in memory location C100H. [03]

OR

- Que:-5** (A) Draw the block diagram of 8254 and Write an ALP to generate the following waveform on the output pin 3 of the port C of 8255. Use 8254 for delay. [08]



- (B) Write an ALP to find complement of the contain of C200H without using CMA and store the result in memory location C100H. [03]

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

- (A) Write an ALP the increment the contain of B until it reach contain of register C.(Assume initially  $B < C$ ).
- (B) Calculate the delay for the following instructions:

```

MVI B, 0FH
Loop 2: LXI D, 1250H
Loop 1: DCX D
        MOV A,D
        ORA E
        JNZ Loop 1
        DCR B
        JNZ Loop 2

```

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

	A	B	S	Z	CY
XRA A					
MVI B, 50H					
SBB B					
ACI AAH					
RAR					



(D) Identify that how many times following loops are execute.

(i) Back: MVI A, F0H  
ADI 10H  
JPO Back

(ii) MVI A, 00H  
Back: DCR A  
JMP Back

(iii) LXI H, C500H  
Back: SBB M  
JC Back

[For (iii) loop Initially (A) = (C500H) = FFH & CY = 1]

**END OF PAPER**

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