GANPAT UNIVERSITY
B. TECH. SEM. V- MECHATRONICS ENGINEERING
CBCS REGULAR EXAMINATION NOV/DEC-2014
2MC-505 MICROPROCESSOR

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.
4). Assume all necessary data.

Section – I

Que:-1	**Attempt All.**	**[12]**
(A)	(i) If the memory chip size is 2048 x 4 bits, how many chips are required to make up 16 K bytes of memory?	**[4]**
	(ii) Explain the difference between SRAM vs. DRAM.	
(B)	Explain the 8085 vectored interrupts.	**[4]**
(C)	Describe various types of ROM.	**[4]**

OR

Que:-1	**Attempt All.**	**[12]**
(A)	Describe in detail the demultiplexing of bus AD_0-AD_7.	**[4]**
(B)	Explain difference between peripheral mapped I/O and memory mapped I/O.	**[4]**
(C)	Explain about the assembly language of the 8085 microprocessor.	**[4]**

Que:-2	**Attempt All.**	**[11]**
(A)	Two machine codes- 0001 0110 (16H – MVI C) and 0100 0010 (42H) – are stored in memory locations C500H and C501H, respectively. Illustrate the bus timings as these machine codes are executed. Calculate the time required to execute each machine cycle and the entire instruction cycle if the clock frequency is 3 MHz.	**[06]**
(B)	Design an interfacing circuit for memory to meet the following specification: (i) 2 to 4 decoder (ii) 2K ROM-address range should begin at 8000H and additional 4 K memory space should be available for future expansion. (iii) 2K CMOS RAM	**[05]**

OR

Que:-2   Attempt All.   [08]

   (A) Design a seven-segment LED output port with the device address F3H 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 **E** at the port.

   (B) Define machine cycle, instruction cycle and T-state.   [03]

Que:-3   Attempt All.   [12]

   (A) List the four operations commonly performed by the 8085 and describe system bus in   [4]
detail.

   (B) Differentiate between traditional CPU and MPU.   [4]

   (C) Explain various control and status signals of 8085.   [4]

Section – II

Que:-4   Attempt All.   [12]

   (A) Load 93H in register A and 6CH in register B and perform the Exclusive OR operation   [4]
with the numbers and store result at memory location C200H. (Note: Use only AND,
OR and compliment operation. A Ex-Or B=A.B'+A'B).

   (B) Write an ALP to decrement the contain of DE register pair. Decrement it until lower 8   [4]
bit is set to 00H [Use DCX and compare instruction].

   (C) Write an ALP to find a maximum number from 5 numbers located on memory starting   [4]
from C100H onwards. Store the number on location C200H.

OR

Que:-4   Attempt All.   [12]

   (A) Load the data byte 8EH in register D and F7H in register E. Mask the high-order bits   [4]
(D7-D4) from both the data bytes, exclusive-OR the low-order bits (D3-D0) and
display the answer.

   (B) A set of ten bytes are stored in memory starting with the address XX50H. Write a   [4]
program to check each byte, and save the bytes that are higher than $(60)_{10}$ and lower
than $(100)_{10}$ in memory locations starting from XX60H.
Data(H) 6F, 28, 5A, 49, C7, 3F, 37, 4B, 78, 64

   (C) String of 6 data bytes are stored from 2050H. It includes blanks. Write an ALP to   [4]
eliminate blanks and store to another location C000H. [HINT: Set zero flag by ORA to
check Blanks.]

Que:-5   Attempt All.   [11]

   (A) A bar code scanner scans the boxes being shipped from the loading dock and records   [3]
all the codes on computer memory:

The end of the data is indicated by the byte 00H. The code 1010 0011 (A3H) is
assigned to 19" television sets. Write a program to count the number of 19" television
sets (i.e. A3H) that were shipped from the following data set.

Data(H) FA, 67, A3, B8, A3, A3, FA, 00

   (B) A set of five bytes is stored from memory location starting from C101H to C105H.   [4]

Write a program to interchange the lower nibble and higher nibble then store on C201H to C205H.(Example 39H then store 93H)

(C) Write an ALP to find out the factorial of a given number in the location 000AH. Store the result in location 000BH. [4]

OR

Que:-5 Attempt All. [11]

(A) Design an up-down counter to count 0 to 9 and 9 to 0 continuously with 1 second delay between each count and display the count at one of the output ports. Show the delay calculations. Assume suitable frequency. [3]

(B) Six bytes of data are stored in memory locations starting at 1050H. Add all the data bytes. Use register B to save any carries generated, while adding the data bytes. Display the entire sum at two output ports, or store the sum at two consecutive memory locations 1070H and 1071H.
Data(H): A2,FA,DF,E5,98,8B [4]

(C) Write an ALP to generate 1 ms delay. Write one separate subroutine for delay. (Use Call and RET instruction). Assume suitable frequency. [4]

Que:-6 Attempt any three out of five [12]

(A) Write a program to provide the given on/off time to three traffic lights(Green, Yellow and Red) and two pedestrian signs(WALK and DON'T WALK). The signal lights and signs are turned on/off by the data bits of an output port as shown below:
The traffic and pedestrian flow are in the same direction; the pedestrian should cross the road when the Green light is on. [4]

Lights	Data bits	On Time(Seconds)
Green	D0	15
Yellow	D2	5
Red	D4	20
WALK	D6	15
DON'T WALK	D7	25

(B) a) Write a program to transfer a block of data of 6 bytes from C050H to C055H to the location C150H to C155H using LDAX and STAX instruction. [4]

b) Specify the number of times the following loops are repeated

1. BACK:MVI A,FOH
       ADI 10H

       JPO BACK

2. MVI A,10H
   GO: CMA

       JM GO

3. MVI B,FAH
   L1: INR B
   JC L1

4. BACK:MVI A,FFH
       ADI 08H
       CMA
       JP BACK

(C) Write an ALP to find out the cube of the given number stored in 1000H. Store result [4] into the memory location 1001H register.

(D) Identify the register contents and the flag status as the following instructions are [4] executed.

	A	C	S	Z	CY
MVI A,5EH					
ADI A2H					
MOV C,A					
HLT					

(E) Write a program to sort given 10 numbers from memory location 2000H in the [4] ascending orders.
Data(H): 12, 56, 00,45,65,09,FF,11,03,89

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