Student's Exam No._____

# GANPAT UNIVERSITY

## B. Tech. Semester IV EC Engineering

## Regular Examination April-June 2016

## 2EC404: Microprocessor Architecture & Programming

**TIME: 3 HOURS]** **[TOTAL MARKS: 60**

**INSTRUCTIONS:**

1. Attempt all questions.
2. Answers to the two sections must be written in separate answer books.
3. Figures to the right indicate full marks.
4. Assume suitable data, if necessary.

### SECTION-I

**Q:1** **(A)** State differences and similarities between CALL-RETURN and PUSH-POP instructions. **3**

**(B)** The memory location D050H holds the data byte DE h. Write instructions to transfer the data byte to the accumulator using three different opcodes: MOV, LDAX and LDA. **3**

**(C)** A binary number is stored in memory location C050 h. Write a program to convert this number into BCD and store each BCD as two unpacked BCD digits in the output buffer starting at memory location C070 h. **4**

**OR**

**Q:1** **(A)** Calculate the delay in the following loop, assuming the system clock frequency is 3 MHz. **3**

| Mnemonics | T States |
|---|---|
| LXI B, 1234 h | 10 |
| Loop: DCX B | 6 |
| MOV A, C | 4 |
| ORA B | 4 |
| JNZ Loop | 10/7 |

**(B)** Write down the sequence of events in each machine cycle for CALL instruction with example. **3**

**(C)** An 8-bit binary number 5E h is stored in memory location D000 h. Write an assembly language program to convert given number to ASCII Hex code and store it to locations E000 h and E001 h. **4**

**Q:2** **(A)** Enlist and explain each method to generate delay with example. **3**

**(B)** Six bytes of data are stored in memory locations starting at D050 h. Add all the data bytes. Use register B to save any carries generated, while adding the data bytes. Display the entire sum at two consecutive memory locations, E000 h and E0001 h. **4**

Data (H) : C2, BA, EF, 56, 9A, 34

**(C)** Enlist conditional CALL and RETURN instructions. **3**

**OR**

**Q:2** **(A)** What is the difference between vectored and non-vectored interrupts? Explain non-vectored interrupts in detail. **3**

(B) Find the positive and negative numbers in an array of 8 elements. Assume array Starting from E050 h onwards. Store the result of number of positive elements in F000 h and negative number in F001 h. Data(H) : E2, 68, 57, 5A, 7F, DA, E5, 3C — 4

(C) Explain each bit of SIM instruction in brief. — 3

Q:3 (A) List out & explain the Branching instructions (conditional and unconditional jumps) with the help of illustrations. — 4

(B) Write an assembly program to Load the hex numbers 6F h and DE h in registers B and C, respectively, and add the numbers. If the sum is greater than FF h, display 01 h at output PORT 2; otherwise, display the sum. — 4

(C) Write an assembly language program to store 23 h in accumulator and store this data to all internal register. — 2

## SECTION-II

Q:4 (A) List the four operations commonly performed by the MPU. — 4

(B) Write a short note on tri-state devices. — 3

(C) What are the advantages of an assembly language in comparison with high-level languages? — 3

**OR**

Q:4 (A) Explain the generation of Read/Write Control Signals for Memory & I/O. — 4

(B) How many flag registers are available in 8085 MPU? Explain each of them in brief. — 3

(C) The memory map of a 4K byte memory chip begins at the location 2000H. Specify the address of the last location on the chip and the number of pages in the chip. — 3

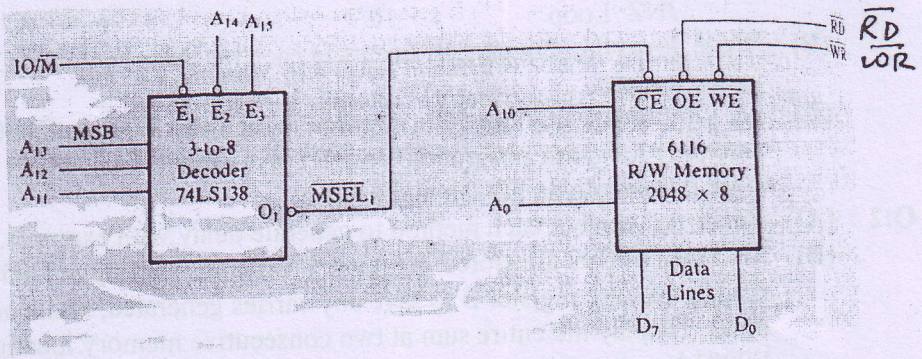
Q:5 (A) Write a short note on Microprocessor Controlled Temperature System (MCTS). — 4

(B) Draw the timing diagram of memory write cycle. — 3

(C) Write a short note on 8155 Programmed Interfacing Device. — 3

**OR**

Q:5 (A) Analyze the interfacing circuit in following figure and find its memory address range. — 4




(B) Draw the timing diagram of OUT instruction. — 3

(C) Write a short note on 8255 Programmed Interfacing Device. — 3

Q:6 (A) Design a seven-segment LED output port with the device address F5H, using a 74LS138 3-to8 decoder, a 74LS20 4-input NAND gate, a 74LS02 NOR gate, and a common-anode seven-segment LED. ***(Questions B, C, D are in continuation)*** — 4

(B) Given $\overline{WR}$ and IO/$\overline{M}$ signals from the 8085, generate the $\overline{IOW}$ control signal. — 2

(C) Explain the binary codes required to display 0 to F Hex digits at the seven-segment LED. — 2

(D) Write instructions to display digit 7 at the port. — 2