

GANPAT UNIVERSITY
B.TECH. SEM. V BIOMEDICAL & INSTRUMENTATION ENGINEERING
REGULAR EXAMINATION NOVEMBER/DECEMBER - 2011

BME – 504: MICROPROCESSORS AND MICROCONTROLLERS

TIME :- 3 Hours

TOTAL MARKS :- 70

Instructions:

1. All the questions are compulsory.
2. Answer of each section must be written in separate answer books.
3. Figure to the right indicate marks.
4. Assume data, if needed.
5. Conventional terms / notations are used.

SECTION-I

Que.1 [12]

- (a) Compare similarities and differences between PUSH/POP and CALL/RET instructions.
- (b) What is Delay? Discuss any three techniques to set the delay.

OR

Que.1 [12]

- (a) Explain the instructions RIM and SIM for 8085 interrupts.
- (b) List the eight steps to initiate and implement the 8085 interrupt.

Que.2 [11]

- (a) What is Stack? What is the function of stack in 8085 microprocessor? Explain it by giving one example.
- (b) What is debugging technique of microprocessor 8085? Explain static and dynamic debugging technique used in microprocessor 8085.

OR

Que.2 [11]

- (a) Enumerate and discuss various registers used in 8085 programming model. Why PC and SP are of 16 bit? Why Data bus is bidirectional and Address bus is unidirectional?
- (b) Describe Various addressing modes used in 8085 microprocessor giving example.

Que.3 [12] **Write an assembly language program and draw flow chart for the following. (Any Three)**

- (a) Write an ALP to find Square of a given data.
- (b) Write an ALP to find No. of 1's from given 8 bit number.
- (c) Write an ALP to separate odd and even numbers from the given string. Also calculate number of zeros in the given string.
- (d) Write an ALP to find largest number from the given array.

SECTION-II

- Que.4** (a) Draw a block diagram of a microprocessor-based system and explain the functions of each component: microprocessor, memory and I/O and their lines of communication. [6]
- (b) Illustrate the data flow and list the sequence of events when the instruction code 4FH (MOV C, A), stored in memory location 2005H, is being fetched by the MPU. [4]
- (c) Define following terms: [2]
- Microprocessor
 - Microcontroller
 - High-level language
 - Low-level language

OR

- Que.4** (a) Explain memory organization and memory map, and explain how addresses are assigned to a memory chip. [8]
- (b) Explain the difference between the machine language and the assembly language of the 8085 microprocessor. [2]
- (c) mention the function of the following signals [2]
1. ALE
 2. IO/M
 3. CLK(OUT)
 4. SOD

- Que.5** (a) Illustrate the bus timings for the execution of an instruction STA 2050H. Three machine codes 32H, 50H and 20H are stored at the memory location 2500H, 2501H and 2502H respectively. Calculate the time required to execute this instruction. Clock frequency is 3MHZ. [6]
- (b) Explain the differences between the peripheral-mapped I/O and memory-mapped I/O techniques. [3]
- (c) Draw a schematic to generate Read/Write control signals for memory and I/O [2]

OR

- Que.5** (a) Draw and explain 8085 timing for the execution of an IN 45H instruction. [5]
- (b) Design a seven segment LED output port with the device address 55H, using a 74LS138 3 to 8 decoder, a 74LS20 4-input NAND gate, a 74LS02 NOR gate and a common anode seven segment LED. WR and IO/M signals are given from 8085, generate the IOW control signal. Write instruction to display digit 6 at the output. [6]

- Que.6 (a) Determine the addresses of the control register, I/O ports and timer registers in Figure 1. [1]
- (b) Write an ALP to generate square-wave with a pulse width of $100 \mu\text{s}$ by using 8155 timer. Set up the timer in Mode 1 if the clock frequency is 2 MHz. Use the same decode logic and the port addresses as in Q.6 (a) (Figure 1). [4]
- (c) Illustrate 8255A Control Word Format for I/O Mode. [2]
- (d) 1. Identify the port addresses in Figure 2. [5]
 2. Identify the Mode 0 control word to configure port A and port C_U as output ports and port B and port C_L as input ports.
 3. Write a program to read the DIP switches and display the reading from port B at port A and from port C_L at port C_U .

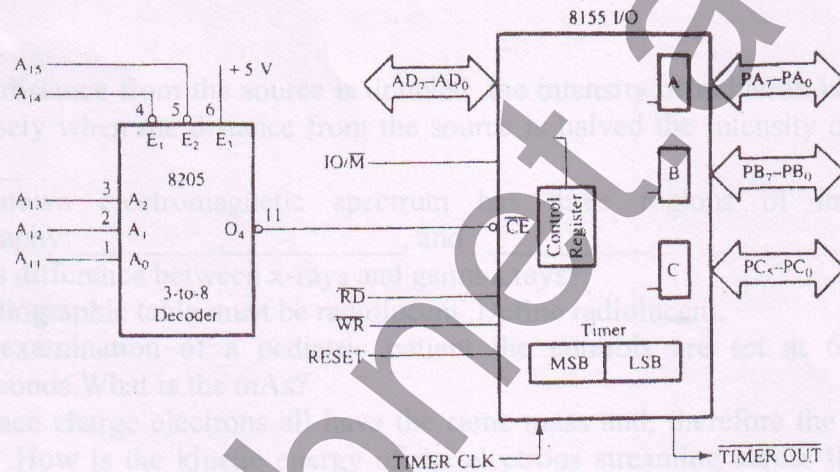


FIGURE 1

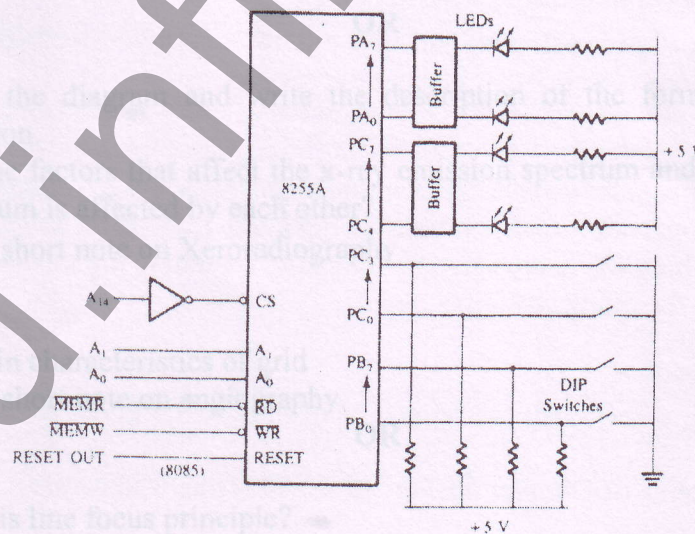


FIGURE 2

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