

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-IV • EXAMINATION – SUMMER • 2014

Subject Code: 140701

Date: 16-06-2014

Subject Name: Microprocessor and Interfacing

Time: 10:30 am - 01:00 pm

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1 (a)** Answer the following questions **07**
- [1] How many address lines are necessary to interface 8 KByte EPROM and 1 KByte RAM with 8085 microprocessor?
 - [2] What is the function of ALE pin in 8085?
 - [3] What is an assembler?
 - [4] Define Bus. List different Bus available in 8085 microprocessor.
 - [5] What is the purpose of temporary registers W and Z in 8085 microprocessor?
 - [6] What is the purpose of HOLD and HLDA pin in 8085 microprocessor?
 - [7] What will be duration of 1 T state if 4 MHz crystal is connected with 8085 microprocessor?
- (b)** Explain how address/data lines AD0-AD7 are de-multiplexed. Draw logic diagram to generate control signals $\overline{\text{MEMW}}$, $\overline{\text{MEMR}}$, IOW and IOR from IO/M, $\overline{\text{WR}}$ and $\overline{\text{RD}}$. **07**
- Q.2 (a)** What is interrupt? What are the interrupts available in 8085 microprocessor? Write interrupt vector table for vectored interrupts. Explain SIM and RIM instructions. **07**
- (b)** Draw and explain programming model of 8085 microprocessor. Explain working of 16 bit registers **07**
- OR**
- (b)** Explain architecture of 8085 microprocessor with help of block diagram. Explain function of each block **07**
- Q.3 (a)** Explain circuit diagram of interfacing of 8K EPROM and 4K RAM with 8085. Write address range for both the memory chips showing address decoding logic **07**
- (b)** Write assembly language programs for the following tasks: **07**
- (1) Total 16 data stored at memory location 4050h to 405Fh. Write program to find out maximum data and store it at memory location 4080h.
 - (2) Write DELAY subroutine to generate 1 second delay. Use this subroutine in decimal counter program which counts 0 to 9 continuously at the interval of 1 second. Consider crystal frequency 2 MHz. Display count value on output device which is having address 08h.
- OR**
- Q.3 (a)** Explain T-state, Machine cycle and Instruction cycle. Draw timing diagram of OUT FFh instruction **07**

- (b) Write assembly language programs for the following tasks: 07
- (1) Write a program to find negative numbers in given set of data stored at the memory location 4050h to 405Fh. Store all negative numbers at the memory location starting from 2050h.
 - (2) Consider that 8 LEDs are connected to port A of 8255 chip. Address of port A is 80h and control register is 83h. Write program to flash 8 LEDs at the interval of 1 second. Write DELAY subroutine to generate 1 second delay. Use this subroutine to flash LEDs. Consider crystal frequency 2 MHz.
- Q.4 (a)** Explain following instructions: 07
- [1] LDAX D [2] DAD B [3] XCHG [4] XRA D [5] EI [6] DAA [7] PCHL
- (b) Explain process of converting HEX data into BCD. Write a program to convert hexadecimal number into equivalent BCD number. HEX data is available from input device at address FFh. Convert that data into BCD and store BCD digits at location 2100h, 2101h and 2102h. LSD at 2100h and MSD at 2102h. 07
- OR**
- Q.4 (a)** What is direct memory access? Explain interfacing of 8237 DMA controller with 8085 microprocessor. What is importance of DMA? 07
- (b) What is stack? Explain stack operations in 8085 microprocessor using PUSH and POP instructions with neat sketches. When stack operations are needed? 07
- Q.5 (a)** Draw and explain block diagram of 8259A Programmable Interrupt Controller 07
- (b) Explain block diagram of 8251A Programmable Communication Interface. 07
- OR**
- Q.5 (a)** Consider that Flash type Analog to digital converter (ADC) is connected with 8085 microprocessor using 8255 chip. Data lines of ADC are connected to port A. 8 LEDs are connected to port B to display digital data. Anodes of LEDs are tied together and connected to +5V. Cathodes are connected to port B via series resistors. Address of port A 80h, port B is 81h, port C is 82h and control register is 83h. Temperature sensor is connected with ADC input. Draw circuit/logic diagram of the system. Write Program to read data from temperature sensor and display it on output device LEDs which are connected to port B. 07
- (b) Draw and explain block diagram of 8254 Programmable Interval Timer. 07
