

**M.Sc.(Instrumentation) Examination 2017**  
**1<sup>st</sup> year 2<sup>nd</sup> semester**

Subject: Microprocessor and Microcontroller  
 Full marks:100

Paper: VII(T-202)  
 Time: 4 hours

**Group: A**

**Answer question No.1 and any four from the rest:**

1. (i) If we had  $24,000_{10}$  Memory locations, what would be the least number of address lines needed to describe each location ?  
 (ii) What is need for ALE signal in 8085  $\mu$ P?  
 (iii) By what means one memory location is differentiated from another?  
 (iv) What is meant of polling ?  
 (v) When we talk about moving, loading, transferring or storing data, what actually we are doing?  
 (vi) When we are taking a data from the top of the stack called?  
 (vii) What is index register in 8086  $\mu$ P?  
 (viii) Show the bit positions of various flags in 8086  $\mu$ P flag register?  
 (ix) State the significance of LOCK signal in 8086  $\mu$ P ?  
 (x) What is memory mapping ? 1 X 10
  
2. (a) Write the operations of the following mnemonic of 8085/8086  $\mu$ P.  
 (i) SPHL    (ii) RST 7.5    (c) NOP    (iii) POP PSW    (iv) MOV BH, 0A<sub>H</sub>  
 (b) Write on maximum and minimum mode in 8086  $\mu$ P. Explain detail function of pins 24 – 31, signal in both modes. 5+5
  
3. (a) Draw a simple circuit to decode three controls signals RD, WR, and IO/M and to produce separate read/write control signal for memory and I/O device ?  
 (b) How many times the given loop will be executed ? What will be the contents of HL pair when control signal reaches HLT instruction ?  

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MVI A, 00H
LXI H, 60FFH
Loop DCX H
      JNZ LOOP
      HLT
    
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5+5
  
4. (a) What is the purpose of segment registers in 8086  $\mu$ P ? Define Pipelining? Write the function of BIU in 8086  $\mu$ P ? What is the maximum memory size that can be addressed by 8086  $\mu$ P ?  
 (a) Assume that all segment registers are initialized at 2000<sub>H</sub>. The instruction register IP holds the address 1000<sub>H</sub>, the stack is initialize at FFFF<sub>H</sub> and SI register is initialize at 80FF<sub>H</sub>. Calculate the beginning physical address of the instruction code, data and stack. Explain what are the physical address, logic address and offset address? 5+5

5. (a) Interface 3 Nos of 8 KB EPROM and 5 Nos of RAM to 8085  $\mu$ P to have total memory capacity of 64 KB .
- (b) Write an assembly language program to find the biggest number in an array of  $20_{10}$  numbers. 5+5
6. What are the different modes in 8255 PPI ? Write the features of mode 0 in 8255 PPI.  
What is control word ? What is the purpose of control word written to control register in 8255 PPI?  
Write a program to read DIP switches and display the reading from port A at port B and from port  $C_U$  at port  $C_L$  . 1+1+1+1+6
7. (a) A string of  $20_H$  bytes stored starting from memory location  $C500_H$  . The string includes some blanks (bytes with zero values). Write an assembly language program to eliminate the blanks from the string.
- (b) Write short notes:
- (i) Data transfer: Formats, modes , ports and conditions.
- (ii) Memory and its classification. 5+5

### Group-B

**Answer any five questions;**

1. a) Write a program to transfer serially the message 'your first name' continuously with a baud rate of 4800.
- b) What is the functionality of the instruction 'DA'? 8+2
2. a) Assuming that XTAL =11.0952 MHz write a assemble language program for 8051 Controller to create a square wave that has a high portion of 1085 us and a low portion of 15 us. Use timer 1.
- b ) Arrange the interrupts of 8051 microcontroller according to their priority. Differentiate RET and RETI. 8+2
3. a) Write a program using interrupts to do the following:
- Assume that the INT1 pin is connected to a switch that is normally high. Whenever it goes low, it should turn on an LED. The LED is connected to P1.3 and is normally off. When it is turned on it should stay on for a fraction of a second. As long as the switch is pressed low, the LED should stay on. Assume that XTAL-11.0592Mhz.
- b) Show the status of the CY, AC and P flag after the addition of 9CH and 64H in the following instructions.

MOV A, #9CH

SUBB A, #6DH

8+2

4. a) How can you send command and data to a LCD display interfaced with microcontroller to LCD  
b) Explain the identification and detection of key pressed of keyboard connected with 8051. 5+5
5. a) Write a program to produce 135 degree anti-clockwise rotation of stepper motor interfaced with 8051 uC and start it to move clockwise direction for 90 degree angular displacement after a while. 10
6. Write a program to clear 16 RAM locations starting at RAM address 60H and also to copy a block of 10 bytes of data from 35H to 60H. 10
7. Write short notes on any two
- a. Asynchronous serial communication of microcontroller 8051.
  - b. Edge triggering and level triggering.
  - c. Importance of interrupt service routine.
  - d. Addressing modes of 8051 u-controller. 5+5