M.Sc. (INFORMATICS) Ist Sem – 2017
Paper IT-15 – MICROPROCESSOR AND INTERFACE PROGRAMMING

Time: 3 hrs.

Attempt any 5 questions.
Question No.1 is compulsory.

Max Marks: 75

(Write your Roll No. on the top immediately on receipt of this question paper)

---

1. Attempt any five :

(a) (i) Determine the physical address when CS=5300H and IP=0200H. Write the starting and ending address of the code segment.

(ii) What is the content of data segment DS to locate the physical address 43657H? Assume the content of IP= 2057H.

(b) Explain ODD bank and EVEN bank memory. Explain data transfer mechanism from ODD and EVEN bank memory.

(c) The contents of different registers are AX=1000H, BX=2000H, SI=3000H, DI=4000H, BP=5000H, SP=6000H, CS=8000H, DS=1000H, SS=2000H, IP=7000H. Determine the 16 bit effective addresses and 20 bit physical address for the following addressing mode :

(i) Direct addressing.

(ii) Based indexed addressing.

(iii) Relative based indexed addressing.
Assume displacement = 0500H.

(d) Determine control words when the ports of Intel 8255 are defined as follows :

(i) Port A as an input port. Mode of the port A is Mode 0. Port B as an input port. Mode of the port B is Mode 0. Port C_{upper} and Port C_{lower} are input ports.

(ii) Port A is used as input and operation mode of Port A is Mode 1. Port B is used as output and operates in Mode 1. PC_6 and PC_7 act as input.

(e) Write a program sequence to set bits 2 and 0, complement bits 6 and 1, clear bits 3 and 4 of DL register and also duplicate the result in AL register. Further, exit the program if bits 7 and 1 are set.

(f) Write the interrupt sequence in an 8086 system.

(5×3=15)

2. (a) Write a program sequence to calculate $|x - y|$ where x is not greater than 60.

(b) Show the allocated space caused by the following statements:

(i) BYTE.VAR   DB   'BYTE', 12, -12H, 3 DUP (0,?,2 DUP (1,2),?)

(II) WORD.VAR   DW   5 DUP (0,1,2), ?,-5,'BY','TE', 256H

(c) Write a short note on stack and procedure.

(5,5,5)

3. (a) Write an ALP to solve the Boolean relation :
$$f(x_7, \ldots \ldots . x_0) = x_6 \bar{x}_5 x_3 x_0 + x_7 \bar{x}_4 x_3 \bar{x}_0 + \bar{x}_4 x_1$$

(b) Explain all the shift and rotate instructions. Assuming (BL)=CE, (CL)=04 and (CF)=0, what will be the result of the following :

(i) ROL BL,CL

(ii) RCR BL,CL

(iii) SAL BL,CL

P.T.O

1

(c) Write an ALP to move N elements present at SRCADDR to DSTADDR assuming ((DS)=(ES))

(5,5,5)

4. (a) Write an instruction sequence to set up the three counters of 8254 as follows :
Counter 0 : Binary counter operating in mode 0 with initial value of 1234H.
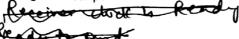Counter 1: BCD counter operating in mode 2 with initial value 0100H
Counter 2: BCD counter operating in mode 4 with initial value of 1FFFH.

(b) Explain the control signal definitions of strobed I/O (mode 1) of 8255.

(c) What should be the OCW code if interrupt inputs IR_0 through IR_3 are to be marked and IR_4 through IR_7 are to be unmarked?

(7,6,2)

5. (a) Explain the following signal description of 8251 :
(i) RXRDY —
(ii) $\overline{RTS}$ —
(iii) $\overline{DSR}$ —

(b) Interface ADC 0808 with 8086 using 8255 ports. Use port A of 8255 for transferring digital data output of ADC to the CPU and Port C for control signals. Assume that an analog input is present at I/P_3 of the ADC and clock input of suitable frequency is available for ADC. Draw the schematic and write the required ALP.

(c) Explain BSR mode of 8255.

(3,7,5)

6. (a) Two byte sized BCD integers are stored at the offset address NUM1 and NUM2 respectively. Write an instruction sequence to generate their difference and store it at NUM3. The difference is to be formed by subtracting the value at NUM1 from that at NUM2. Assume that all storage locations are in the current data segment.

(b) Write an instruction sequence that generates a byte size integer in the memory location defined as RESULT. The value of the integer is to be calculated from the logic equation :
$$(RESULT) = (AL) \cdot (NUM1) + (\overline{NUM2}) \cdot (AL) + (BL)$$
DB

Assume that all parameters are byte sized. NUM1, NUM2, and RESULT are the offset address of memory locations in the current data segment.

(c) Write the part of assembly language program to show the double precision equivalent of the calculation

$$(P) \leftarrow Quotient\ of\ \frac{Q + R - 36 + S}{Q}$$

$$(T) \leftarrow Remainder$$

(5,5,5)

2