Roll No.: _____

M.Sc. (INFORMATICS)/ MIT/I Sem – 2012

Paper IT15 – MICROPROCESSOR AND INTERFACE PROGRAMMING

Write your roll number on the top of the paper

Note: Attempt five questions in all, Question No. 1 is compulsory

1. (a) Memory location 2000H has the word 5000H stored in it. What does each location contain after INC BYTE PTR [2000H]? 2

(b) The lower byte of the flag register contains 95H. Which of the following instructions will actually jump? 2

(i) JZ (ii) JNC (iii) JP (iv) JA

(c) If ADD AL,BL is executed with AL containing 16H and BL containing 24H, what is the resulting value of AL? What does AL contain if DAA is executed next? 2

(d) How would the integer +500 and -1000 be stored in memory starting at address 0A000H? 2

(e) The interrupt-control flag $INTE_A$ for output port A in mode 1 is controlled by PC_6. Using the set/reset feature of the 8255, what command code must be written to the control word register of the 8255 to set it to enable the control flag? 2

(f) Explain how bytes and words stored in even and odd address are accessed. 3

(g) What is REP prefix? What is its use? 2

2. (a) Identify the source and destination addressing mode in each of the following instructions:

(i) MOV AX,BX
(ii) MOV AH,7
(iii) MOV [DI],AL
(iv) MOV AX,[BP]
(v) MOV AL,[SI+6] 5

(b) Write a program to multiply two double precision numbers. 5

(c) What is segment register? Explain the advantages of segment registers. 5

3. (a) Explain various conditional and unconditional branching instructions. 5

(b) Write a program sequence to calculate $|x - y|$ where x is not greater than 75. 4

(c) Given a n array A(I) of 100 16-bit signed numbers stored in memory starting at address $A000_{16}$, write a program to generate two arrays from the given array such that one array P(J) consists of all the positive numbers and the other N(K) contains all the negative numbers. Store the array of positive numbers in memory starting at offset address 8000_{16} and the array of negative numbers starting at offset address $C000_{16}$. 6

4. (a) Write a program sequence that will test the byte STATUS and branch to ROUTINE -1 if bits 1, 2 or 4 is 1. Otherwise it is to branch to ROUTINE-2 if both bits 1 and 3 are 1 and to ROUTINE-3 if both bits 1 and 3 are 0. In all other cases it is to execute Routine-4. Assume that the routines are more than 128 bytes long. Also give a flowchart of the sequence. 5

(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. (a) 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 input port 2 of the ADC and a clock input of suitable frequency is available for ADC. Draw the schematic and write required ALP. 5

(b) The counter 8254 is programmed to operate in mode 3 and is loaded with the decimal value 15. Determine the characteristics of the square wave at OUT. 5

(c) Interface two 4Kbyte EPROMs and two 4Kbytes RAM chips with 8086. Select suitable map. 5

6. (a) Explain all operating modes of 8254 programmable internal timer. 5

(b) Explain the following signal descriptions of 8251. 7
(i) RXRDY Rx rdy
(ii) $\overline{DSR}$ Data set Rcvd
(iii) $\overline{RTS}$ Requ to Send
(iv) TXE Tx Empty
(v) SYNDET/BD Syn Brk

(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? 5

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