USN | | | | | | | | | | **15CS44**

Fourth Semester B.E. Degree Examination, Dec.2017/Jan.2018
Microprocessor and Microcontroller

Time: 3 hrs.   Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

Module-1

1 a. Explain the architecture of 8086 microprocessor with a neat diagram along with functions of various blocks. **(06 Marks)**

     b. With an example distinguish between physical address, logical address and offset address. If CS = 2000 h, DS = 3000 h, SS = 4000 h, ES = 5000 h, BX = 0020 h, BP = 0030 h. Find physical address for (i) MOV AL, [BP]   (ii) MOV CX, [BX]. **(04 Marks)**

     c. Explain the following addressing modes of 8086:
       i) Register indirect
       ii) Based indexed indirect
       iii) Direct memory. **(06 Marks)**

OR

2 a. What are assembler directives? Explain the following assembler directives (i) PROC, (ii) Assume, (iii) PTR. **(04 Marks)**

     b. Write assembly language program to add 5 bytes of data stored in data segment. **(04 Marks)**

     c. With syntax, explain the following control transfer instructions:
       i) Conditional transfer
       ii) Unconditional transfer instruction. **(08 Marks)**

Module-2

3 a. Explain the syntax of following instructions with an example:
       i) DAA   ii) MUL   iii) AND   iv) SHR   v) CMP   vi) AAM **(06 Marks)**

     b. Write a program to convert lower case to upper case by reading string from KB and print the converted string at 10th row, 20th column after clearing the screen. **(06 Marks)**

     c. Write an ALP to count the number of one's and zero's in a given 8 bit data using rotate instructions. **(04 Marks)**

OR

4 a. Explain the syntax of following instructions with example: i) AAA,   ii) Shl, iii) DIV, iv) RCR. **(04 Marks)**

     b. What is an interrupt? Explain various types with an interrupt vector table. **(06 Marks)**

     c. Write an ALP to sort a given set of 16 bit numbers in ascending order using any sorting method. **(06 Marks)**

Module-3

5 a. With an example, explain how to identify over flow and under flow using flags in a flag register for performing arithmetic operation on 16 bit number. **(06 Marks)**

     b. Write the syntax of following instruction and explain with an example: (i) CBW, (ii) IDIV, (iii) CMPSB, (iv) Xlat. **(04 Marks)**

     c. Design a memory system for 8086 with one 64 KB RAM and one 64 KB ROM at address 30000h and F0000h show the complete design along with memory mapping and draw the final diagram with address decoder. **(06 Marks)**

OR

6 a. With block diagram, explain 8255 and write control word register format for P_A output, P_B input in mode 0. **(06 Marks)**

b. Write an ALP to read P_B and check number of one's in a given 8 bit data at P_B and display FFh on P_A if it is even parity else 00h on P_A if it is odd parity. **(05 Marks)**

c. Write a program using string instructions to accept a string from keyboard and check for palindrome and accordingly display appropriate message. **(05 Marks)**

Module-4

7 a. Compare microprocessor with microcontroller. **(04 Marks)**

b. Explain the programmer's model of ARM processor with complete register sets available. **(04 Marks)**

c. With diagram explain the various blocks in a 3 stage pipeline of ARM processor organization. **(04 Marks)**

d. Explain registers used under various modes. **(04 Marks)**

OR

8 a. Explain the structure of ARM cross development tool kit. **(06 Marks)**

b. Describe the various modes of operation of ARM processor. **(05 Marks)**

c. Explain the various fields in Current Program Status Register (CPSR). **(05 Marks)**

Module-5

9 a. Explain the syntax with example the following instructions of ARM processor (i) MVN, (ii) RSB, (iii) ORR, (iv) MLA, (v) LDR. **(05 Marks)**

b. Write a program to display message "Hellow world" using ARM7 instructions. **(04 Marks)**

c. Explain various formats of add instructions based on operands of ARM7 processor. **(04 Marks)**

d. If $r_5 = 5$, $r_7 = 8$ and using the following instruction, write values of r_5, r_7 after execution MOV r_7, r_5, LSL # 2. **(03 Marks)**

OR

10 a. Explain software interrupt instruction of ARM processor. **(04 Marks)**

b. Explain various types of multiply instructions with syntax and example. **(04 Marks)**

c. What are the salient features of ARM instruction set? **(05 Marks)**

d. If $r_1 = 0b1111$, $r_2 = 0b0101$, find r_0 after BIC r_0, r_1, r_2. **(03 Marks)**

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