BITS PILANI, DUBAI CAMPUS

Year II – Semester II 2010– 2011

COMPREHENSIVE EXAM (Closed Book)

Course No: ES 263 **Course Name: Microprocessor Programming and Interfacing**

Date: 5-6-11 **Weightage: 40%** **Max Marks: 80** **Duration: 3 Hrs**

NOTE: 1. Answer Part A and Part B in separate booklets provided to you.

2. Do not use calculators

PART A

1. Convert the following decimal number into binary, octal and hexadecimal:
   3452 (3M)
2. In the real mode, show the starting and ending addresses of each segment located by the following segment register value: CAB0H. (2M)
3. Find the memory address of the next instruction executed by the microprocessor, when operated in the real mode. (3M)
   CS = 1235H, DS = 2A00H, IP = ABCDH
4. Suppose that DS = 2400H, BX = 0500H and SI = 150H. Determine the address accessed by the following instruction, assuming real mode operation.MOV [SI + 100H] , AX. (2M)
5. Show which JMP instruction assembles if the JMP APPLE instruction is stored at memory address 15B7FH and the address of APPLE is 15A5B. (2M)
6. Write a program that pushes the contents of AX, BX, CX and DX onto the stack. Exchange the values of AX with CX and BX with DX. (4M)
7. Write a program to scan a text string of 80 characters for a carriage return 0DH. Put offset of string into DI. (5M)
8. Select an instruction that will subtract word at displacement 3427H in DS and contents of Carry Flag(CF) from BX. (2M)
9. If CF = 0, CL = 4, AL = 10110011, What will be the contents of CF and AL after ROR AL, CL? (2M)
10. Write a program using procedures to exchange the word contents of two memory locations CAT and FOX without using OFFSET directive. (5M)
11. Write a program using procedure that searches a table of 50 bytes for 7DH. (5M)
12. Convert **8B9D 7259H** from machine language to assembly language, use the tables given below. (5M)

R/M Code	Addressing Mode
000	DS:[BX+SI]
001	DS:[BX+DI]
010	SS:[BP+SI]
011	SS:[BP+DI]
100	DS:[SI]
101	DS:[DI]
110	SS:[BP]
111	DS:[BX]

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TEST II (Open Book)

Course No: ES 263 **Course Name: Microprocessor Programming and Interfacing**

Date: 17-4-11 **Weightage: 20%** **Max Marks: 40** **Duration: 50Mins**

NOTE: 1. Do not use calculators

2. Only prescribed text book and handwritten class notes permitted

1. Develop a sequence of instructions that multiplies two numbers 32 and 17 without using mul instruction. (4 M)

2. The original contents of AX, BL, word-size memory location SUM and carry flag (CF) are 1234H, ABH, 00CDH and 0H respectively. Describe the results of executing the following sequence of instruction? (6 M)

```
ADD AX, [SUM]

ADC BL, 05H

INC WORD PTR[SUM]
```

3. Assuming that the register BX contains 003AH. What is the result of executing the following instruction? (4 M)

```
NEG BX
```

4. What is the result in BX and CF after execution of the following instructions?

```
RCR BX, CL
```

Assume that, prior to execution of the instruction CL = 04H, BX = 1234H and CF = 0. (4 M)

5. Write an instruction to mask off the upper 12 bits of the word of data in AX. (2 M)

6. Write a program to compare the user entered password with a password stored in memory, if the passwords do not match an alarm goes off, the alarm is connected at port FFEAH, if the passwords match the user is allowed to continue his work. Make use of string functions for the comparison operation. (8M)

P.T.O

7. Write a program to perform the operation of converting a packed BCD digit to its binary equivalent. The process of conversion is explained below with an example.

4596 = (4X1000) + (5X100) + (9 X10) + (6X1) . The number can be represented as a sum of the individual digits as per the weight of the digit.

6 =	6 x 0001H	= 0006H
90 =	90 X 000AH	= 005AH
500 =	5 X 64H	= 01F4H
4000=	4 X 03E8H	= 0FA0H
4596		= 11F4H (Binary Equivalent)

Consider a **two digit number** and write a program to perform the conversion of the two digit number from packed BCD to Binary. (7M)

8. Write instructions for each of the following operations.
   i) Create an array of 30 double words where each of these array locations contains data 05.
   ii) Write an instruction which loads the data segment register and the Source Index register with the contents of the destination index register. (2 + 3M)

**********ALL THE BEST**********

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Year II – Semester II 2010– 2011

TEST I (Closed Book)

Course No: ES 263 Course Name: Microprocessor Programming and Interfacing
Date: 27-2-11 Weightage: 20% Max Marks: 40 Duration: 50Mins

NOTE: Do not use calculators

1. Which flag bits will be affected when the following instruction is executed?
   MOV AX, CX (2 M)
2. What are supplemental segment registers? In which microprocessors they are used? (2 M)
3. Which register is used by the microprocessor to find the next sequential instruction in a program and how it can be modified? (2 M)
4. Specify the memory size and data bus width of Pentium Microprocessor.(2 M)
5. What is instruction cache? (2 M)
6. Write the major difference between 80386 and 80486 microprocessor. (3 M)
7. Convert the unpacked BCD number into a decimal number. (2 M)
   00000011000001110000010100000010
8. Convert the decimal number into octal number. (3 M)
   .9375
9. Convert the hexadecimal number into decimal number. (2 M)
   AC.DC
10. Perform the following arithmetic operations on the given decimal numbers and give the status of the sign flag, carry flag, zero flag, parity flag and explain their significance.
    -12 - 15 (use 8 bit signed arithmetic) (4 M)
11. Give the different 16 bit segment register and offset address combinations available in the 8086 microprocessor. (4 M)
12. In the real mode addressing if the Segment Register contains the value E9A6 and the DI contains 2800, calculate the start address of the segment and the ending address of the segment , assuming that the segment occupies 64K byte of memory. Also specify which segment is referred to using this addressing format. (4 M)
13. Give appropriate 8086 instructions for the following commands and specify the addressing mode used.
    a. Load the lower 8 bits of the accumulator with the hexadecimal value FA.
    b. Load the 16 bit base register value into the memory location specified by the combination of Extra Segment with a displacement of hexadecimal 1200H.
    c. Load the 16 bit accumulator with data stored in the memory variable addressed as NUM.
    d. Transfer data from the 16 bit data register to the base pointer. (8M)

**********ALL THE BEST**********

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Year II – Semester II 2010– 2011

QUIZ I (Closed Book)

Course No: ES 263 Course Name: Microprocessor Programming and Interfacing
Date: 22-3-11 Weightage: 5% Max Marks: 10 Duration: 20Mins

NOTE: Do not use calculators

SET A

NAME_____ **ID**_____

1. Write an instruction that copies DL into the stack segment memory location addressed by the sum of ARRAY, BP, SI and 8. 1 M

2. Suppose that DS = 1300H, SS = 1400H, BP = 1500H and SI = 0100H. Determine the address accessed by the following instruction, assuming real mode operation. 2 M

   MOV AL, [BP+SI-200H]

3. Write an instruction to remove a word from the stack and place it into code segment register and state whether it is valid or not. 2 M

4. Write the hexadecimal encoded value for the instruction MOV [SI + F35AH], 36CEH, given that DS:SI = 100. 2.5 M

5. Give the hexadecimal encoded value for the instruction MOV AX, [BP], given the code for AX = 000, BP = 110. 2.5 M