BITS, PILANI-DUBAI
DUBAI INTERNATIONAL ACADEMEIC CITY, DUBAI
II-SEMESTER 2009-10

COURSE : ES C263 MICROPROCESSOR PROGRAMMING & INTERFACING

COMPONENT: COMPREHENSIVE EXAMINATION WEIGHTAGE: 105 MARKS

DURATION: 3 HRS DATE: 26-05-2010 Time: 10: am – to – 1:00pm

No. of PAGES: 2

NOTE: Answer all the Questions of part A, B & C. Use separate Answer Books for Part A, B & C. Write the question numbers clearly.

QNo	Questions	Marks
	PART - A	
QA1.	What is a Flag register and what is its importance in the microprocessor system? Explain all the contents of a flag register in the 8086/80186 microprocessor?	10

QA2.	Given the following assembly instructions, write the equivalent machine codes.
	MOV BX, [SI]
	MOV [DI], AH
		10

QA3.	What are the roles of DI and SI register during the execution of string data transfer instructions? Develop a sequence of instructions that copy 12 bytes of data from an area of memory addressed by SOURCE into a memory addressed by DEST.	10
QA4.	Explain the following assembler directives (I.)PROC (II.) DT	5
QA5.	The status bits of 8086 microprocessor S3 and S4 are at logic 0 and logic 1, what is the segment accessed by the microprocessor and what are the status bits used to indicate conditions of IF flag bits.	5
QA6.	Draw the 8086 Microprocessor Pin diagram with the direction of flow of signals in and out of the 8086 microprocessor, shown them in your pin diagram.	10
QA7.	What are the Integrated circuits used by the 8086 microprocessor for the following types of functional activities? Name them with the IC number. (i) To generate accurate time delays, which is used as a real-time clock? (ii) For high speed data transfer	5

PART - B

QB1.	Show which JMP instruction assembles (short, near or far) if the *JMP BITS* instruction is stored at memory address 48964H and the address of BITS is 48889H.	3
QB2.	Write a program using stack to swap two values 10H and 20H stored in registers AX and BX respectively.	4
QB3.	Suppose that DS = 0500H, SS=0200H, BP = 0300H and SI = 400H. Determine the memory address accessed by the following instruction, assuming real mode operation. MOV AL, [BP+SI-8]	3
QB4.	Write a short sequence of instructions to divide two 16-bit numbers -25 / +4.	5
QB5.	Develop a sequence of instructions that scans through a 200H byte section of memory called BITS, located in the data segment, searching for a 45H. (Complete program is not required)	4
QB6.	Write an 8086 assembly language program which will perform the following operations using procedures. (addresses are offset addresses): (a) Subtract the 16-bit number in the addresses 1200H and 1201H from the 16-bit number in the addresses 1300H and 1301H. (b) Subtract the 16-bit number in the addresses 1400H and 1401H from the 16-bit number in the addresses 1500H and 1501H. (c) Add the results of both subtractions and store the final result in the addresses 1600H and 16001H.	6

PART - C

QC1.	How many control inputs are there for RAM and ROM and why?	4
QC2.	If the crystal oscillator is operating at 30MHz, what is the output at the following pins of the 8284 clock generator? PCLK CLK OSC	3
QC3.	Find the memory access time for 8086 when the address does not appear until 70 ns after the start of T1 and the data setup time is 30 ns before T3.	3
QC4.	Write the advantage and disadvantage of MACRO comparing with PROCEDURES.	5
QC5.	Design a circuit that uses eight 2764 EPROMs for a 64K*8 section of memory in an 8086 microprocessor based system. The addresses selected in this circuit are 40000H–4FFFF H.	10

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TEST II (OPEN BOOK) , II YEAR
MICROPROCESSOR PROGRAMMING AND INTERFACING (ES C263)
Date : 9th May 2010 Time : 50 Minutes , Total Marks: 45 (15 %)
Note: Only prescribed text book and handwritten notes are allowed for the test

Qns. No.	Questions	Marks
Q 1A	Write a complete assembly language program to find the sum and average of the 10 decimal numbers stored in an array. Store the results in the memory location.	10
Q1B	Write the correct instructions to do the following tasks i. Shift the DI register left five places with zero moved into the right most position. ii. Given an 8 bit number in the AL register, count total number of bit 1 in that number.	5
Q2A	In a jump instruction, the displacement value is 0154H. Given CS = 2051, i. Find the value of IP. ii. Identify the type of jump. iii. Find the address where jump points to	3
Q2B	Write an assembly program using procedures to perform the following: 8 16-bit numbers stored in successive offset addresses starting at 1200H are added together. An AND operation with the number 8888H is then performed on the 16-bit result and the resulting number is stored in the offset addresses 1400H and 1401H.	6
Q2C	Identify the error in declaration of macro: PRINT MACRO A,B PUSH AX MOV AX,B PRINT ENDM	1
Q3A	What are different functional units of 8086 microprocessor and which functional unit differentiates the 8086 microprocessor with the 8088 microprocessor	3
Q3B	Which segment is used to store interrupt and subroutine return address registers in 8086.	4
Q3C	Why the Maximum clock frequency of 8086 is 5 MHz? Briefly explain it with proper justification.	3
Q4A	For 8086 microprocessor based system, use an address decoder worksheet to help you to draw a circuit to show how 74LS138 can be connected to select one of the eight 1K byte RAMS. Write the address range for all the eight memory devices.	10

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II SEMESTER 2009-10

COURSE	:ES C263 MICROPROCESSOR PROGRAMMING AND INTERFACING
YEAR	:II YEAR
COMPONENT	:TEST - I (CLOSED BOOK)
DURATION	:50 MINS
WEIGHTAGE	:20% (60 Marks)
Date	:28-03-2010, Sunday
No. Pages	:2 Pages

Note: Answer all the Questions.

1. What is the maximum clock frequency of 8086 microprocessor? (3 Marks)
2. Where does the Disk Operating Systems (DOS), other programs that controls the computer system and the currently active and inactive DOS application programs reside in the main memory area of a personal computer? (3 Marks)
3. If the clock frequency of a 80486 microprocessor is 63 MHz; what is the time taken by the microprocessor to execute an instruction? (3 Marks)
4. Do the addition operation for the given two BCD inputs and convert their sum into hexadecimal data.
   Inputs are: 1011 0101 and 0110 0000 (6 Marks)
5. Name the instructions that use Auxiliary Carry flag. (3 Marks)
6. What physical address is represented by 348A:4214? (4 Marks)
7. If the stack segment register contains 3000H and the stack pointer register contains 8434H, what is the physical address of the top of the stack? (4 Marks)
8. If the code segment for an 8086 program starts at address 348A0H, what number will be there in CS register? (4 Marks)
9. Show which JMP instruction assembles if the JMP THERE instruction is stored at memory address 10000H and the address of THERE is 10085H. (3 Marks)
10. What is wrong with the following instructions? (6 Marks)

```
MOV [SI], [DI]
MOV [BX+1000H], 1FEA H
```

11. What happens when PUSHA instruction is executed? (3 Marks)

12. Suppose that EAX=00001000H and EBX=00002000 H and DS=0010H. Determine the address accessed by the following instruction assuming real mode of operation. **MOV DH,[EBX+4*EAX+1000H]** (3 Marks)

13. convert the following machine language to the assembly language (give all details)

i) 8B07 H
ii) 8BFB H (2*5=10 Marks)

14. Convert the following assembly instructions to the machine language (give all details)

MOV AL, [SI] (5 Marks)

Following tables can be used for the Question No. 13 & 14

TABLE 4–1 MOD field for the 16-bit instruction mode

MOD	*Function*
00	No displacement
01	8-bit sign-extended displacement
10	16-bit displacement
11	R/M is a register

TABLE 4–3 REG and R/M (when MOD = 11) assignments

Code	*W=0 (Byte)*	*W=1 (Word)*	*W=1 (Doubleword)*
000	AL	AX	EAX
001	CL	CX	ECX
010	DL	DX	EDX
011	BL	BX	EBX
100	AH	SP	ESP
101	CH	BP	EBP
110	DH	SI	ESI
111	BH	DI	EDI

TABLE 4–4 16-bit R/M memory-addressing modes

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]

Opcode for MOV instruction = 100010

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II SEMESTER 2009-10

COURSE	:ES C263 MICROPROCESSOR PROGRAMMING AND INTERFACING
YEAR	:II YEAR
COMPONENT	:QUIZ - II (CLOSED BOOK)
DURATION	:20 MINS
WEIGHTAGE	:5% (15 Marks)
Date	:06-04-2010, Tuesday
No. Pages	:3 Pages

A

Note: Answer all the Questions.

1. For the machine code 8B0E 7A43. Answer the following questions. (4 * 1 = 4 Marks)

   a. Data transfer takes place from _____ to _____.

   b. _____ is the size of Data transfer.

   c. _____ is the displacement value.

   d. _____ is the instruction if REG field is CX and it is direct addressing.

2. Write the one of the important application of stack memory? (1 Mark)

3. Use the stack map to show the effect of each of the following instruction on the stack pointer. (2 Marks)

```
MOV SP,4000 H
    PUSH  EDX
    PUSH F
    POP AX
    POP FD
```

4. What is wrong in the following instruction? (1 Mark)

```
PUSH CL
```

5. If AX=1001 H and DX=F0FF H, list the sum and content of the each flag register bit (C,A,S,Z and O) after ADD AX,DX instruction is executed.

(2 Marks)

6. Write a sequence of codes to compare two 8 bit numbers and jump to location "THERE" if the numbers are equal. (2 Marks)

7. What are the five string data transfer instructions? Mention them.

(1 Mark)

8. What does the following instruction do? (1 Mark)

```
IN AX, p8
```

9. What is the function of the following directives? (2* ½ = 1 Mark)

(i) .CODE

(ii) OWORD

B
3 Pages

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II-SEMESTER 2009-2010

Max. Marks: 15

QUIZ – I

Course: ES C 263 Microprocessor Programming & Interfacing **Date: 23-02-2010**

Duration: 20 Mins

Name: _____ Id. No. _____

Section: _____

Note: **Calculators are not allowed.**

1. Convert the following signed binary words to decimal numbers.
   1111 1111 1000 1000 (2 Marks)

2. Convert the octal number to decimal number.
   67.07 (1 Mark)

3. Convert the ~~following signed binary words to decimal~~ decimal number to hexdecimal numbers. 0.625 (1 Mark)

4. What is wrong with the following instructions:
   (a) MOV DX, AL (2 Marks)

   (b) MOV ES, DS

5. Select an instruction for moving FACEH into 16-bit Accumulator Register. (1 Mark)

6. Which register or registers are used to hold an offset address for the string instruction destination in the microprocessor? (1 Mark)

7. Determine the memory location addressed by the following real mode 80286 register combinations. (1 Mark)
   SS=2300H and BP=3200H

8. The stack memory is addressed by a combination of the ____ segment plus _____offset (1 Mark)

9. Find the memory address of the next instruction executed by the microprocessor, when operated in the real mode , for the following CS:IP (1 Mark)
   CS=3456 and IP=ABCDH

10. What do you mean by numeric processor? Why do we need it? (1 Mark)

11. How many flags are available in flag register of 8086 Microprocessor? (1 Mark)

12. What are the 16-bit registers that are available in 8086? List them. (2 Marks)