1. Answer all questions in sequential order, questions attempted out of
   Sequence will not be evaluated
2. Calculators not allowed
3. This question paper contains 18 questions

1. Define parity. The binary word _____ has odd parity. (0.5 M + 0.5M)
2. How many memory locations can be addressed by a microprocessor with 14 address lines? (1 M)
3. What is the acronym RISC? (0.5 M)
4. Describe the function of the 8086 queue. How does the queue speed up processing? (0.5 M + 0.5M)
5. Draw the conceptual view of Pentium pro processor. (0.5M)
6. What happens when signed positive number 01001001 is added to the signed positive number 10110110 ? (0.5M)
7. _____ flag is used for single stepping through a program. (0.5M)
8. What are the advantages of segment and offset addressing scheme? (1M)
9. What is the size of the conventional memory system? What is the minimum number of digits required to represent them in hexadecimal?   (0.5+0.5M)
10. In the real mode, show the starting and ending addresses of each segment located by the following segment register values.
    a) E000H
    b) AB00H   (1M)
11. What is the purpose of the direction flag in 32 bit flag register?   (1M)
12. Write about the default 32-bit segment and offset address combinations in the Processors 80386 through the Pentium 4.   (1M)
13. i) In what significant way do the following instructions differ
    a. MOV DX,AC24H
    b. MOV DX,[AC24H]
    ii) of the above question, one operand is in square brackets. What is the name of this feature?   (0.5M + 0.5M)
14. What is the function of the .STARTUP and the .EXIT command in 8086 programming.(1M)
15. What do the words DQ and DD mean, give examples to illustrate their usage.(0.5M)
16. Initialize an array of size 20 words which is not initialized to any data.(0.5M)
17. Predict the state of the six 8086 flags after each of the following instructions is executed. Use the register contents shown below. Assume that all flags are reset before the execution of the instruction.(Show the status of the six flags affected by arithmetic operations and indicate the status of the flags as either a 0 or a1)

      i.   MOV AL,AH

     ii.   ADD BL,CL

    iii.   OR CX,BX

      AX=A407 , BX=24B3, CX=0002, DX=FFFA   (1.5M)

18. How does the .SMALL program segment vary from the .TINY program segment? (0.5M)

BITS, PILANI – DUBAI CAMPUS
KNOWLEDGE VILLAGE, DUBAI
II Year Second Semester 2006 – 2007
MICROPROCESSORS PROGRAMMING & INTERFACING ES UC 263

Comprehensive Examination

Duration : 3 hours   Weightage : 40%
20/5/07   MAX : 40 MARKS

Note:

1. This question paper has **three** parts **PART A PART B** and **PART C.**
2. Answer **PART A in the main answer book** and **PART B and PART C** in the **separate additional booklets** provided.
3. Answer all questions in **each section** sequentially.
4. **No calculators** are to be used.

PART A

1.   Which control signal causes the memory to perform a read operation? 1M
2.   Find the memory address of the next instruction executed by the microprocessor, when operated in the real mode, for the following CS:IP combination CS = 3456H and IP = ABCDH   1M
3.   In the real mode, show the starting and ending addresses of each segment located by the following segment register value 1234H.   1M
4.   Which program can be placed into any area of memory and executed without change?   1M
5.   Select an instruction that copies the contents of DX register into BL.   1M
6.   Suppose that DS = 1100H, BX = 0200H, LIST = 0250H and SI = 0500H. Determine the address accessed by the following instruction, assuming real mode operation. MOV CL, LIST[BX+SI]   1M
7.   Write a program to exchange the contents of array elements 5 and 8, and also array elements 2 and 3.   1M
8.   Show which JMP instruction assembles if the JMP CAT instruction is stored at memory address 12000H and the address of CAT is 12110H.   1M
9.   How is disk edit a powerful tool?   1M
10. Write a program to read 25 characters from keyboard and store in memory location labeled FROG.   1M
11. Explain Automatic Rotation Mode in Interrupts with example. 1M
12. What are the applications of 8254 Programmable Interval Timer?   1M

PART B

1. If a MOV DX,[BX+2] instruction appears in a program, what is its machine language equivalent?   2M
2. Explain what happens when PUSHA instruction executes. Make sure to show, where the stack pointer will be after this instruction is executed.(Assuming that SP=0100H, SS=0200H)   2M
3. Write a short sequence of instructions that clears bits 9 and 10,sets bits 0 and 2 and inverts bit 12 of CX   3M
4. In which segment does the DI always addresses data for string instructions
   1M
5. What happens if AH=02H and DL=41H when INT 21H instruction is executed?   1M
6. Write a sequence of events that occur, when a software interrupt executes
   1M
7. How does IRET instruction differ from the RET instruction   1M
8. Which JMP instruction is 5 bytes long? And write what are these 5 bytes?
   1M
9. Write the pros and cons of Macros and Procedures.   2M

PART C

1. Draw the timing diagram of the Read operation; indicate the status of the address/data lines, ALE, Ready, and the RD signal (with overbar). 2M
2. What is the significance of the wait state? Explain its working with a clock diagram   2M
3. What do you mean by multiplexing and demultiplexing? What are its uses 2M
4. Draw a generalized block diagram of a memory component showing address, data and control selections. 1M
5. What is the advantage of using a 3 to 8 decoder when compared to a NAND gate for address decoding. 1M
6. Show how a NAND gate is used to select a 64K EPROM.   1M
7. Show the connection for 8 memory units each of 2K capacity connected to an 8086 microprocessor. A 1K X 8 PROM decoder is used for address decoding.
   3M
8. Discuss the difference between a memory mapped I/O and an I/O mapped I/O. Indicate clearly with a figure. 2M

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

Figure 5.19a (Reprinted by permission of Carrier Corporation.)

1. **Answer all questions in sequential order, questions attempted out of Sequence will not be evaluated**
2. **Calculators not allowed**
3. **This question paper contains 15 questions**
4. **Write clear and concise programs**
5. **Make use of appropriate comment statements**

1. Write an assembly language program to exchange the data stored in two arrays of size 20 bytes using
    i)   MOV instruction
    ii)   XCHG instruction   (2 + 1 M)
2. Write an assembly language program to multiply an 8 bit signed number by an 16 bit signed number.   (2M)
3. Give the instruction to move 20 bytes of data from one location to another. Use minimum number of instructions to perform the task   (1M)
4. Which instruction is used to invert the rightmost 5 bits of the DX register without changing the leftmost 11 bits.   (1M)
5. If DS = 1000H, what will be the output of the instruction DEC DS?   (1 M)
6. Write an instruction to copy a word from top of stack to memory in DS with EA = TABLE + [BX]   (1M)
7. Write a program to compute the average of 4 bytes stored in an array in memory. (1M)
8. Develop a sequence of instructions that compare by subtracting 4371H from AX and jump to label RUN_PRESS if AX above 4371H.   (1M)
9. Develop a sequence of instructions to multiply the number 7 by 8 without using MUL instruction.   (1M)
10. Convert the instructions given below from assembly language to machine language.   (2M)
        MOV SP, BX
11. Convert the machine language given below to assembly language.   (2M)
        8B 77 12
12. Which registers are affected for i) LODS   and   ii)   STOS instructions? (1M)
13. MOV CS: [BX], DL   Explain the significance of this instruction and explain how it works?   (1M)
14. Which is more efficient MOV with an OFFSET or LEA instruction? And why? (1M)
15. Is it a valid instruction REP LODSB? Justify?   (1M)

BITS, PILANI - DUBAI CAMPUS
KNOWLEDGE VILLAGE, DUBAI
Microprocessors Programming & Interfacing   ES UC263
Quiz 1(Closed book)
Duration : **30 Mins**   Max marks : 10   Weightage : **10%**
VERSION:A
Regular

1. Answer all questions in sequential order, questions attempted out of
   Sequence will not be evaluated
2. Calculators not allowed
3. This question paper contains 13 questions
4. Write the version A or B in the answer paper.

1. Give two methods to load register BX with the starting address of an array
    named LIST and also name the addressing mode.   **[1M].**

2. In the instruction MOV AL, [EBP + 2 * EDI], 2 is called the
    _____.   **[0.5M]**

3. If the instruction MOV LIST[BP + SI +4],DH is used to access an element in
    a file than
        LIST points to _____
        BP points to _____
        SI points to _____   **[1.5M]**

4. 8086 microprocessor can address _____ bytes of I/O address space **[0.5M]**

5. _____ bus is used to request a memory location or I/O device. **[0.5M]**

6. If the _____ signal is logic 0, memory write operation is performed by
    the microprocessor.   **[0.5M]**

7. Write an instruction to define a word data named DATA1 as 1000
    hexadecimal.   **[0.5M]**

8. All instructions (code) are accessed by the combination of ____ plus _____.
   [1M]

9. a. If the code segment for an 8086 program starts at address 82650H, what number will be in the CS register?   [0.5M]

   b. Assuming this same code segment base, what physical address will a code byte be fetched from if the instruction pointer contains FA7BH? [0.5M]

10. If the stack pointer points to memory location 7004C H after the instruction PUSH CX, where will be the stack pointer pointing to?   [0.5M]

11. Can we POP a word from the stack to Code segment register? Why? [1M]

12. JMP TABLE [BX] what type of addressing mode is used in this instruction? And explain what happens in the instruction   [1M]

13. Suppose that DS=1100H, BX=0250H, LIST=0F00H and SI=05C0H
    Determine the address accessed by instruction given below, assuming real mode of operation MOV CL, LIST [BX+SI]   [0.5M]

Rough work