University of Rajshahi
Department of Computer Science and Engineering
B.Sc. (Engg.) Part-3 Even Semester Examination-2020
Course: CSE3231 (Microprocessor and Assembly Language)

Full Marks: 52.5   Time: 3:00 Hours

[N.B. Answer any **Six** questions taking **Three** from each section.]

Section-A

1. (a) What is memory banking? How odd and even addressing is done in 8086 microprocessor?   3
   (b) Differentiate 8085 and 8086 microprocessor on basis of data lines, address lines, memory capacity, and speed.   3
   (c) Write the steps by which a microprocessor communicates with peripherals or memory locations.   2.75

2. (a) Discuss how address and data buses of 8086 microprocessor are multiplexed? How those are demultiplexed?   3
   (b) Write the differences between BIOS routine and DOS routine.   2
   (c) Discuss how byte and word data are read from an odd address and an even address of 8086 microprocessor.   3.75

3. (a) Draw the block diagram of the organization of Intel 8086 microprocessor and discuss its Execution Unit and Bus Interface Unit.   4
   (b) Briefly discuss different data registers of 8086 microprocessor.   3
   (c) What is Flag of 8086 microprocessor? Mention different Flags of 8086 microprocessor.   1.75

4. (a) Explain the memory segmentation concept of 8086 microprocessor.   3
   (b) Discuss the role of different segment registers and offset registers of 8086 microprocessor.   3
   (c) For the memory location whose physical address is specified by 1256AH, give the addresses in segment:offset form for segments 1256H and 1240H.   2.75

Section-B

5. (a) Write assembly language code for the following problem. s-6 p-20   3
   "Read a character. If it's "y" or "Y", display it; otherwise, terminate the program."
   (b) Explain with example, how AND, OR and XOR instructions can be used to clear, set, and complement respectively, specific destination bits. S-7 P-3   3
   (c) Why do we write the following two statements in the assembly language code?   2.75
         MOV AH, 4CH
         INT 21H

6. (a) Explain signed overflow and unsigned overflow with example.   3
   (b) Discuss SAL and SAR instructions of 8086 microprocessor.   2.75
   (c) Write some assembly codes that will reverse the bit pattern of BX register without changing its contents.   3

7. (a) What is meant by masking? Set the most significant and least significant bits of BL register while preserving the other bits.   3
   (b) Write how many ways we can clear the content of a register.   3
   (c) Explain why TEST and JCXZ instructions are used in 8086 microprocessor.   2.75

8. (a) What is flag? Discuss how flags are affected for signed and unsigned overflow.   3.75
   (b) Write different flags of the flags register after executing ADD AX, BX; where AX contains FFFFH, BX contains FFFFH.   2
   (c) Explain Program Segment Prefix (PSP).   2
   (d) Write codes to load the contents of flags register to AX register.   1

[N.B. Answer any Six questions taking **Three** from each Section.]

Section-A

1. (a) Define 64-bit processor. Distinguish between 64-bit and 32-bit processor on the basis of data, address and memory size. — 4
   (b) Discuss different categories of functions performed by a microprocessor. — 3
   (c) What is an interrupt? — 1.75

2. (a) Discuss how address and data buses of 8086 processor are multiplexed? How those are demultiplexed? — 3
   (b) Discuss how byte and word data are read from an odd address and even address of an 8086 processor. — 3.75
   (c) Determine the contents of the status flags after executing the instruction ADD AX,BX. Where AX contains FFFFH and BX contains FFFFH. — 2

3. (a) Draw the block diagram of the organization of Intel 8086 microprocessor and then discuss its Execution Unit and Bus Interface Unit. — 4
   (b) What are CS and DS ? Why and how are they used in an assembly language program? — 3
   (c) For the memory location whose physical address is specified by 1256AH, give the addresses in segment:offset form for segments 1256H and 1240H. — 1.75

4. (a) Define assembler directives and pseudo opcodes with example. — 2.75
   (b) Suppose AX contains FFFFH and BX contains FFFFH. What will be the value of CF and OF after executing MUL BX and IMUL BX. — 3
   (c) Discuss DOS and BIOS interrupts with example. — 3

Section-B

5. (a) What is flag? Discuss how flags are affected for signed overflow and unsigned overflow. — 3.75
   (b) Write some assembly codes that will reverse the bit pattern of AX without changing its contents. — 3
   (c) Explain Program Segment Prefix (PSP). — 2

6. (a) What is the range problem of conditional jump instructions? How can the problem be solved? — 3
   (b) What do you mean by range problem of conditional jump instructions of 8086. How can the problem be solved? — 2.75
   (c) What is meant by masking? Set the most significant and least significant bits of register AL while preserving the other bits. — 3

7. (a) Explain near type and far type of procedures used in assembly language. — 3
   (b) What happened when CALL and RET instructions are executed. — 3.75
   (c) Exchange the 15th and 30th elements in a word type array A. — 2

8. (a) What is addressing mode? Discuss Based and Indexed addressing modes with examples. — 4.75
   (b) Discuss the string operations with assembly language instructions and examples:
   (i) Scan a character from a string (ii) Compare a string with another string. — 4

University of Rajshahi
Department of Computer Science and Engineering
B.Sc. (Engg.) Part-3 Even Semester 2018
Course: CSE3231 (Microprocessor and Assembly Language)
Time: 3 Hours   Full Marks: 52.5
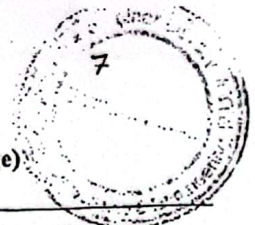[Answer any three (03) questions from each Section.]

Section-A

1. (a) Discuss how address and data buses of 8086 Microprocessor are multiplexed? How those are de-multiplexed? — 3.00

   (b) Define odd address bank and even address bank of an 8086 Microprocessor. — 2.00

   (c) Discuss how byte and word data are read from an odd address and even address of an 8086 Microprocessor. — 3.75

2. (a) Discuss the internal organization of an 8086 Microprocessor. — 4.00

   (b) Discuss memory segmentation and then discuss different segment registers of an 8086 Microprocessor. — 3.00

   (c) Discuss with example how a physical address is generated by an 8086 Microprocessor to access a memory segment. — 1.75

3. (a) What is an assembler directive? Mention some assembler directives with their tasks. — 2.75

   (b) Write different memory models of 8086 microprocessor with required number of code segment and data segment. — 3.00

   (c) Compare 8085 and 8086 microprocessor on basis of the size of data bus, address bus, and memory accessibility. — 3.00

4. (a) What is interrupt? How does 8086 respond when an interrupt has been requested? — 5.00

   (b) What is INT 21H? Discuss how INT 21H instruction is used to input and output a single character. — 3.75

Section-B

5. (a) Explain signed overflow and unsigned overflow with examples. — 3.00

   (b) What do you mean by range problem of conditional jump instructions of 8086? How can the problem be solved? — 2.75

   (c) What is meant by mask bits? Discuss how logical instructions of 8086 are used to mask of bits of a register. — 3.00

6. (a) What are the important signals of 8086? Discuss them in brief. — 3.00

   (b) Write a program to check whether an inputted string is palindrome or not. — 4.00

   (c) Discuss DOS routine with examples. — 1.75

7. (a) Explain near type and far type of procedures used in assembly language. — 3.00

   (b) What happened when CALL and RET instructions are executed? — 3.00

   (c) Write some assembly codes to count the number of 1 bits in a register without changing the content of that register. — 2.7.

8. (a) What do you mean by Program Segment Prefix (PSP)? Explain it. — 3.0

   (b) What are the remainder, quotient and registers contain after execution the following instruction sequence — 3.0

```
MOV    DX, 0
MOV    AX, 15
MOV    BX, 2
DIV    BX
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   (c) Describe the different between the instruction MOV AX, 2437H and MOV AX, [2437]. — 2.75

University of Rajshahi
Department of Computer Science and Engineering
B.Sc. (Engg.) Part-3 Even Semester Examination-2017
Course: CSE-3231 (Microprocessor and Assembly Language)
Marks: 52.5   Time: 3:00 Hours

[Answer any SIX of the following questions taking THREE from each section.]

Section-A

1. (a) Define microprocessor. Briefly discuss different categories of functions performed by a microprocessor. **5**
    (b) What is meant by 16-bit processor? Mention the basic differences between 8085 and 8086 processors. **3.75**

2. (a) Discuss how address and data buses of 8086 processor are multiplexed? How are those demultiplexed? **3.75**
    (b) Draw the block diagram of the internal organization of an 8086 processor and discuss its different units. **5**

3. (a) What is memory banking? How odd and even addressing is done in 8086? **3**
    (b) What is mean by memory segmentation? What are its advantages and disadvantages? **3**
    (c) Discuss MOV and XCHG instructions with their differences and restrictions. **2.75**

4. (a) Define memory segment. Discuss different memory segments and segment registers of 8086 processor. **5**
    (b) Discuss with example how a physical address is generated by an 8086 processor to access a memory segment. **3.75**

Section-B

5. (a) What is memory model? Mention different memory models of 8086 processor. **4**
    (b) Define assembler directive. Why a stack is declared by .STACK directive at the beginning of an assembly language program. **2**
    (c) What is meant by Program Segment Prefix (PSP)? Explain. **2.75**

6. (a) Describe flag register of 8086 with neat diagram. **3**
    (b) Explain the register organization of 8086 processor in detail. **4**
    (c) Discuss how BIOS function calls are invoked in assembly language programs. **1.75**

7. (a) What do you understand by range problem of conditional jump instructions of 8086 Processor? How can the problem be solved? **2**
    (b) Discuss with example how logical instructions of 8086 processor are used to mask of bits of a register. **3**
    (c) Define addressing mode. Discuss Based addressing mode and Indexed addressing mode of 8086 processor. **3.75**

8. (a) Discuss NEAR type and FAR type procedures of assembly language program. **3**
    (b) Explain what happens during the execution of CALL and RET instructions. **3**
    (c) Discuss how a string is compared with another string for finding a substring using CMPSB Instruction. **2.75**

University of Rajshahi
Department of Computer Science and Engineering
B.Sc. (Engg.) Part-3 Even Semester Examination-2016
Course: CSE-3231 (Microprocessor and Assembly Language)

Marks: 52.5   Time: 3:00 Hours

[N.B. Answer any SIX of the following questions taking THREE from each part.]

PART-A

1. (a) Define 64-bit processor. Distinguish between 16-bit and 32-bit processor on the basis of data, address and memory size. — 4
   (b) Draw the block diagram of the organization of Intel 8086 processor and then discuss the functions of its two major units. — 3
   (c) What is an interrupt? — 1.75

2. (a) What is memory segment of 8086 processor? Discuss different segment registers of 8086 processor. — 3.75
   (b) Discuss how a physical address is generated by 8086 processor to access a memory segment. — 3
   (c) A memory location has physical address 80FBDH. In what segment does have offset BFD2H? — 2
       80FD2H

3. (a) What are odd address bank and even address bank of an 8086 processor? — 2
   (b) Discuss how byte and word data are read from an odd address and even address of an 8086 processor. — 4
   (c) Explain memory model. Mention some memory models used in assembly language. — 2.75

4. (a) What do you mean by assembler directive? Mention some assembler directives with their applications. — 3
   (b) Explain pseudo-opcode. Mention some pseudo-opcodes with their functions. — 3.75
   (c) Write the differences between BIOS routine and DOS routine. — 2

PART-B

5. (a) What is flag? Discuss how flags are affected for signed overflow and unsigned overflow. — 3.75
   (b) Write different flags of the flags register after executing ADD AX, BX ; where AX contains FFFFH, BX contains FFFFH. — 2
   (c) Explain Program Segment Prefix (PSP). — 2
   (d) Write the codes to load the contents of flags register to AX register. — 1

6. (a) What is the range problem of conditional jump instructions? How can the problem be solved? — 2.75
   (b) Mention the different ways for the following assembly language task: — 4.5
       (i) Clearing a register (ii) Test a number for odd/even (iii) Convert a letter to its opposite case
   (c) Write some codes to exchange the contents of two word type variables. — 1.5

7. (a) What is masking? Write how can the sign bit of DX be changed? — 2
   (b) Differentiate between a near type procedure and a far type procedure. — 1.75
   (c) Briefly discuss what happens during a call and a return statement executes. — 3
   (d) Write some codes to reverse the bit pattern in BX. — 2

8. (a) What is a subroutine? Explain about CALL and RETURN Instructions. — 3
   (b) Explain the functions of CX and DX registers of 8086 microprocessor. — 2
   (c) Write a program for 8086 processor to find the average of five 16 bit numbers. — 3.75

[N.B. Answer any SIX of the following questions taking THREE from each part.]

Part-A

1. (a) What do you mean by 16-bit processor? — 1
   (b) Draw and discuss the block diagram of the organization of an Intel 8086 microprocessor. — 4
   (c) Discuss how data and address busses of 8086 processor are multiplexed and how they are demultiplexed. — 3.75

2. (a) What are memory segments of 8086 processor? Discuss different segment registers of 8086 processor. — 4
   (b) A memory location has physical address 80FD2h. In what segment does it have offset BFD2h? — 2.75
   (c) How does the processor determine that overflow occurred? — 2

3. (a) Discuss the start-up operation when the PC is powered up? — 2
   (b) Discuss how byte and word data are read from an odd address and even address of an 8086 processor. — 4
   (c) What is assembler directive? Mention some assembler directives with their tasks. — 2.75

4. (a) What is Flag of a processor? Discuss the flags affected after executing the instruction SUB AX, BX where AX contains 8000h and BX contains 0001h. — 4
   (b) What is meant by masking? How a mask bit pattern is generated? — 2.75
   (c) Write some assembly codes to reverse the bit pattern of a register without changing its contents. — 2

Part-B

5. (a) Briefly discuss MOV and XCHG instructions with their restrictions. — 3.75
   (b) What is range problem of conditional jump instructions? How can the problem be solved? — 2
   (c) Explain the functions of EQU, LEA and DUP instructions? — 3

6. (a) Write assembly language code for the following problem. — 3
   "Read a character. If it's "y" or "Y", display it; otherwise, terminate the program."
   (b) Why do we write the following two statements in the assembly language code? — 2.75
   MOV AH, 4CH
   INT 21H
   (c) Explain with example, how AND, OR, and XOR instructions can be used to clear, set and complement, respectively, specific destination bits. — 3

7. (a) What do you mean by FAR type and NEAR type procedures in assembly language? — 2.75
   (b) Discuss how the contents of Flags register can be loaded in AX register. — 3
   (c) Explain what happens when CALL and RET statements are executed. — 3

8. (a) What is DF of an 8086 processor? How a string is scanned in increasing order and decreasing order? — 2.75
   (b) Discuss the instruction by which we can move a string from one memory location to another. — 3
   (c) Explain how a string can be searched in another string for finding a sub string. — 3