International Islamic University Chittagong

Department of Computer Science and Engineering

Midterm Examination, Spring- 2024

Course Code: CSE-3523, Course Title: Microprocessors, Microcontrollers and Embedded Systems

Total Marks: 30 Time: 1.5 Hours

(There are Three questions, answer all Three Questions. Figures on the right margin indicate marks.)

1.	a) What are the basic components of a microprocessor? What makes the microprocessor different from the CPU? Which has more efficiency, and how? OR, Consider a scenario in which a library checkout system operates as an analogy for system buses. In this analogy, the book reader will be borrowed book, books are keep in the bookshelf, and the librarian will provide book to the book reader. Explain how these components interact in the library system, and provide insights into the roles of the system bus in facilitating the borrowing process. Additionally, highlight how the return of a book can be correlated to the system bus analogy.	CO1	3
	b) Consider the following instructions: 1. MOV BL, 0032H 2. SUB CS, BX 3. MOV CX, 0041H Are the above instructions correct or incorrect? Explain if the instructions are right or wrong with logic.	CO2	3
	c) How does the fetch-decode-execute cycle work? Describe for instruction MOV AX,0x100. How can the efficiency of the Fetch-Decode-Execution cycle be affected by the choice of instruction format and addressing modes?	CO3	4

2.	a) Draw the Internal Block Diagram of 8086 Microprocessor. OR, a) What is memory segmentation for 8086 processor? What is the use of it? How can a 16-bit microprocessor generate 20-bit memory addresses?	CO2	3
	b) Consider the following instruction:MOV CH,[BX][SI]+2234H. Where CS=0200H,IP=0000H,BX=2000H,SI=3000H. The memory content of the first 4 byte instruction is 8AA03412H.Calculate the physical address(before and after)passing the instruction. Which memory addressing mode will the instruction use?Explain with the help of diagram.	CO2	4
	C) In the real mode, show the starting and ending addresses of each segment located by the following segment register values: I. DA01H II. 23F1H	CO2	3

3.	a) What is instruction? What is the main difference between an opcode and an operand in a microprocessor? Explain with examples.	CO3	3
	b)Consider the following scenario: 1. Tanveer and Shihab are good friends. Tanveer was preparing himself for the midterm exam, sitting in the library. At that time, Shihab called Tanveer and asked him to come and play at Central Field. Tanveer avoided him and said he would come after 30 minutes after completing his	CO2	4

	assignment. At the same time, Tanveer's teacher called and asked to meet to arrange a special class. Tanveer went to meet without avoiding. Shihab noticed something in the pin diagram of the microprocessor (intel 8086): the timing of the interrupt was also the same. Some interrupts are avoided by the microprocessor, while some are not. Now write and discuss the pins responsible for the interrupts. 2. DMA stands for Direct Memory Access. It is designed by Intel to transfer data at the fastest rate. It allows the device to transfer the data directly to/from memory without any interference of the CPU. Now, discuss the pins responsible for DMA techniques in 8086 µp. OR, **In an arithmetic operation involving the 8086 Microprocessor, describe how the general-purpose registers AX, BX, CX, and DX are utilized. Discuss the specific roles each register plays during the execution of the operation. Provide an example arithmetic operation and illustrate the step-by-step involvement of these registers in the process.**		
	c) Write an assembly language program to compute Y= (5+3) * (2+1)	**CO2**	**3**