

International Islamic University Chittagong
Department of Electrical and Electronic Engineering
B. Sc. Engineering in EEE
Final Exam, **Autumn 2021**

Course Code: **EEE 3505**

Course Title: **Microprocessor & Interfacing**

Time: 2 hours 30 minutes

Full Marks: 50

(i) The figures in the right-hand margin indicate full marks

(ii) Course Outcomes and Bloom's Levels are mentioned in additional Columns

Course Outcomes (COs) of the Questions	
CO1	Explain the architecture and operation of microcomputer and microprocessor
CO2	Learn assembly language programming.
CO3	Design various microprocessor-based systems according to practical applications.

Bloom's Levels of the Questions						
Letter Symbols	R	U	App	An	E	C
Meaning	Remember	Understand	Apply	Analyze	Evaluate	Create

Part A

[Answer the following questions]

1. a) Create a simple series of instructions that changes the DX register's leftmost five bits, inverts the rightmost three bits, and clears the middle four bits while leaving the remaining three bits unchanged. In SI, save the result. CO2 E 5
1. b) Using jump instruction write assembly language program to find out the sum of following series. CO2 E 5
 $1+4+7+10+13 \dots\dots\dots+112$
- Or,
1. a) Explain the operation of different ROTATE instructions of 8086 microprocessor with example. CO2 R 5
- b) How can we get the address of interrupt service procedure from interrupt vector? Write a program that reads in a temperature value from a sensor connected to a port 05H, adds a correction factor of +7 to the value reads in and then stores the result in a reserved memory location. CO2 E 5
2. a) Point out the difference between Minimum and Maximum mode for 8086 microprocessor. Describe the functions of the following pins of an 8086 microprocessor chip: (i) INTR, (ii) $\overline{DT}/\overline{R}$ (iii) $\overline{RD}$. CO1 An, R 5
2. b) Write short notes on five predefined interrupts of 8086 microprocessor. CO1 E 5

Part B

[Answer the following questions]

3. a) Briefly describe the methods of parallel data transfer used for microprocessor interfacing. CO1 U 4
3. b) An 8086-8255 based microcomputer is required to drive an LED connected to bit 2 of **Port B** based on two switch inputs connected to bit 6 and 7 of **Port A**. If both switches are either high or low, LED will turn on; otherwise, it will CO3 C 6

remain OFF. Assume base address of 60H. **Design** the system and **write** an 8086 assembly language program to accomplish this.

Or,

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|----|----|--|-----|-----|---|
| 3. | a) | Describe the Control Words of 8255A. | CO1 | U | 4 |
| 3. | b) | An 8086-8255 based microcomputer is required to drive an LED connected to bit 0 and 1 of Port A based on two switch inputs connected to bit 6 and 7 of Port B . If both switches are either high or low, LED will turn on; otherwise, it will remain OFF. Assume base address of 60H. Design the system and write an 8086 assembly language program to accomplish this. | CO3 | C | 6 |
| 4. | a) | Discuss "Rate Generator mode and Square wave Generator mode of the counters of 8254. | CO3 | C | 5 |
| 4. | b) | In an 8086-8254 based system the output of Counter 0 of 8254 PIT is initially high. The Gate of Counter 0 can be retriggered by a switch. Triggering of the gate makes the output of Counter 0 low for 50 μ s. Which operation mode of 8254 PIT you have to design the timer to perform this? Write an 8086 subroutine to perform this job considering the clock frequency 2MHz. Assume base address of 8000H. | CO3 | C | 5 |
| 5. | a) | Draw the internal block diagram of an 8259A PIC and explain the operations of the IRR, ISR, IMR, and Priority resolver blocks | CO3 | R,E | 5 |
| 5. | b) | Why PLC is so important for Microprocessor? Describe the Exclusive OR operation of Relay circuit. | CO3 | U | 5 |