**SET A**

# CSE 341: Microprocessors
## Department of Computer Science and Engineering
## Brac University

Examination: Midterm | Semester: Fall 23
Duration: 1 Hour 15 Minutes | Full Marks: 30

**1. CO1** **8**

| Address | 31234h | 31235h | 12000h | 12001h | 30600h | 30601h |
|---|---|---|---|---|---|---|
| Data | 12h | 34h | 10h | 20h | 11h | 21h |

**A.** Assume for an 8086**, DS = 1000h, CS = 3000h, SS = 8A40h, BX = 2000h, BP = 1234h, SI = 0020h, DI = 030Fh.** We also execute the **JMP [BX]** instruction**. Now, deduce** the **physical address** of the memory location 8086 will jump to**. [4]**

**B.** Using the physical address obtained from (A), **deduce** the **logical address** with the **smallest segment number. [2]**

**C.** **Deduce** 2 other **logical addresses** for the **physical address** obtained from (A)**. [2]**

**2. CO1** **7**

**A.** **Illustrate** using a **block diagram**, the **Internal Architecture** of **Intel 8086** and **label** the individual components. **[3]**

**B.** **Explain** 3 differences between a microprocessor and a microcontroller. **[2]**

**C.** **Briefly** explain when pipelining fails. **[2]**

**3. CO1** **MOV AX, 2FXYh** **8**
**MOV BX. FCDFh**
**ADD AX, BX**

A. **Deduce the minimum** value for **X** and maximum value for **Y** such that **PF** = **1. [1]**

B. **Using the values obtained from (A), deduce** the values of **OF**, **AF**, and **SF**, after the execution of the given instructions. Explain the **reasonings** behind the deduced values. **[3]**

**C.** Assume a scenario where an 8086 is receiving a **maskable interrupt signal** as well as a **non-maskable interrupt signal** at the same time. But it has currently **disabled** all **interrupts**. And so, an appropriate reply has been sent to the **source** of the **maskable interrupt** by the 8086.

**Deduce** the values of the **concerned pins**. Give **reasons** behind your answer. **[4]**

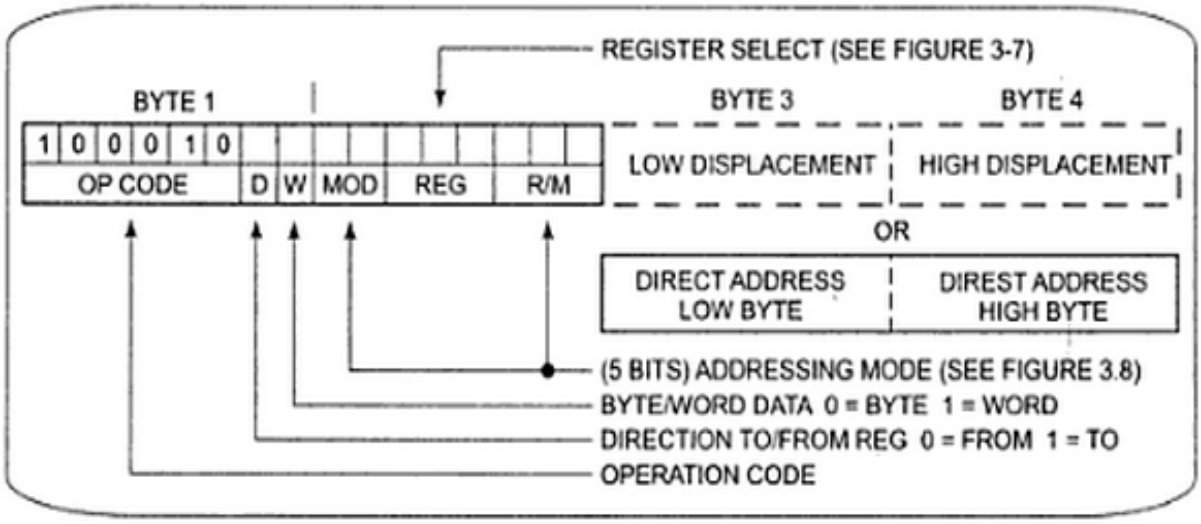
**4. CO2** **7**

**I. MOV CL, [BX]**
**II. MOV CL, [BX+SI]**
**III. RET [1234h]**
**IV. MOV AX, [BP]**

A. **Explain** with **reasoning** which category of **addressing modes** the above-given instructions fall into. **[4]**

B. **Deduce** the machine code of the following assembly language instruction: **MOV DI, [BP+42h].** Your final answer should be in **hex**. **[3]**

**4 Byte Instruction Template and the Opcade table are given on the next page**




| MOD / RM | 00 | 01 | 10 | 11 | |
|---|---|---|---|---|---|
| | | | | W = 0 | W = 1 |
| 000 | [BX] + [SI] | [BX] + [SI] + d8 | [BX] + [SI] + d16 | AL | AX |
| 001 | [BXI + [DI] | [BX] + [DI] + d8 | [BX] + [DI] + d16 | CL | CX |
| 010 | [BP] + [SI] | [BP] + [SI] + d8 | [BP] + [SI] + d16 | DL | DX |
| 011 | [BP] + [DI] | [BP] + [DI] + d8 | [BP] + [DI] + d16 | BL | BX |
| 100 | [SI] | [SI] + d8 | [SI] +d16 | AH | SP |
| 101 | [DI] | [DI] + d8 | [DI] +d16 | CH | BP |
| 110 | d16 (direct address) | [BP] + d8 | [BP] +d16 | DH | SI |
| 111 | [BX] | [BX] + d8 | [BX] + d16 | BH | DI |