CSE 341: Microprocessors

Department of Computer Science and Engineering, Brac University

Examination: Quiz 3 **Semester: Fall 2025**

Duration: 25 Minutes **Full Marks: 15**

Name: ID: Section:

Answer all the questions.

1.Suppose an 8086 is operating in a way such that T_on is 1/3rd of the total time required for one clock pulse. Consider T_on is 50 ns. Now the 8086 is going to execute the instruction MOV [ABDAh], BX.

a) **Calculate** the frequency in MHz at which the 8086 is operating. **[2]**

b) **Deduce** the total time required to execute the given Instruction MOV [ABDAh],BX. **[2]**

c) **Write** the values of pins A0 and BHE' during the executing of the given instruction MOV [ABDAh], BX. **[2]**

d) **Draw** the timing diagram for the given instruction. Only show the following pins in the diagram in (T1-T4) -M/IO', RD'/WR', DEN', ALE. **[2]**

2. Initially a 8086 µp has some segments which have the following segment addresses respectively: DS = 2000h, CS =3000h, SS = 4000h. In this 8086 µp, after program X was running but suddenly an interrupt N occurred. To service this interrupt N, we need to go to ISR which is at 386A9h and it is located in the same code segment of the µp. Additionally, before fetching the ISR, the offset of the stack top (SP) became 3505h. Some parts of the memory is also given below:

Address	Data
4351Ah	57h
43509h	76h
43508h	32h
43507h	13h

Address	Data
43506h	93h
43505h	38h
43504h	56h
003AFh	30h

Address	Data
003AEh	00h
003ADh	86h
003ACh	A9h
003ABh	98h

a) **Deduce** the value of **CS** and **IP** of program X. You must show the calculation. **[3]**

b) **Deduce** the memory addresses or locations of the IVT table where the **CS** and **IP** of Interrupt N is situated. You must show the calculation. **[2]**

c) **Deduce** the Interrupt **Type N**. You must show the Calculation. **[2]**

d) **Write** two differences between polling and interrupt. **[2]**

Solution of Set A

1. a) 6.67 MHz

   b) 1 bus cycles needed, per state T = 150 ns

   (150 ns * 4) = 600ns

   c) A0 = 0, BHE' = 0

   d) Draw for Write Operation

2. a) CS =3213h, IP = 9338h

   b)

003AFh	30h
003AEh	00h
003ADh	86h
003ACh	A9h

c) 003ACh/ 4 = 940h = 235

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Answer all the questions.

1.Suppose an 8086 is operating in a way such that T_on is 1/5th of the total time required for one clock pulse. Consider T_on is 40 ns. Now the 8086 is going to execute the instruction MOV BX, [BCDEh].

e) **Calculate** the frequency in MHz at which the 8086 is operating. **[2]**

f) **Deduce** the total time required to execute the given Instruction MOV BX, [BCDEh]. **[2]**

g) **Write** the values of pins A0 and BHE' during the executing of the given instruction MOV BX, [BCDEh]. **[2]**

h) **Draw** the timing diagram for the given instruction. Only show the following pins in the diagram in (T1-T4) -M/IO', RD'/WR', DEN', ALE. **[2]**

2. Initially a 8086 µp has some segments which have the following segment addresses respectively: DS = 1000h, CS =2000h, SS = 3000h. In this 8086 µp, after program X was running but suddenly an interrupt N occurred. To service this interrupt N, we need to go to ISR which is at 21386h and it is located in the same code segment of the µp. Additionally, before fetching the ISR, the offset of the stack top (SP) became 5046h. Some parts of the memory is also given below:

Address	Data
3351Ah	57h
35049h	30h
35048h	02h
35047h	13h

Address	Data
35046h	93h
33505h	38h
002ABh	20h
002AAh	00h

Address	Data
002A9h	13h
002A8h	86h
002A7h	A9h
002A6h	98h

e) **Deduce** the value of **CS** and **IP** of program X. You must show the calculation. **[3]**

f) **Deduce** the memory addresses or locations of the IVT table where the **CS** and **IP** of Interrupt N is situated. You must show the calculation. **[2]**

g) **Deduce** the Interrupt **Type N**. You must show the Calculation. **[2]**

h) **Write** two differences between polling and interrupt. **[2]**