United International University (UIU)

Dept. of Computer Science & Engineering (CSE)

Mid-Term Exam::Trimester::Spring 2022

Course Code: CSE 425 Course Title: Microprocessor, Microcontroller and Interfacing
Sec: (A, B, C) Total Marks: 30 Duration: 1 hour 45 minutes

Any examinee found adopting unfair means would be expelled from the trimester/ program as per UIU disciplinary rules.

Question 1: Answer all the questions. (6 Marks)

a. A 5 pin input device is connected to PORTA. Another 3 pin output device is connected to PORTB. Now show the corresponding configuration of DDRA and DDRB registers for individual programmed I/O. [2]

b. [2+2]

Transfer of bus control in either direction, from processor to device or vice-versa, takes 150 ns. One of the IO devices has a data transfer rate of 50 KB/sec and employs DMA.

1. Assume that in Cycle Stealing Mode, data is transferred 2 Bytes at a time. How long does it take to transfer a block of 100 bytes if DMA employs cycle stealing mode?
2. How long does it take to transfer a block of 100 bytes if DMA employs burst mode?

Question 2: Answer all the questions. (5 Marks)

a. [1+2]

Sensor A: Fire Alarm Sensor	Sensor B: Fingerprint Sensor
INT 60H	INT 64H

1. Draw the Interrupt vector table for the interrupt of sensor B showing the physical address of the vector table.
2. Suppose the microprocessor is executing ISR for the interrupt of Sensor A. While executing the ISR for sensor A, sensor B generates an interrupt too. Now, explain in detail about how the microprocessor executes the ISR for both sensors and return to its main program.

b. What is INT 3 interrupt and explain what the microprocessor does when it gets an INT 3 interrupt? [2]

Question 3: Answer all the questions. (6 Marks)

a. [4]

Suppose after execution of a signed additional instruction (3FBFH + 4000H), what would be the value of CF, OF, ZF, SF status flags?

b. [2]

Which address pins and data pins are multiplexed in 8086? How does the processor differentiate whether data or address is being transmitted using the multiplexed pins?

Question 4: Answer all the questions. (5 Marks)

a. In 8086, Why segment : offset form of an address is not unique? [1]

c. [2+2]

The contents of the following registers are:

- DS = 3233 H
- SS = 2626 H
- SP = 1100 H
- SI = 0021H

1. Calculate the corresponding physical addresses for the address bytes in DS and SS.
2. Also, find the last address of the corresponding segments.

Question 5: Answer all the questions. (8 Marks)

a.

Suppose a 16-bit microprocessor with a 20 bit address bus and 8 bit data bus interfaced with 256K RAM. Each RAM chip has a 16 bit address bus and 8 bit data bus. Now answer the following questions:

[1]

1. What is the capacity of each RAM? [1]
2. How many RAMs are needed? [4]
3. Draw the interfaced diagram using the full decoding method. Show the corresponding starting address and end address for the whole system. [2]
4. Modify the previous diagram to interface at address range 00000 H - 3FFFF H