Name:	ID:	Section:

Question 1 [2+3 Points]

In a 16-bit microprocessor, the **Program Counter (PC)** and **Instruction Register (IR)** work closely during instruction execution. Explain the sequence of operations(including bus) from fetching to executing one instruction, indicating when each register is updated.

Question 2 [3 Points]

Consider a smart surveillance system that must process real-time video and control motorized cameras. Should it be built around a **microcontroller** or **microprocessor**?Justify based on processing needs, integration, and real-time constraints.

Question 3 [1+1+1+1 Points]

Define **data bus**, **address bus**, and **control bus**. Why is the data bus bidirectional while the address bus is unidirectional?

Question 4 [1.5+1.5 Points]

How does the **Instruction Decoder** differ from the **Control Unit**, even though both generate control signals?