QE in Computer Engineering

(2017. 5. 26.)

- **You have two parts: "Digital system design" and "Microprocessors".**
- **Each part accounts for 50 points.**

QE for Digital System Design

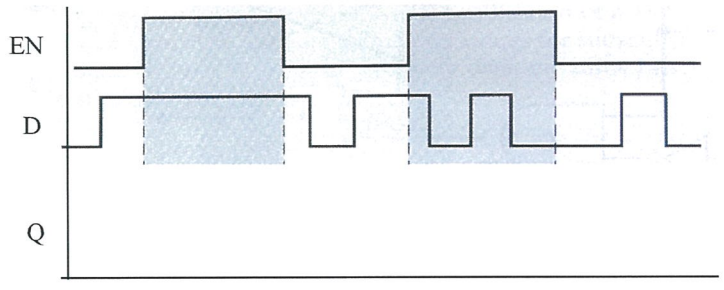
1. **(10 points)** Simplify the expression $x = (A' + B)(A + B + D)D'$ without using a K-map.

2. **(10 points)** Design a logic circuit that allows an input signal A to pass to the output Z only when one, but not both, of the control inputs, B and C, are HIGH; otherwise, the output will stay HIGH. Explain its operation.

3. **(10 points)** Explain the difference between static hazard and dynamic hazard of a combinational logic.

4. **(10 points)** Explain what the consensus theorem is. Explain the consensus theorem using a Boolean expression and using a K-map.

5. **(10 points)** Draw the output **Q** of the active-high type **D** latch for the following input **D** and enable signal **EN**. Assume D is 0, initially. Give your answer on the answer book.



QE for Microprocessors – 2017

1. (10 points) Describe 5 different addressing modes with the proper examples.

2. (10 points) Explain three types of instructions.

3. (10 points) Explain the concept of interrupt vector table, and how the interrupt cases are managed by using this table.

4. (10 points) What is the direct memory access (DMA)? Provide an example that describes the advantages of DMA.

5. (10 points) Explain the differences between CISC and RISC in four different ways.