22446 Microprocessors (Spring 2011)
First Exam

رقم الشعبة: رقم التسجيل: الاسم:

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Instructions: Time **50** min. Closed books & notes. No calculators or mobile phones. No questions are allowed. Show your work clearly. Every problem is for 2 marks. Active low signals are shown with a slash, e.g., /CE.

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Q1. Develop an I/O port decoder, using the 74ALS138 shown below, that generates low-bank I/O strobes, for a 16-bit microprocessor, for the following 8-bit I/O port addresses: 10H, 11H, 12H, 13H, 14H, 15H, 16H, and 17H.
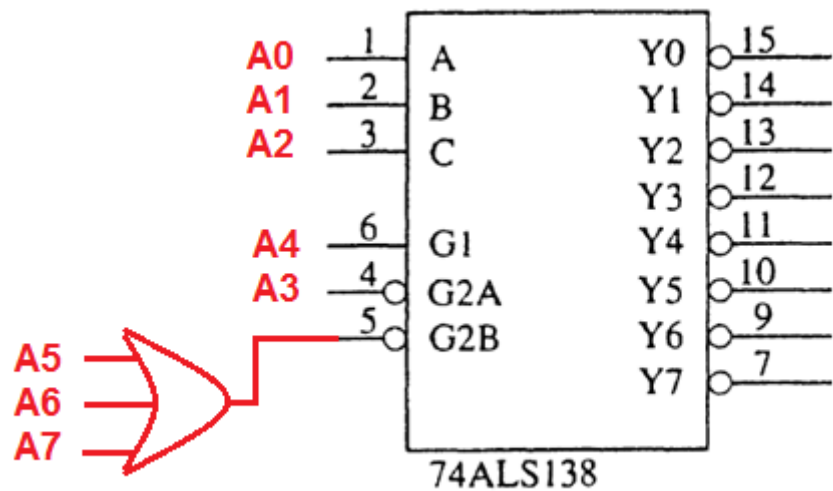
Q2. What is a von Neumann machine?

A Computer with memory for storing the instructions of user programs.

Q3. The first 1M byte of memory in a DOS-based computer system contains a(n) **Transient Program Area**

and a(n) **System** area.

Q4. What is the PCI interface and where it is used in a system?

Peripheral Component Interconnect, general purpose I/O bus in modern PCs.

Q5. The personal computer system addresses **64 K** bytes of I/O space.

Q6. What is the purpose of the /IOWC signal?

Indicates writing to an output port.

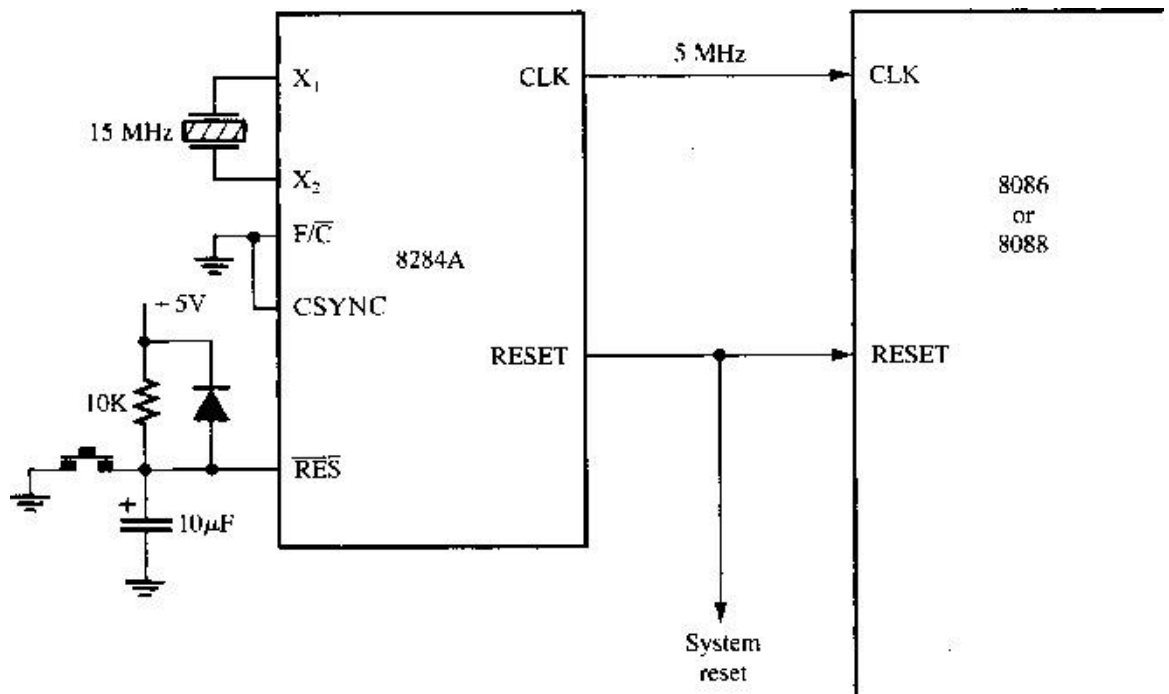**Q7.** List two differences between the 8086 and the 8088 microprocessors.

8088:   8-bit data bus,   M/IO pin is low for memory access

8086:   16-bit data bus,   M/IO pin is low for I/O access

**Q8.** What is the purpose of the ALE signal on the 88086 microprocessor?

Address Latch Enable.

Q9. In the circuit shown below, complete the connections for Pins X_1, X_2, and /RES of the clock generation chip.

**Q10.** Where is the I/O port number stored for a variable I/O instruction?

DX

Q11. In the circuit shown below, show the needed ICs and connections to fully buffer and demultiplex the shown 8086 pins.
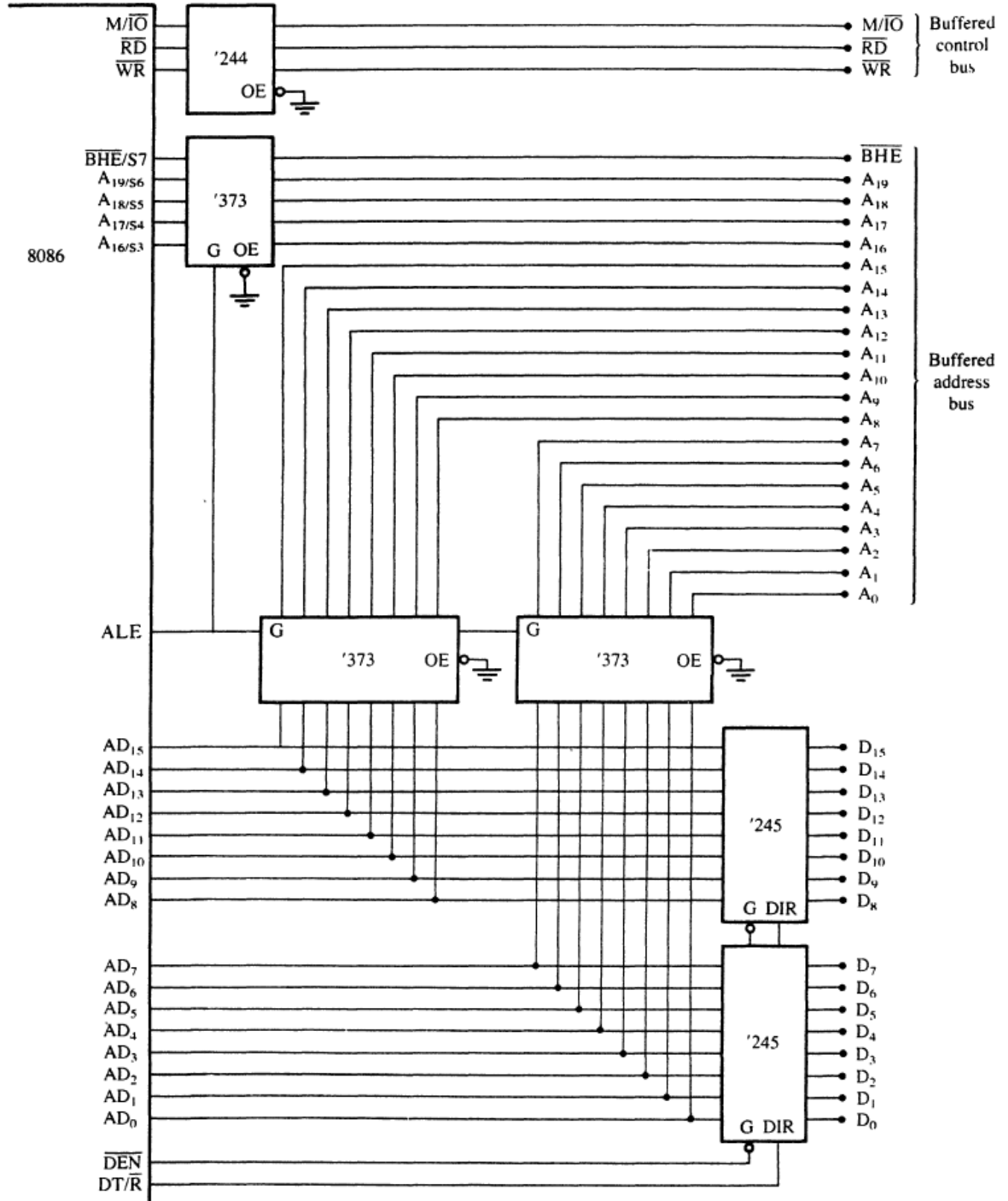
Q12. In the circuit shown below, show the needed resisters and connections to interface the 8 LEDs shown. Specify the resisters values to operate the LEDs on 10 mA.
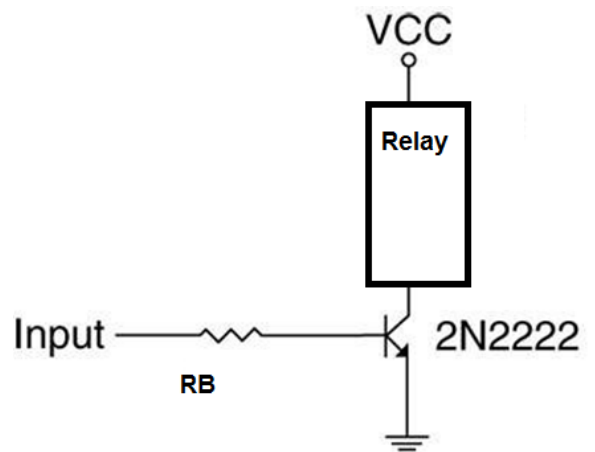
RL = (5V – 0.7V) / 10 mA = 430 Ohm
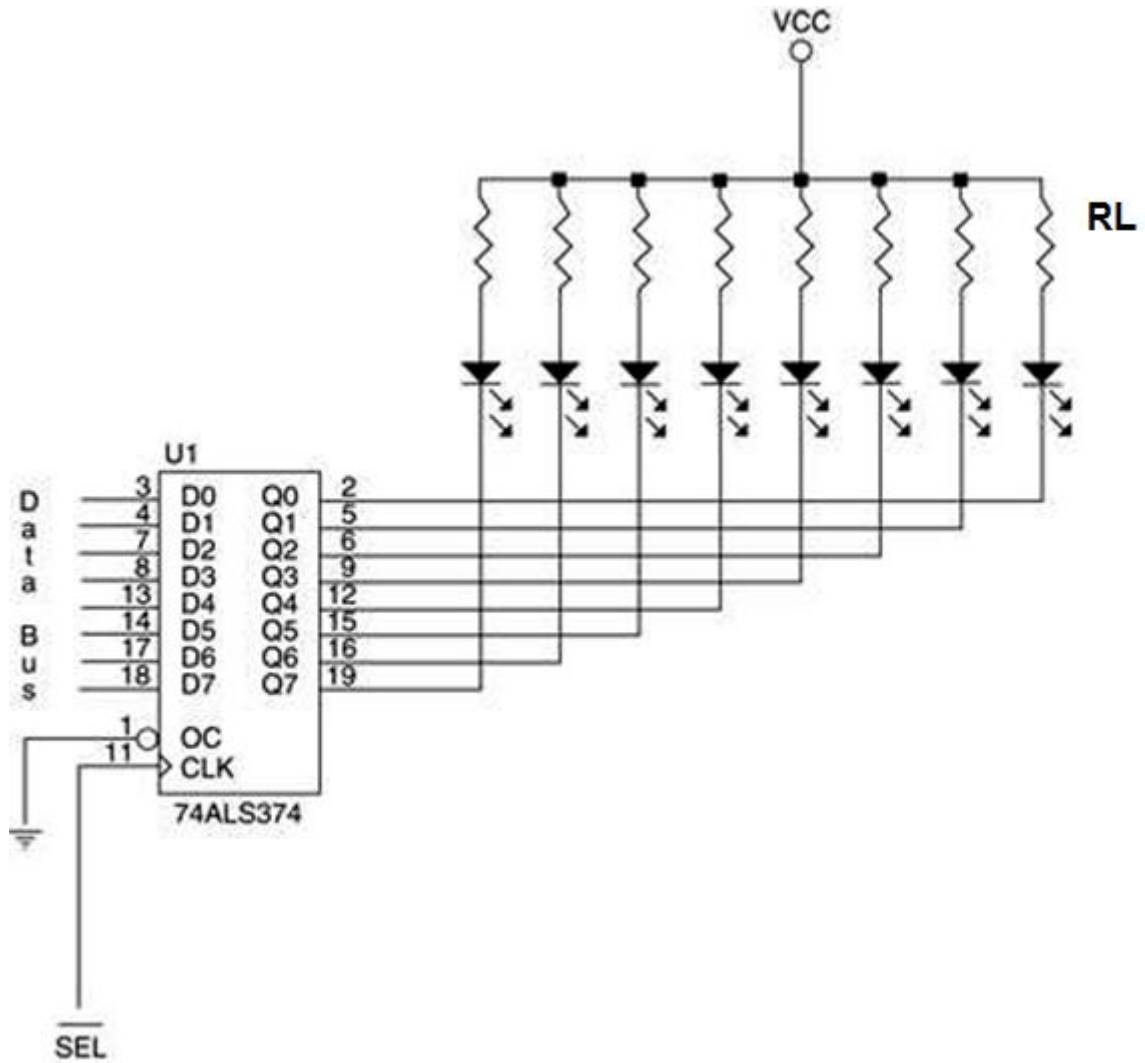
Q13. Develop an interface to correctly drive a relay. The relay is 12 V and requires a coil current of 120 mA. Use the 2N2222 transistor which has a gain = 100. You need to specify the value of any resistor used.

IB = 120 /100 = 1.2 mA
RB = (2.4V – 0.7V) / 1.2 mA = 1.42 KOhm

Good Luck>