

# EEE3131 ASSIGNMENT 7

**DUE DATE: 07/06/2023**

**SUBMIT QUESTIONS: 3, 6, 11 and 12**

1. Briefly describe the difference between SRAMs and DRAMs. What are the advantages and disadvantages of each?
2. What do you understand by the term ‘bus contention’?
3. A certain semiconductor memory chip is specified as 2K X 8. How many words can be stored on this chip? What is the word size? How many total bits can this chip store?
4. Which memory stores the most bits: a 5M X 8 memory or a memory that stores 1M words at a word size of 16 bits?
5. Define the following terms.
  - (a) Memory cell
  - (b) Memory word
  - (c) Address
  - (d) Byte
  - (e) Access time
6. Figure 6.1 shows how data from a ROM can be transferred to an external register. The ROM has the following timing parameters:  $t_{ACC} = 250$  ns and  $t_{OE} = 120$  ns. Assume that the new address inputs have been applied to the ROM 500 ns before the occurrence of the TRANSFER pulse. Determine the minimum duration of the TRANSFER pulse for reliable transfer of data.
7. Repeat Problem 6 if the address inputs are changed 70 ns prior to the TRANSFER pulse.

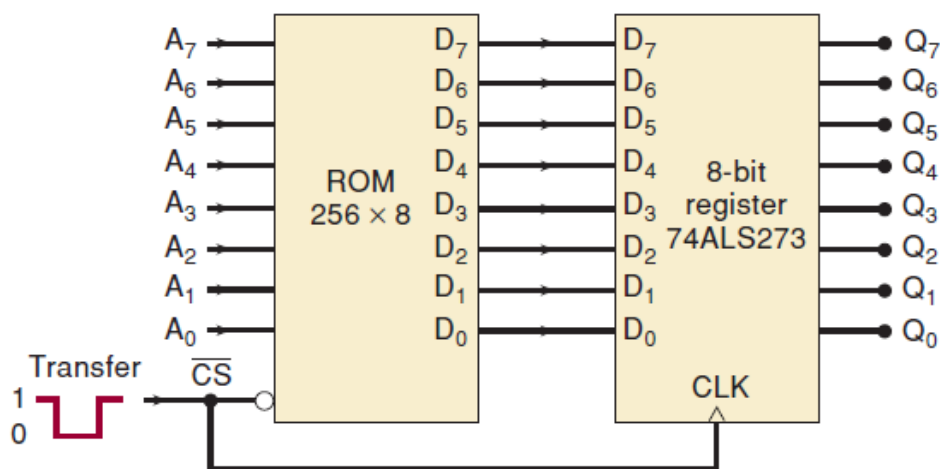


Fig 6.1

8. (a) What are the three buses in a computer memory system?  
 (b) Which bus is used by the CPU to select the memory location?  
 (c) Which bus is used to carry data from memory to the CPU during a read operation?  
 (d) What is the source of data on the data bus during a write operation?
  
9. A microprocessor uses RAM chips of  $1024 \times 1$  capacity.  
 (a) How many chips are required to yield the capacity of 1 Kbytes?  
 (b) How many chips will be required to provide the capacity of 16 Kbytes?
  
10. What is the capacity of a RAM which has 16 address inputs, 4 data inputs and 4 data outputs?
  
11. In a microcomputer, the addresses of memory locations are binary numbers that identify each memory circuit where a byte is stored. The number of bits that make up an address depends on how many memory locations there are. Since the number of bits can be very large, the addresses are often specified in hex instead of binary.
  - a. If a microcomputer uses a 20-bit address, how many different memory locations are there?
  - b. How many hex digits are needed to represent the address of a memory location?
  - c. What is the hex address of the 256th memory location? (Note: The first address is always 0.)
  
12. Complete the following Table:

Memory Type	Max Speed	Supply Voltage	No. Of Pins On Connectors
DDR1	400 MHz	2.5 V	184
DDR2			
DDR3			
DDR4			
DDR5			