ECE3221 – Quiz # 3 **May 27, 2019** **Adam Wilson**

Name: _ Student #: _____ Signature: _____

Time limit: 30 min. Calculators not allowed. All programming questions relate to the NIOS II processor.

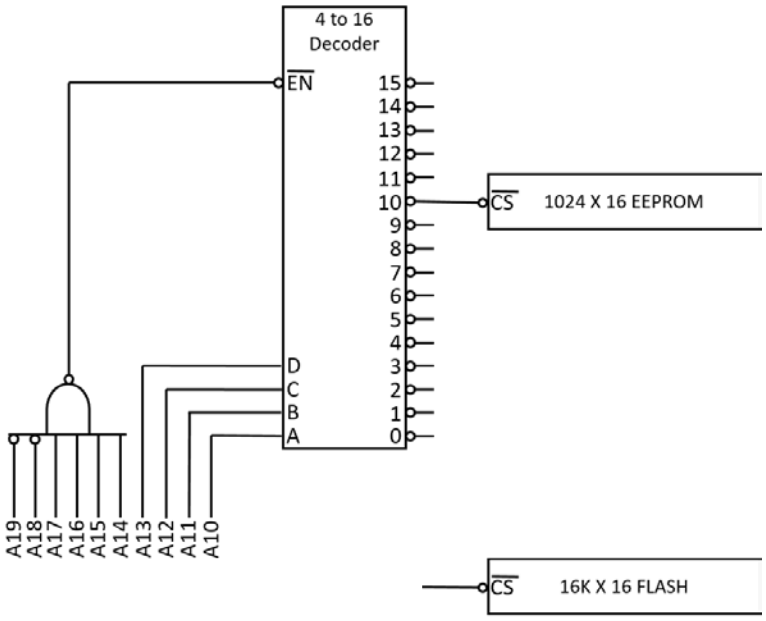
A computer system has a 20-bit address bus and a 16-bit data bus. Answer the next 4 questions related to the computer system:

1. (1 mark) What is the maximum number of memory locations that can be addressed by this system?

2. (1 mark) If the system addresses 2 bytes at a time (the width of the data bus), what is the maximum amount of memory storage, in bytes, that can be addressed by this system?

3. (5 marks) The following decoder circuit is used to decode 16 sub-sections of memory within the 20-bit memory space. Fill in the addresses in the memory map (shown on the next page) of the system with the starting and ending addresses of the total 20-bit memory space, the starting and ending addresses of the EEPROM and ending address of FLASH.

4. (2 marks) Draw another decoding circuit, on the figure below, to locate the FLASH at the location shown in the memory map (starting at 0x08000).



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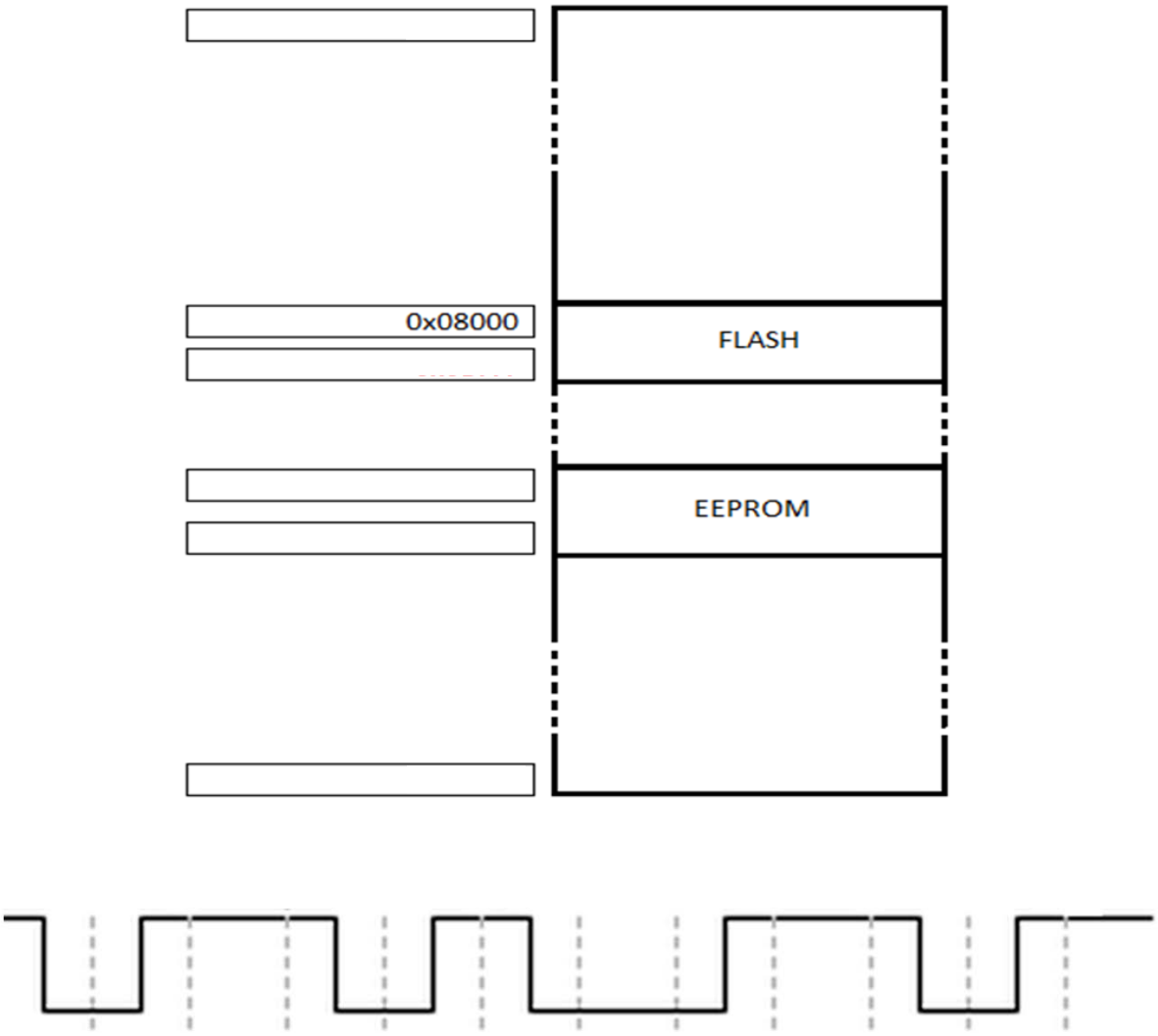

Figure 1 - Asynchronous transmission of 8 data bits

5. (2 marks) Figure 1 shows the timing diagram for an asynchronous RS232 data transmission with a data size of 8 bits. What is the value of the data byte being transmitted in **hex**?

6. (1 mark) What type of parity is being used in the data transmission in Figure 1 (assume no errors in the data)?

7. (1 mark) If the duration of each bit is 10µs in Figure 1, what is the data rate of the transmission in **bit/s**?