ECE473-F07 Quiz 4 Name: Key

ID (last 4):

1.(5) What is the difference between synchronous and asynchronous data communication?

Synchronous communication uses a separate signal usually called a "clock" to validate or mark the time at which data is to be sampled.

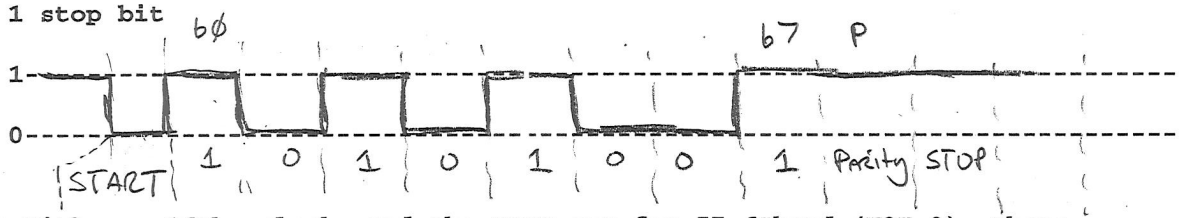
2.(5) What is the difference between full and half duplex communication?

Full duplex: communication can be bidirectional & simultaneous
half duplex: communication can be bidirectional but only one direction at a time

3.(15) Below, draw the waveform seen at the AVR UART output data pin for one serial data frame as follows:

-5 for wrong data order
-5 for wrong parity
-10 for no levels shown

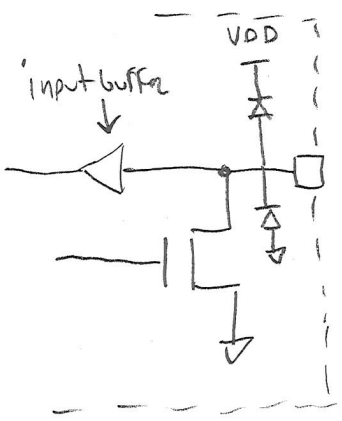
8 data bits, byte = 0b1001_0101
1 parity bit, odd parity
1 stop bit



4.(10) With our 16Mhz clock, and the UART set for 57.6Kbaud (U2X=0), there is a 2.1% baud rate error. Why?

16 Mhz clock is not an integer multiple of the 57,600 baud rate.

5.(10) Draw the output structure (transistor level) for an open drain output driver.



-2 no protection diodes
-4 wrong direction for diodes
-0 for showing resistor for pullup or for pin capacitance

6.(10) What are the four major parts of a TWI transmission:

Start, SLA + R/W, DATA PACKETS, STOP

(ACK also Accepted as part of SLA + R/W & DATA)

7.(10) How many bytes can be transmitted between a TWI START and STOP transaction?

As many as you would like

8.(10) Lets say you want to write two different addresses on the TWI bus but did not want to relinquish the bus. Can you do that? If so, how do you do it? If not, tell why you cant.

yes, Use repeated start to send new address prior to sending stop.

9. (5) What is address 0b0000000 used for on the TWI bus?

general call

10. (5) If you are in a pin limited situation and must talk to 25 different devices, which would be better to use, TWI, SPI or UART w/RS232?

TWI - can add up to 127 devices without using more wires.