

Do not use any notes.

Name: _____ **Solution** _____ UCR ID: _____

1. (6 point) If you have an Analog to Digital (A/D) converter that is 8 bits and the input range is 1V to 3V what is the input (in volts) if the output is 11111011 (binary)? Don't worry about calculating the tolerance.

$$e/V = d/2^n - 1$$

Solve for e, offset range by 1V.

$$e/2 = 0b11111011/2^8 - 1$$

$$e/2 = 251/255$$

$$e = 2 * 251 / 255 = 1.968$$

Add the one volt to account for the offset...

$$\text{Output} = 1 + 1.968 = 2.968V$$

2. (2 points) What is the resolution (in volts) of the A/D in problem 1?

Resolution = value for one bit

$$e/2 = 1/255$$

$$\text{Resolution} = 2 * 1/255 = 0.00784V$$

3. (2 points) For a UART, what is the **purpose** of a parity bit?

To detect errors.