**EGR-334**

**Analog - Digital Interface**

**Homework 3.0**

**Week 12**

**Thursday November 1, 2018**

**Due Thursday November 8, 2018**

1. **Given a 8 - Bit DAC with a 5.00 V Reference Connecting to a Light Source with an Intensity given by IL = 45 V(3/2) W/m2, Please Determine the Following:**

**[Process Control Instrumentation Technology 8th Edition, Curtis D. Johnson]**

45\*(0)^(3/2) = 0, 45\*(5)^(3/2)

**a) What is the Range of Intensity that can be Produced?**

**\_\_\_\_**0 W/m2**\_\_\_\_ to \_\_\_\_\_**503 W/m2**\_\_\_\_\_**

**b) What Intensities are Produced by the Following Digital Inputs;**

1B=27, 27/255\*(5 V)=0.529 V, 45\*(0.529)^(3/2)=

**1) 1BH \_\_\_\_\_\_**17.3 W/m2**\_\_\_\_\_**

7A=122, 122/255\*(5 V)=2.39 V, 45\*(2.39)^(3/2)=

**2) 7AH \_\_\_\_\_\_**166.5 W/m2**\_\_\_\_\_**

9F=159, 159/255\*(5 V)=3.12 V, 45\*(3.12)^(3/2)=

**3) 9FH \_\_\_\_\_**247.7 W/m2**\_\_\_\_\_\_**

E5=229, 229/255\*(5 V)=4.49 V, 45\*(4.49)^(3/2)=

**4) E5H \_\_\_\_\_**428.2 W/m2**\_\_\_\_\_**

1. **Given that Temperature is Measured by a Sensor with an Output of 0.03 V/°C. Please Determine the Following;**

**[Process Control Instrumentation Technology 8th Edition, Curtis D. Johnson]**

120 °C \* 0.03 V/°C = 3.6 V

**a) ADC Reference Voltage \_\_\_\_\_**3.6 V**\_\_\_\_\_**

120 °C/0.05 °C = 2400, 2^11=2048, 2^12=4096

**b) Word Size Required to Measure 0 to 120 °C with a 0.05 °C Resolution**

**\_\_\_\_\_\_**at least 12 bits or 3 bytes**\_\_\_\_\_\_\_**