**CMGT 235 – Electrical and Mechanical Systems**

**Homework #23** – Voltage Drop

Due: 11/16/2021

Points: 20

Solution

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

NEC 2017 Edition, Chapter 9 Tables

**Conductor Resistance**

Table 8 Conductor Properties – for DC

Table 9 Alternating-Current Resistance – for AC

1. What is the voltage drop of two 12 AWG THHN conductors in a PVC Conduit that supply 16A, 120V AC load located 100 feet from the power supply? Use Uncoated Copper Wires.

VD = 2 x R x L x I / 1000 = 2 x 2Ω X 100 ft x 16A / 1000 = 6.4 V

1. What is the percentage voltage loss for the circuit in problem 1?

%VD = [1 – (120V – 6.4V)/120V] x 100 = 5.3%

1. What is the Effective Z at 0.85 PF for Uncoated AWG 10 Copper Wire in a steel conduit?

NEC 2017 Chapter 9, Table 9

1.1 Ω / 1000 ft

1. Calculate the length a 12V DC AWG 16 uncoated stranded copper wire that supplies 2.4 A can be if the voltage drop is limited to 5%.

L = VD x 1000 / 2 x R x I = (12V x 0.05) x 1000 / 2 x 4.99 x 2.4 A = 25 ft