

CMGT 235 – Electrical and Mechanical Systems

Homework #23 – Voltage Drop

Due: 11/10/2022

Points: 20

Name: _____

NEC 2017 Edition, Chapter 9 Tables

Conductor Resistance

Table 8 Conductor Properties – for DC

Table 9 Alternating-Current Resistance – for AC

1. Determine both the resistance and the reactance in Ω/kft of the 600V, 500kcmil, copper cables used within a 3Φ circuit at a temperature of 75°C if the cables are enclosed in an aluminum conduit.

X_L (Reactance) = _____

R (Resistance) = _____

2. A feeder has a 100-ampere continuous load. The system source is 240 volts, 3-phase, and the supplying circuit breaker is 125 amperes. The feeder is in a trade size $1\frac{1}{4}$ in. aluminum conduit with three 1 AWG THHN copper conductors operating at their maximum temperature rating of 75°C . The circuit length is 150 ft, and the power factor is 85 percent.

- A. Use Table 9 COLUMN “Effective Z at 0.85 PF for Uncoated Copper Wires”:

$Z =$ _____ ohm per 1000 ft

- B. Calculate the line-to-neutral voltage drop:

VD (line-to-neutral) = $Z \times (\text{circuit length} / 1000 \text{ ft}) \times \text{circuit Load}$

VD (line-to-neutral) = _____

- C. Calculate the voltage present at the load end of the circuit:

$V_{\text{load}} =$ _____