

# Skyler MacDougall

## Homework 7: due 3/2/2020

7. In order to meet an emergency, three single-phase transformers rated at 100kVA, 13.2kV-2.4kV are connected in wye-delta on a 3-phase, 18kV line.

1. What is the maximum load that can be connected to the transformer bank?

$$\begin{aligned} 100kW &= P_{\phi} \\ P_{3\phi} &\approx 173kW \end{aligned} \quad (1)$$

2. What is the outgoing line voltage?

$$\begin{aligned} a &= \frac{N_p}{N_s} = \frac{13.2kV}{2.4kV} = 5.5 \\ V_s &= \frac{V_p}{a} = \frac{18kV}{5.5} \\ |V_s| &= 3.27kV \end{aligned} \quad (2)$$

8. Two transformers rated at 250kVA, 2.4kV-600V are connected in open-delta to supply a load of 400kVA.

1. Are the transformers overloaded?

$$\begin{aligned} I_s &= \frac{S}{I} = \frac{250kVA}{600V} = 416.6A \\ S &= \sqrt{3}EI = \sqrt{3} \times 416.6A \times 600V \\ S &= 433.01kVA \\ \therefore \end{aligned} \quad (3)$$

*The Transformer is not overloaded*

2. What is the maximum load the bank can carry on a continuous basis?

\$\$

1	Calculated\ above\ to\ be\
2	S=433.01kVA

\$\$

$$\begin{array}{l} \textit{Calculated above to be} \\ S = 433.01kVA \end{array} \quad (4)$$

$$\begin{array}{l} \textit{Calculated above to be} \\ S = 433.01kV \end{array} \quad (4)$$