2)

Part (a): The line-neutral load voltage $V_{\text{load}} = 24 \text{ kV}/\sqrt{3} = 13.85 \text{ kV}$ and the load current is

$$\hat{I}_{\text{load}} = \left(\frac{375 \text{ MVA}}{\sqrt{3}\, 24 \text{ kV}}\right) e^{j\phi} = 9.02 e^{j\phi} \text{ kA}$$

where $\phi = \cos^{-1} 0.89 = 27.1°$.

The transformer turns ratio $N = 9.37$ and thus referred to the high voltage side, $V'_{\text{load}} = NV_{\text{load}} = 129.9$ kV and $\hat{I}'_{\text{load}} = \hat{I}_{\text{load}}/N = 962 e^{j\phi}$ A. Thus, the transformer high-side line-neutral terminal voltage is

$$V_{\text{H}} = |V'_{\text{L}} + jX_{\text{t}}\hat{I}'_{\text{load}}| = 127.3 \text{ kV}$$

corresponding to a line-line voltage of 220.6 kV.

Part (b): In a similar fashion, the line-neutral voltage at the source end of the feeder is given by

$$V_{\text{s}} = |V'_{\text{L}} + (Z_{\text{f}} + jX_{\text{t}})\hat{I}'_{\text{load}}| = 126.6 \text{ kV}$$

corresponding to a line-line voltage of 219.3 kV.