

Example Sheet: Transformer Efficiency and Three Phase Transformers

1. A resistive load of 1.6Ω is connected across the secondary terminals of a 10kV/400V transformer. If $R_c = 50K\Omega$, $X_m = 10K\Omega$, $R_{1eq} = 50\Omega$ and $X_{1eq} = 80\Omega$ calculate:
 - a. Percentage Voltage regulation
 - b. Efficiency
 - c. Secondary load resistance such that the transformer operates at its maximum efficiency point.

2. A three-phase transformer has 400 primary turns and 32 turns on the secondary winding. If the supply voltage is 3 kV determine the secondary line voltage with no load when the windings are connected.
 - a. Star-Delta
 - b. Delta-Star

3. The primary and secondary windings of a 500 kVA transformer have resistances of 0.4Ω and 0.0021Ω respectively. The primary and secondary voltages are 11 kV and 400 V, respectively. The core loss is 3 kW and the power factor of the load is 0.85. Calculate:
 - a. The full load secondary and primary currents
 - b. The full load total primary and secondary copper loss.
 - c. The efficiency on full load
 - d. The efficiency on half load