Non-Ideal Transformers (48:13)

Discuss copper losses associated with non-ideal transformers. Discuss methods of minimizing copper losses.

Discuss the purpose of varnish on transformer windings. Discuss common modes of transformer failure.

Discuss iron losses associated with non-ideal transformers. Discuss transformer construction methods to minimize iron losses.

Discuss magnetizing current associated with non-ideal transformers.

Given this ideal transformer determine the voltage, current, and power for both primary and secondary windings.

Explain how the inductive reactance of transformer windings and hysteresis is accounted for using a simple model.

Given this non-ideal transformer accounting for both magnetizing current and hysteresis, determine the voltage, current, and power for both primary and secondary windings.

Determine the efficiency of real power transformer for the above model of a non-ideal transformer.

Explain how the iron losses associated with eddy currents is accounted for using a simple model.
Given this non-ideal transformer accounting for magnetizing current and hysteresis and eddy current iron losses, determine the voltage, current, and power for both primary and secondary windings.

Determine the efficiency of real power transformer for the above model of a non-ideal transformer.

Explain how copper losses associated with the primary and secondary windings are accounted for using a simple model.

Given this non-ideal transformer accounting for magnetizing current and hysteresis, eddy current iron losses, and copper losses in the primary and secondary windings, determine the voltage, current, and power for both primary and secondary windings.

Determine the efficiency of real power transformer for the above model of a non-ideal transformer.

Given 2 transformers with the following modeled non-ideal characteristics determine which transformer will offer better performance. Provide reasons for your decision.

Explain the rationale behind the simplified model of an ideal transformer.
Explain why transformers draw current and experience losses even when there is no load on the secondary.

Given this non-ideal transformer determine the performance of this non-ideal transformer with no load on the secondary.

Discuss how voltage strongly influences transformer performance.

Define transformer voltage regulation. Identify a means of calculating transformer voltage regulation.

Given this observed performance data calculate the voltage regulation for this transformer.

<table>
<thead>
<tr>
<th>Load Current</th>
<th>Output Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0A</td>
<td>24.0V</td>
</tr>
<tr>
<td>1 A</td>
<td>23.86V</td>
</tr>
<tr>
<td>2 A</td>
<td>23.72V</td>
</tr>
<tr>
<td>3 A</td>
<td>23.58V</td>
</tr>
<tr>
<td>4 A</td>
<td>23.44V</td>
</tr>
<tr>
<td>5 A</td>
<td>23.30V</td>
</tr>
</tbody>
</table>