ECE 3354 – Power Laboratory

Experiment: Transformer Waveforms

Steady-State Testing and Performance of Single-Phase Transformers

Report must be the student's own work. The report must be hand written.

Date of Experiment

Month/Day/Year

Bench # _____ CRN _____

Prepared By:

Author's Name

Partner's Name

Prepared For:

Instructor's Name

Experiment Introduction and Objective

(Less than 5 lines. Refer to the lab manual and re-write in your own words in bullets or numbering format)

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                         (Short answers, be brief and <5 lines)
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Part I – Plotting Currents, Flux, and B-H Curves without Load Attached

Describe the wave shapes observed during Part-1 of the experiment. Comment on the frequency, phase, and any distortion of these waveforms. Remember that we also varied the input primary voltage.

(Answer here)

Current Waveforms

From $I_1 = I_c + I_m + I_2$ …..

(Show plots of I_1, I_c, I_m – note that $I_2=0$ because there was no load attached, and R_3 set to be zero).

 (Answer here)

Flux Waveform

The flux was capture by …… Did it change with primary voltage? Explain.

(Show plot of the φ waveform)

(Answer here)

AC Saturation Curve and Hysterisis Curve

(Expanding in your own words, say what you did and why you did it. Include any equations, table, data, plots, and results for this part here)

 (Answer here)

Part II – Measuring Net Flux in the Transformer Core with R Load Attached

Describe the wave shapes observed during Part-2 of the experiment. Comment on the frequency, phase, and any distortion of these waveforms. Remember that we also varied the input primary voltage.

By varying the load current (pure R load attached), the net flux in the core increased or decreased because …… (Continue expanding in your own words, say what you did and why you did it. Include all equations, table, data, plots, and results for this part here)

(Answer here)

AC Saturation Curve and Hysterisis Curve as load is varied

(Expanding in your own words, say what you did and why you did it. Include any equations, table, data, plots, and results for this part here)

(Answer here)

Explain the causes of any frequency differences, phase changes, and distortion.
(Answer here)

Note and explain any wave shape variations caused by different loads Part 2.
(Answer here)

Explain the behavior of the core flux for various loads.
(Answer here)

In order to reduce the core-loss current, what would you change in the design of the transformer? (Do not change voltage or power rating of the device.)
(Answer here)

Part III – Load Influences on the Characteristics of Terminal Voltage and Current (R and RC Load)

By varying the load type (from R load to RC load), the relative magnitudes and phase angles of the terminal voltage and the current I_1 will be changed because …… (Continue expanding in your own words, say what you did and why you did it. Include all equations, table, data, plots, and results for this part)
(Answer here)

Explain the relationship of input voltage, current, and primary side power factor as the load power factor is changed, (from R load to RC load) in terms of the energy relationships.
(Answer here)

Identify and comment on power factor in relationship to load current, core losses and magnetizing current. How does I_M, I_C, I_1, and I_2 change.
(Answer here)
(Short answers, be brief and <5 lines)