

## Chapter 6

## DISCUSSION AND CONCLUSION

The purpose of this thesis is to study, design, construct and test the voltage transformer having primary voltage rating 12 KV. and secondary voltage rating 120/240 volts, rated burden 200 VA., accuracy class 0.5, rated frequency 50 Hz. The design and construction follow The International Electrotechnical Commission Recommendation Publication 186 (1969).

Applied potential, induced voltage and impulse voltage tests had been provided to the voltage transformer for insulation testing. The tests were carried out with no damage appeared and showed fine results which meant that the voltage transformer had been designed and constructed with adequate insulation.

Voltage Transformer Uniload Test Set, a precise and most reliable equipments for high accuracy class testing, was used for measuring the percent voltage ratio errors and phase angle errors. The sets was designed for USA Standard (constant standard burden at W, X, Y, Z and ZZ). Unable to find a better test set we had to use this one, so we had to convert the measured values to IEC Standard by using the method recommended by USA Standard. Otherwise the set is suitable for measuring the values at any voltage not more than 120 volts secondary side. Open circuit test, for finding exciting current, and calculation were used for approaching any values at voltage above 120 volts. So the error values at 144 volts or 80% , 100% and 120% rated voltage 240 volts are only indicative values.

From the exciting current data of the open circuit test we found that at 100% and 120% rated voltage, its difference is small that causes slightly increase in no load error but remained in a limit of validity.

The error measured were slightly less than the errors from design. We did the measurements at 29°C ambient temperature but for the design, we used as designed temperature 75°C. For this case, the resistance will vary directly with temperature that caused the measured values to be less than the value designed.

In temperature rise test, the temperature rise of the top oil was very small because the radiating surface and oil were sufficiently supplied. The voltage transformer winding resistance is very low, there is little heat to be dissipated from the windings, and solid insulation without regard for cooling ducts in the winding can be used.

Wound core or Nickel - steel can be used for instrument transformer because they can reduce the exciting current especially the magnetizing current, so that the core dimension or number of turns of the winding can be reduced and so the size of the transformer.

The voltage transformer has been tested to ensure that it possesses qualifications according to the requirements of The International Electrotechnical Commission (IEC). The final results showed that the voltage transformer conforms to the standard.

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