**Centurion University of Technology and Management, Paralakhemundi**

**Sub- Transformer Manufacturing (Domain)**

**Assignment 2**

**Design Problem 1:** Designing an Efficient Power Transformer for Renewable Energy Integration

Problem Statement: Design an electrical power transformer that can efficiently handle the integration of renewable energy sources into the existing power grid.

Requirements:

Power Rating: The transformer should be capable of handling a minimum power rating of 100 MVA.

High Efficiency: The transformer should have a high efficiency rating, preferably above 98%, to minimize energy losses during power transmission.

Voltage Regulation: The transformer should provide efficient voltage regulation to ensure stable power supply even with fluctuating input from renewable energy sources.

Cooling System: Design an effective cooling system for the transformer to maintain optimal operating temperature and prevent overheating.

Compact Size: The transformer should be designed to occupy minimal space, considering the increasing demand for renewable energy installations in urban areas with limited space availability.

**Design Problem 2:** Designing a Step-Up Transformer for Long-Distance Power Transmission

Problem Statement: Design an electrical power transformer that efficiently steps up the voltage for long-distance power transmission.

Requirements:

Voltage Conversion: Design a step-up transformer that can convert the voltage from a low value (e.g., 10 kV) to a high value (e.g., 500 kV) for long-distance transmission.

Power Handling: The transformer should be capable of handling a power rating of at least 500 MVA.

High Efficiency: The transformer should have a high efficiency rating, preferably above 99%, to minimize energy losses during the voltage conversion process.

Insulation System: Design an effective insulation system to ensure safe operation and prevent breakdowns due to high voltage stress.

Longevity: The transformer should be designed to have a long operational life, considering the significant investment involved in long-distance power transmission systems.