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

**Course: Basic Electrical Engineering (CUTM 1057)**

**Assignment 2**

1. A circuit consists of a resistor, an inductor, and a capacitor connected in series. The resistor has a resistance of 20 ohms, the inductor has an inductance of 0.5 henries, and the capacitor has a capacitance of 100 microfarads. The circuit is connected to a sinusoidal voltage source with an amplitude of 10 volts and a frequency of 50 Hz.

Determine the following:

a. Calculate the impedance of the circuit at the given frequency.

b. Calculate the current flowing through the circuit.

c. Calculate the voltage drop across each component (resistor, inductor, and capacitor).

d. Determine the phase angle between the current and the applied voltage.

2. A circuit consists of a resistor, an inductor, and a capacitor connected in series. The resistor has a resistance of 100 ohms, the inductor has an inductance of 0.2 H, and the capacitor has a capacitance of 50 μF. The circuit is driven by an AC voltage source with a frequency of 50 Hz.

Calculate the following:

i. Calculate the impedance of the circuit at the given frequency.

ii. Determine the total current flowing through the circuit when the AC voltage source has an amplitude of 10 V.

iii. Find the phase angle between the current and voltage in the circuit.

iv. Calculate the power factor of the circuit.