**Department of Electronics & Communication Engineering**

(Faculty of Technology, Dharmsinh Desai University, Nadiad)

**Academic Year: 2022 - 2023**

**TUTORIAL – 6**

**Subject:***(ESC101) BASIC ELECTRICAL ENGINEERING*

**Class :**  *B. Tech. Sem.I (EC/CE/IT)*

**Topics:***Pharos representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance.*

1. In a series circuit containing pure resistance and a pure inductance, the currentand the voltage are expressed as:

i (t) = 5 sin (314 t + 2 π/3) and v (t) = 15 sin (314 t + 5 π/6)

(a) What is the impedance of the circuit?

(b) What is the value of the resistance?

(c) What isthe inductance in henrys?

(d) What is the average power drawn by the circuit?

(e) What is the powerfactor?

1. A pure resistance of 50 Ω is in series with a pure capacitance of 100microfarads. The series combination is connected across 100-V, 50-Hz supply. Find (a) the impedance(b) current (c) power factor (d) phase angle (e) voltage across resistor (f) voltage across capacitor.Draw the vectordiagram.
2. A 240-V, 50-Hz series R-C circuit takes an RMS current of 20 A. The maximumvalue of the current occurs 1/900 second before the maximum value of the voltage. Calculate(i) the power factor (ii) average power (iii) the parameters of the circuit.
3. A capacitor and a non-inductive resistance are connected in series to a 200-V,single-phase supply. When a voltmeter having a non-inductive resistance of 13500 Ω is connectedacross the resistor, it reads 132 V and the current then taken from the supply is 22.35 mA. Indicate on a vector diagram, the voltages across the two components and also the supplycurrent (a) when the voltmeter is connected and (b) when it is disconnected.
4. In a circuit, the applied voltage is 100 V and is found to lag the current of 10A by 30°. (i) Is the PF lagging or leading? (ii) What is the value of PF?(iii) Is the circuit inductive or capacitive ? (iv) What is the value of active and reactive power inthe circuit?

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