PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRICAL ENGINEERING

SUBJECT: Electrical and Electronics Engineering **SUBJECT CODE: 03010601ES02**

Assignment-2 A.C. Circuit

1.	Explain how to produce an Alternating EMF.
2.	Define the following. (1) Voltage (8) Average Value (2) Current (9) R.M.S. Value (3) Frequency (10) Instantaneous Value (4) Cycle (11) Peak Factor (5) Time Period (12) Form Factor (6) Resistor (13) Phase & Phase Angle (7) Peak Value (14) Power factor
3.	Derive the expression of Average value and R.M.S. value in terms of Maximum value for sinusoidal quantities.
4.	Distinguish between (i) Apparent power (ii) Active power and (iii) Reactive power in A.C. circuits.
5.	Discuss about pure resistive circuit with phasor diagram, Waveform and power equation
6.	Prove that the current in purely Inductive circuit lags its voltage by 90° and average power consumption in pure inductor is zero.
7.	Prove that the current in purely Capacitive circuit leads its voltage by 90° and average power consumption in pure capacitor is zero.
8.	Explain series R-L circuit in brief. Draw phasor diagram and the wave forms of voltage, current and instantaneous power.
9.	Explain series R-C circuit in brief. Draw phasor diagram and the wave forms of voltage, current and instantaneous power.
10.	Discuss Resonance in R-L-C series circuit. Explain how power factor, XL, and R vary with frequency. Draw relevant vector diagram.

11.	Explain Parallel resonance RLC Circuit.
12.	Derive the relation between line-voltage and phase-voltage for a three-phase four wire star and delta connection network.
13.	A series circuit consists of a resistance of 100 Ω and a capacitance of 50 μf and is energized from a 200 V, 50 Hz mains. Determine (1) the impedance (2) the current in the circuit (3) power factor (4) the phase angle (5) voltage across R and C.
14.	A coil having a resistance of 10 Ω and inductance of 0.05 H is connected in series with a capacitor of 100 μf. The whole circuit is connected to 200 V, 50 Hz supply. Calculate (1) impedance (2) the current (3) power factor (4) power absorbed.
15.	A Capacitor C is in series with a 75 Ω resistor and a 12 H inductive coil across a 220 V, 60 Hz supply. Determine the value of C that resonate the circuit.
16.	A coil having a resistance of 7 ohm and an inductance of 31.8mH is connected to 230V, 50Hz supply. Calculate (i) the circuit current (ii) phase angle (iii) power factor (iv) power consumed v) Reactive power
17.	In an R-L-C parallel circuit, derive expressions for impedance, admittance, and power factor. Discuss the voltage-current phasor diagram for the circuit.
18.	In a series circuit containing pure resistance and a pure inductance, the current and the voltage are expressed as $i(t)=5\sin(314t+2\pi/3)$ and $v(t)=15\sin(314t+5\pi/6)$. Calculate the average power drawn and power factor of the circuit.
19.	Two impedance $Z1 = (8 + j6)$ and $Z2 = (3 - j4)$ are in parallel. If the total current of the combination is 25 A, find the current taken and power consumed by each impedance.
20.	Three identical coils are connected in star to a 200-V, three-phase supply and each takes 500 W. The power factor is 0.8 lagging. What will be the current and the total power if the same coils are connected in delta to the same supply?
21.	Explain the power triangle and derive the relationship between active, reactive, and apparent power.
22.	A 10 Ω resistance and a capacitor of 50 μf are connected in series across a 230 V , 50 Hz a.c supply. Find the impedance, current, power factor , Reactive power, and Active power of the circuit
23.	Explain the concept of impedance, admittance, conductance, and susceptance in AC circuits.
24.	A 10 ohms resistor and a 20 mH inductor are connected in series across a 230 V 50 Hz supply. Find the circuit impedance, Current, Active Power, Apparent Power and Reactive Power.
25.	A 3-phase AC circuit has a line voltage of 400 V and a line current of 20 A with a power factor of 0.9 lagging. Calculate the total active power, reactive power, and apparent power. Compare the results with a single-phase system.