**Question Bank (I-Scheme)**

**Name of course: Electrical Circuits Unit Test: I**

**Subject code: 22324 (ECI) Semester: III Program: EE**

**Chapter 1: Single phase A.C Series circuits (15 M)**

1. **Marks**

1.Draw impedance triangle for R-C series circuit. Write nature of power factor of this

circuit.

2. Define impedance and reactance related to single phase AC series circuit. Give the

units of both.

3. Define quality factor of series A.C. circuit.

4. Convert (i) Z = 6 + j8 Ω in polar form. (ii) Z= 200∠600 in rectangular form

**4 Marks**

1. Explain the Generation of single phase ac supply by an elementary alternator with neat diagrams.
2. Define Active Power, Reactive Power, Apparent Power and Draw its Power triangle.
3. Write down the equations for voltage, current and Impedance of a series RC circuit connected across ac supply. Also draw its circuit diagram, waveforms and vector diagram.
4. A series RL Circuit has R=25Ω, L=25mH. Find Inductive Reactance, Impedance, current and Power factor of the circuit across 230V, 50Hz supply.
5. Find active, reactive and apparent power and power factor of the A.C. Series circuit

consisting of R= 1 ohm, L=0.001 Henry and C= 1 microfarad supplied with 100 volt,

50 Hz power supply.

1. A coil of resistance 50 Ω and inductance of 0.1 H is connected in series with 100 mF capacitor. The combination is supplied with 230 V, 50 Hz A.C. supply. Calculate i) voltage across each, ii) current through the circuit, iii) power factor and iv) draw complete vector diagram.
2. An inductive coil (10 + j40) Ω impedance is connected in series with a capacitor of 100 μF across 230 V, 50 Hz, 1-Phase supply mains find :

(1) Current through the circuit

(2) P.F. of the circuit

(3) Power dissipated in the circuit

(4) Draw phasor diagram

8. An a.c. series circuit has a resistance of 10 Ω, an inductance of 0.2 H and a capacitance of 60μF.Calculate: (a) resonant frequency (b) current (c) power at resonance. Applied voltage is 200 V.

9. An inductive coil having resistance of 5 Ω and inductance of 0.2 H is connected in series with a capacitor of 20μF. If this combination is connected to 230 V, variable frequency supply, determine :(i) Resonant Frequency (ii) Quality factor (iii) Current at resonance (iv) Voltage across inductive coil at resonance

**Chapter 2: Single phase A.C Parallel circuits (13M)**

**2 Marks**

1. Define Susceptance. write its unit.

2. Define admittance and conductance in relation with parallel circuits. Give formulas

for the same.

3. Define Quality Factor for parallel resonance. Give equation of it.

4. What is current magnification in parallel R-L-C circuit.

**4 Marks**

1. A voltage of 200 ∠ 53° is applied across two impedances in parallel. The values of impedances are (12 + j16) and (10 – j20). Determine the kVA, kVAR and kW in each branch and power factor of the whole circuit.

2. Two impedances (12 + j16) and (10-j20) Ω are connected in parallel across a supply of 200∠60° using admittance method calculate branch currents, total current and power factor of whole circuit.

3. A coil having resistance of 5 Ω and inductance of 0.2H is arranged in parallel with another coil having resistance of 1 Ω and inductance of 0.08 H. Calculate the current through the combination and power absorbed when a voltages of 100 V, 50 Hz is applied. Use impedance method.

4. Impedances Z1 = (10 + j5) Ω and Z2 = (8 + j6) Ω are connected in parallel across V = (200 + j0). Using the admittance method, calculate circuit current and the branch currents.

5. A coil having resistance of 5 Ω and inductance of 0.2H is arranged in parallel with capacitor of 50 μF. Calculate the current through the combination and power absorbed when a voltages of 100 V, 50 Hz is applied. Use impedance method.

6. Compare series resonance to parallel resonance on the basis of

(i) Resonant Frequency (ii) Impedance (iii) Current (iv) Magnification

**Chapter 3: Three phase circuits (13M)**

1. **Marks**

1. Draw the sinusoidal waveform of 3-phase emf and also indicate the phase sequence.

2. Define balanced and unbalanced load in case of poly phase circuits.

3. Draw a neat circuit for star connected load. also indicate currents and voltages

1. **Marks**
2. Give four advantages of poly phase circuits over 1-phase circuits.

2. Each phase of a delta-connected load comprises a resistor of 50 Ω and capacitor of 50 μF in series. Calculate the line and phase currents when the load is connected to a 440 V, 3 phase 50 Hz supply. also find power factor and power consumed.

3**.** State relationship between line voltage and phase voltage, line current & phase current in a balanced star connection. Draw complete phasor diagram of voltages & current.

4.In a 3 phase star connected system, derive the relationship VL = √3 Vph.

5. A Symmetrical, 3-phase,400v system supplies a balanced load of 0.8 lagging power factor and connected in star. If the line current is 34.64 A , find: i)impedance ,ii) resistance and reactance per phase iii) total power and iv) total reactive volt-amperes.

6. Explain ‘Neutral Shift’ in case of 3-phase star-connected unbalanced load.

7. Three equal impedances having R = 20 Ω in series with C = 50 μF, are connected in delta across 415 V, 3-ph, 50 Hz AC supply. Determine : (i) Impedance per phase

(ii) Phase and line currents (iii) Total 3-ph power consumed by load.