GANPAT UNIVERSITY
U. V. PATEL COLLEGE OF ENGINEERING
B.TECH. SEM-I
2ES103: BASIC OF ELECTRICAL ENGINEERING
A.C.CIRCUITS - II
3: ASSIGNMENT &TUTORIAL

Part – I Multiple Objective Questions (MCQ)

1. The Power- factor at resonance in R-L-C circuit is

A)	Zero	**B)**	Unity
C)	0.5 lagging	**D)**	0.5 leading

2. In a series RLC circuit at resonance, the magnitude of the voltage developed across the capacitor

A)	is always zero	**B)**	can never be greater than the input voltage
C)	can be greater than the input voltage, however it is 90% out of phase with the input voltage	**D)**	Can be greater than the input voltage, and is in phase with the inputvoltage.

3. At series resonance, the voltage across L or C is

A)	Equal to applied voltage	**B)**	Less than applied voltage
C)	Much more than applied voltage	**D)**	Equal to voltage across R

4. A 12 ohm resistor, a 40 µF capacitor, and an 8 mH coil are in series across an ac source. The resonant frequency is

A)	28.1 Hz	**B)**	281 Hz
C)	2810 Hz	**D)**	281 KHz

5. The impedance at the resonant frequency of a series *RLC* circuit with L = 20 mH, C = 0.02 F, and R= 90 ohm is

A)	0 ohm	**B)**	90 ohm
C)	10 ohm	**D)**	40 ohm

6. The dynamic impedance of a parallel resonant circuit is 1 MΩ. If C = 1 µF and R = 1 Ω, then value of L is

A)	1 H	**B)**	10^{12} H
C)	10^{-12} H	**D)**	None of the above

7. 47 ohm resistor and a capacitor with 150 ohmof capacitive reactance are in series across an ac source. The impedance, expressed in rectangular form, is

A)	$Z = 47 + j150$ ohm	**B)**	$Z = 47 - j150$ ohm
C)	$Z = 197$ ohm	**D)**	$Z = 103$ ohm

8. A 1.5 kΩ resistor and a coil with a 2.2 kΩ inductive reactance are in series across an 18 V ac source. The power factor is

A)	0.564	**B)**	0.664
C)	0.764	**D)**	0.864

9. A parallel resonant circuit magnifies

A)	Current	**B)**	Voltage
C)	Both voltage & current	**D)**	None of the above

10. An RLC series resonant circuit has a Q of 50 and source voltage of 5 V. The voltage V_C across the capacitor is

A)	10 V	**B)**	250 V
C)	125 V	**D)**	500 V

Part – II Shorts Questions(1 & 2 Marks)

1. State the condition for series R-L-C resonance circuit. Derive the equation for resonant frequency.
2. Compare series and parallel resonance.
3. List out various methods to solve parallel circuit.
4. Define: Admittance, Susceptance.
5. Draw phasor diagrams for the followings under resonance condition (i) R-L-C series circuit and (ii) Parallel R-L-C circuit

Part – III Examples

1. A resistance of 20 Ω, an inductance of 0.2 H and a capacitance of 100 μF are connected in series across 220-V, 50-Hz mains. Determine the following (a) impedance (b) current(c) voltage across R, L and C (d) power in watts and VA (e) p.f. and angle of lag.
   Ans: (a)37ohm(b)6A(c)Vr=120V,Vl=278V,Vc=192V(d)713W(e)pf=0.54

2. Two impedances Z1 and Z2 when connected separately across a 230-V, 50-Hz supply consumed 100 W and 60 W at power factors of 0.5 lagging and 0.6 leading respectively. If these impedances are now connected in series across the same supply, find : (i) total power absorbed and overall p.f. (ii) the value of the impedance to be added in series so as to raise the overall p.f. to unity.
   Ans: (i) P=99W, p.f=0.92 (ii)195ohm

3. A coil having an inductance of 50 mH and resistance 10 Ω is connected in series with a 25 μF capacitor across a 200 V ac supply. Calculate (a) resonance frequency of the circuit (b) current flowing at resonance and (c) value of Q0 by using different data.
   Ans(a)142.3Hz(b)20A(c)4.47

Part – IV Long Questions **(Only For Preparation)**

1. Discuss resonance in R-L-C series circuit. Explain how pf, X_L and R vary with frequency.
2. Draw and explain the Admittance triangle.
3. Explain the condition for parallel resonance and obtain the equation for resonance frequency.
4. Draw and explain the Phasor method.

***Notes: Students have to write only Part I, Part II and Part III.**