OBJECTIVE TYPE QUESTIONS

Q1 What is the main difference while applying Kirchhoff's Laws to d.c circuits, and a.c. circuits using the meter readings?

Ans: For d.c. circuits algebraic sum is required.
For a.c. circuits phasor sum is required.

Q2 A choke (inductive coil) is rated at 110Volts. what do you expect if it is connected to a 220Volts supply, the other data remaining same

Ans: Due to the doubled voltage, the core flux will have to be approximately doubled, since the applied voltage ≃ induced emf = $4.44 f \Phi_m N$
where f = supply frequency,
Φ_m = Peak value of the flux.
N = Number of turns of the coil.
Due to increase in the core flux, the core loses also increase considerably To establish double the normal flux, the current required will be very large. This is dangerous for the winding. Further the winding insulation is also strained more due to higher voltage.

Q3. If the number of turns on a choke coil are doubled what happens to its self inductance? Comment.

Ans: Since self inductance is proportional to square of number of turns $L_1 \propto N^2$ and $L_2 \propto (2N)^2$ with doubled turns. Thus $L_2 = 4L_1$

Q4. What are the power input and power factor at resonance in a series RLC circuit?

Ans: Power input = $\frac{V^2}{R}$; power factor is unity.

Q5. At the two half power frequencies, comment on the power factor

Ans: Power factor is $\frac{1}{\sqrt{2}}$ both at f_1 and f_2. It is leading at f_1 and lagging

Q6: what is the application of a series resonant circuit?

Ans: Since the current is maximum at f_0 and accordingly the voltage V_L and V_C are large, the series circuit is used as a filter which is a circuit to select (for passing through this circuit) some frequencies

Q 14. For the two wattmeter method for a balanced load, ha... calculate phase angle ϕ of the load?

Ans Phase angle ϕ of the load is given by $\tan\phi = \sqrt{3}\left(\frac{W_2 - W_1}{W_1 + W_2}\right)$

Q 15. Is it always possible to operate at maximum power transfe... condition?

Ans No. specially with low impedance sources. Further the power ... devices cannot be operated at efficiencies so low as 50%, wh... in the efficiency under P_{max} condition.

Q 16. What is the condition under which the superposition theorem can be applied?

Ans Linearity of the circuit elements and bilateral behaviour.

Q 17. What is the expression for energy stored in an inductive coil

Ans Energy stored = $\frac{1}{2}LI^2$ Joules.

Q 18. What is the expression for energy stored in a capacitor?

Ans Energy stored = $\frac{1}{2}CV^2$ joules.

Q 19. In a purely inductive circuit what is the power dissipated?

Ans Zero.

Q 20 In a purely capacitive circuit what is the power dissipated?

Ans zero.

Q 21 A choke coil having resistance R is in parallel with a capacit... What is the resonant frequency?

Ans $f_r = \frac{1}{2\pi}\sqrt{\frac{1}{LC} - \frac{R^2}{L^2}}$ Hz. where L = self inductance of the coil

Q 22 Can you apply reciprocity theorem for a network having two sour...

Ans No. Reciprocity theorem can be applied to only single source net...

Q 23 In a series RLC circuit, is the resonant frequency dependent on resistance.

Ans No. Because $f_0 = \frac{1}{2\pi\sqrt{LC}}$ Hz.

What is the precaution to be taken while working with the R-L-C series circuit?

Ans: The current may be very large, damaging the resistor and the coil of the inductor. The voltages V_L and V_C also may be excessive damaging the capacitor. To limit these values, a suitable resistor must be put in the circuit.

Q8: Express $f_2 - f_1$ in terms of the circuit parameters of RLC series circuit

Ans: $f_2 - f_1 = \frac{R'}{2\pi L} = \frac{1}{2\pi}\left(\frac{R}{\omega_0 L}\right)\omega_0 = \frac{f_0}{Q_0}$ where $Q_0 = \frac{\omega_0 L}{R}$

Q.8: In a 3phase balanced system if the line to line voltage is 415 Volts what will be line to neutral voltage?

Ans: Line to neutral voltage $= \frac{415}{\sqrt{3}} = 240$ Volts.

Q.9. Out of the supply terminals namely R, Y, B and N which has a potential nearly equal to the ground potential?

Ans: Neutral terminal.

Q.10. How many phase sequences are possible in a 3phase system?

Ans: only two phase sequences namely RYB and RBY.

Q.11. A 415 Volt, three phase, four wire, distribution system has a balanced load of 2.3KW in each phase. Calculate the neutral wire current

Ans: ZERO.

Q12. With what type of load, will the two wattmeter readings be equal and of same sign?

Ans: For purely resistive loads, under balanced conditions.

Q13. For a three phase, 4 wire unbalanced load, can you use the two wattmeter method?

Ans: No: since $i_R + i_Y + i_B \neq 0$

Q24: What do you mean by half power frequencies in a series resonant circuit?

Ans: There are two frequencies f_1 and f_2 on either side of the resonant frequency at which the equivalent reactance is equal to the resistance. At these frequencies $I = \frac{I_{max}}{\sqrt{2}}$ and power is half of the power at resonance. Hence f_1 and f_2 are called half power frequencies in terms of power at resonance.

Q25 What is the relationship between the reactance and resistance at half power frequencies in a series resonant circuit?

Ans At f_1 and f_2, $X = X_L \sim X_C$ is equal to resistance R.

Q26 Define bandwidth for a series resonant circuit

Ans Bandwidth is the frequency separation $(f_2 - f_1)$ between the half-power points.

Q27 In a series R-L circuit energised by a constant alternating voltage what is the locus of impedance if any one element is varied over a wide range?

Ans If resistance is varied keeping inductance constant, the locus of impedance is a straight line parallel to the real axis.
If inductance is varied keeping resistance constant, the locus of impedance is a straight line parallel to imaginary axis.

Q28 In a series R-L circuit what is the locus of admittance if any one element is varied over a wide range?

Ans: When R alone is varied the locus of admittance is a semi circle with $\frac{1}{X_L}$ as diameter. When R is constant and X_L is varied the locus of admittance is a semicircle with $\frac{1}{R}$ as diameter.

29: In a series R-L circuit what is the locus of current if any one element is varied over a wide range?

Ans: When a constant voltage V, constant frequency supply, is connected across R-L circuit, the current (which is proportional to admittance) has a locus which is a semicircle with $\frac{V}{X_L}$ as diameter when R alone is varied. If R is constant and X_L is varied then also current locus is a semicircle with $\frac{V}{R}$ as diameter.

I Sem B.E Electrical Laboratory

Viva-Voce Questions

1. Fluorescent lamp
   A) What is the function of Choke and Starter?
   B) How Fluorescent lamp works?
   C) What is the function of Capacitor?
   D) How to find given wattmeter constant?
   E) What is real power, apparent power and reactive power?
2. KCL & KVL
   A) Is KCL & KVL applicable to both DC and AC circuits?
   B) What do you mean by sign convention in KVL?
   C) Give the statement of KVL.
3. Measurement of L
   A) Define self inductance and mutual inductance.
   B) The inductance of the coil depends on what factors.
   C) Three voltmeter method – AVW method, in which we get most accurate value of L?
   D) Define coefficient of coupling.
   E) Define impedance and power factor.
4. Semiconductor diode
   A) Difference between Silicon and Germanium diode.
   B) Mention few applications of Diode.
   C) How to find forward resistance of diode?
5. OC & SC Test on transformer
   A) Why transformer rating is in KVA?
   B) What are the losses occur in Single phase transformer?
   C) How to minimize eddy current and hysteresis loss?
   D) How to minimize copper loss?
   E) What is the condition for maximum efficiency?
   F) To find % regulation which test will be conducted.
   G) Define % regulation and efficiency.
   H) Differentiate between core type and shell type.
   I) What is the use of conducting OC & SC tests?
6. Open circuit characteristics of DC generator
   A) What is residual voltage?
   B) Define critical field resistance.
   C) What are the conditions to be fulfilled for building up voltage in a DC generator?
   D) Why 14 ohms is kept at cut-in position?
   E) Mention few applications of DC shunt generator.
   F) What is relation between flux and speed in a DC generator?
   G) Write emf equation of DC generator for LAP and WAVE connections.
7. Speed control
   A) In which speed control we can vary the speed of DC motor more than its rated speed?
   B) Mention few applications of DC series motor, shunt motor.
   C) What is difference between armature control and flux control?
8. Three phase Star delta
   A) Advantages of three phase circuits.
   B) In which connection we get neutral voltage.
   C) Write expression for three phase power.
   D) Differentiate between star and delta connection.
9. Transistor
   A) Mention few applications of NPN transistor.
   B) If its base current is zero what is collector voltage?
   C) What is the use of input and output characteristics?
10. Op-Amp
    A) Mention few applications of Op-Amps.
    B) What is virtual ground?
    C) Write the characteristics of Op-Amp.