Ajay Kumar Garg Engineering College, Ghaziabad
Department of Electrical &Electronics Engineering
SESSIONAL –II

Subject: Electrical Engineering

Semester: I

MM: 50

Sub Code: REE-101

Branch: CS /EN/EI/IT

Time: 2 Hour

NOTE: Attempt all question.

SECTION –A

Q1. Attempt all the parts.   (5x2=10)

(a) What are the disadvantages of low power factor?

(b) State maximum power transfer theorem as applied to AC circuits.

(c) Two wattmeters connected to measure the input to balanced three-phase circuit, indicates 2500 and 500 W respectively. Find the total power supplied and the power factor of the circuit when the latter reading is obtained after reversing the connections of the current coil.

(d) Mention four analogies between electrical circuit and a magnetic circuit.

(e) Define half power frequencies and bandwidth with respect to RLC resonant circuit.

SECTION B

Q2. Attempt all the parts.   (5x5=25)

(a) For the circuit shown in Fig.1, find   (i) Branch currents   (ii) Total current in the circuit
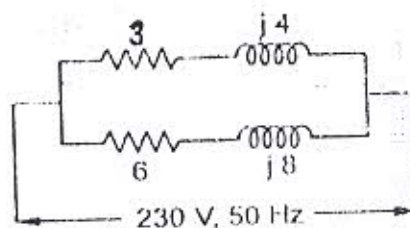(iii) Power drawn by the source   (iv) Reactive power.

Fig.1

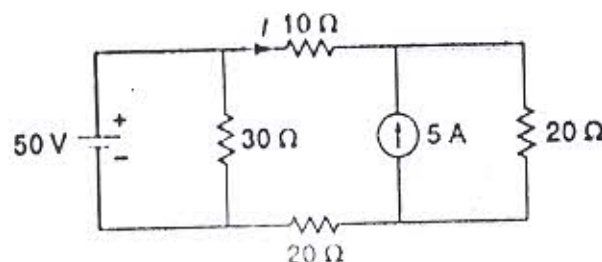(b) Find the current in 10Ω resistance using superposition theorem for the circuit shown in fig.2.

Fig.2

(c) One branch of a parallel circuit consists of a coil of inductance 0.05H and effective resistance of 5 Ω and the other branch has a 0.1 μF capacitor. Calculate (a) Resonant frequency (b) Dynamic impedance (c) Q-factor

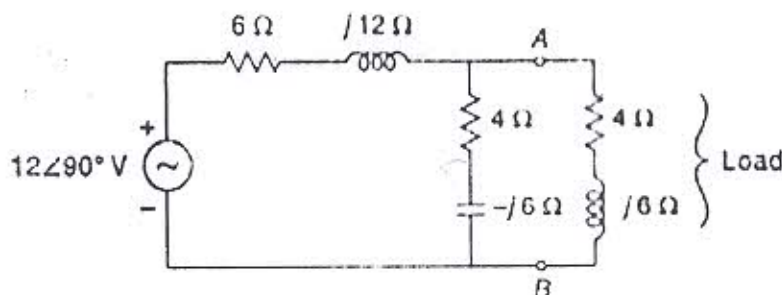(d) Find the current through the load as shown in fig 3 using Thevenin's theorem

Fig: 3

(e) An iron ring of 8 cm mean diameter is made up of round iron of diameter 1 cm and permeability of 900 has an air gap of 2mm wide. It consists of winding with 400 turns carrying a current of 3.5A. Find (i) MMF (ii) Total reluctance (iii) Flux (iv) Flux density in ring

SECTION- C

Q3. Attempt all the parts. (7.5x2=15)

(a) Show that three phase power can be measured using two wattmeter method for a balanced three phase star connected load with lagging power factor. Also derive the expression for power factor using two wattmeter readings.

(b)(1) The voltage and current of an R-L-C series circuit are: (4)
$V = 141.4 \sin(314t + 45^0)$ V and $i = 28.28 \sin(314t - 15^0)$A. Find:
(i) Power factor (ii) Power consumed (iii) Impedance (iv) Circuit constants.

(2) Three similar coils each having series resistance of 20Ω and capacitance 100μF are connected in star to a 3-phase, 400V, 50 Hz balanced supply. Find the (i) line current (ii) power factor (iii) total KVA (iv) total KW. (3.5)

Ajay Kumar Garg Engineering College, Ghaziabad

Department of EN

Sessional Test -2

Course : B.Tech   Semeseter: I

Session: 2017-18   Section : CS-1,2,3 EN-1,2 IT-1,2 EI

SUBJECT : Basis Elect. Engg.   Sub. Code : REE-101

Maximum Marks : 50   Time :2 Hours

Section A

**A.   Attempt all the parts.**   (5*2=10)

1. State Thevenin's theorem
2. Define quality factor and bandwidth.
3. What are the causes of low power factor?
4. Define phase sequence for a three phase system.
5. Two wattmeter are used to measure three phase power. If one wattmeter reads zero, then what is the power factor of the load?
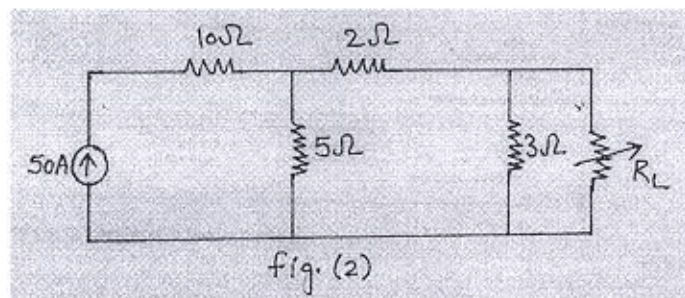
Section B

B.   Attempt all the parts.   (5*5=25)

6. Find the current flowing through 12Ω resistance in fig. (1) using Norton Theorem.

fig. (1)
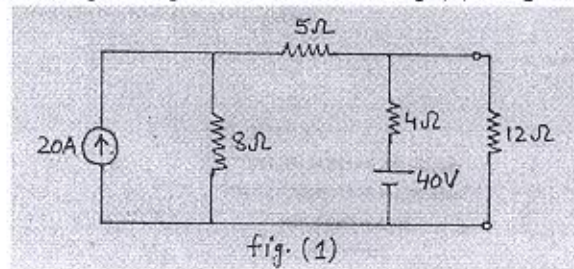
7. Determine the maximum power delivered to load in the circuit as shown in fig. (2)

fig. (2)

8. A coil connected across a 250 V, 50 Hz supply takes a current of 10 A at 0.8 p.f. (lagging). What will be power taken by choke coil when connected across 200 V, 25 Hz supply. Also calculate resistance and inductance of the coil. H

9. Derive the expression for resonant frequency and quality factor for parallel resonance. L

10. Three identical coils, each of (4.2+j5.6) Ω are connected in star across 415 V, three phase, 50 Hz supply. Find (i) Phase voltage (ii) phase current (iii) Two wattmeter readings when they M are connected to measure three phase power.

Section C

C. **Attempt all the parts.**   **(2*7.5=15)**

11. Three similar choke coil are connected in star to three phase supply. If the line current is 15 A, total power consumed is 11kW and volt-ampere input is 15 kVA, find line and phase voltages and reactance and resistance of each coil.

    If these coils are now connected in delta, calculate phase and line current, active and H reactive power.

12. Determine the current through (2+j5) Ω impedance shown in fig. (3) by using superposition theorem.

fig. (3)