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B.Tech. Examination, 2015

(Second Semester)

(ME & EC Branches)

Paper - II

ELECTRICAL ENGINEERING

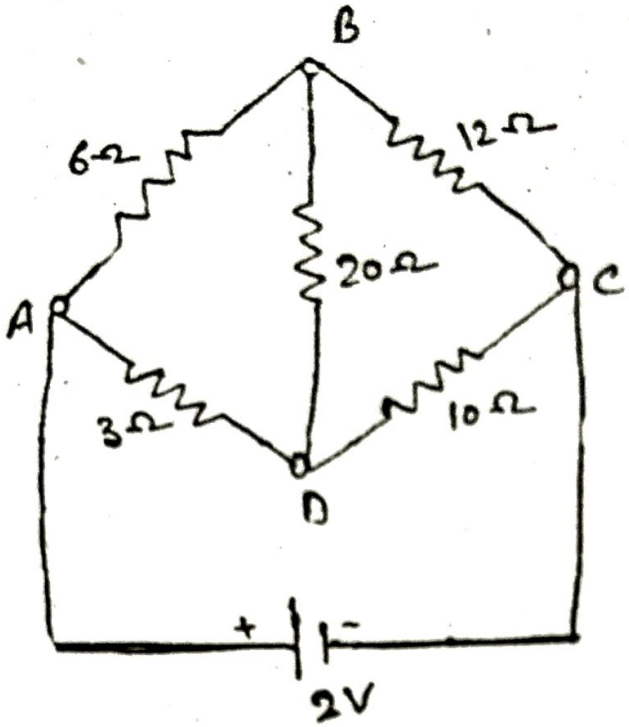
Time Allowed : Three Hours

Maximum Marks : 100

Note : Attempt any five questions.

Q. 1. (a) State and prove maximum power transfer theorem for dc networks.

(b) Determine the current in 20 Ω resistor of the network shown in fig. (a) by Thevenin's theorem.



Q. 2. (a) A circuit consists of a non-inductive resistor of 10 Ω an inductor of 0.1 H and capacitor of 8 μF in series. Calculate :

(i) The resonant frequency

(ii) The current at resonant frequency

(iii) The voltage across each component when a voltage of 25 V at resonant frequency is applied to the whole circuit.

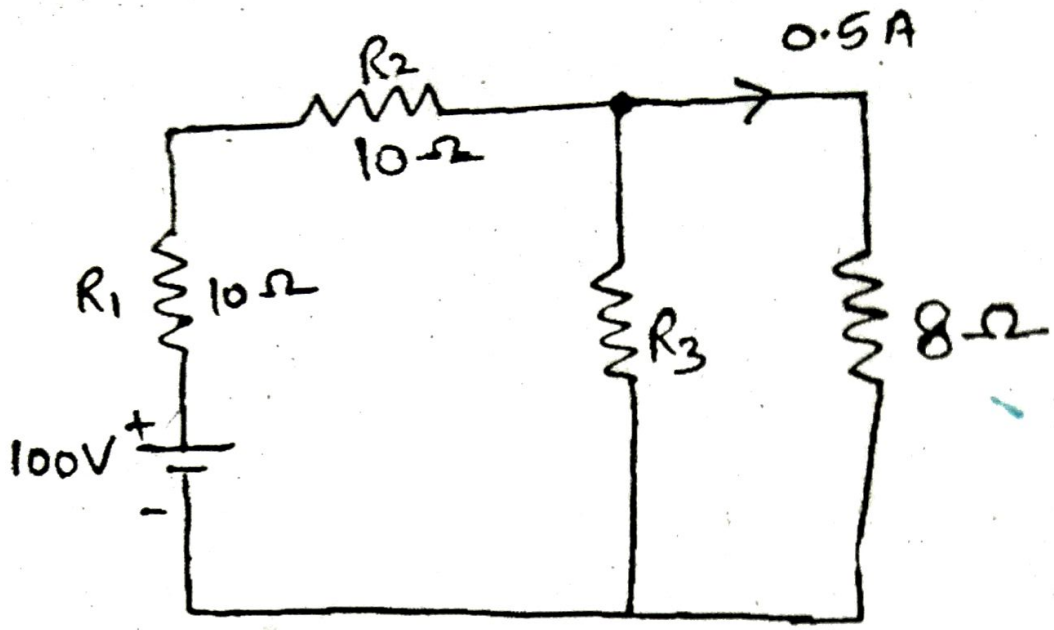
(b) Explain series RLC circuit with phasor diagram and also derive the expression of impedances.

Q. 3. (a) Calculate the line current of a three alternator delivering 5 MW at 33 KV and working at 0.8 power factor.

(b) Why power factor improvement is important ? What are causes and problems of low power factor ? How power factor can be improved ?

Q. 4. (a) Discuss the construction and working principle of PMMC type measuring instruments.

(b) Find the voltage drops across R_1 and R_2 in fig. The resistance R_3 is not specified.



Q. 5. (a) Draw and explain the B-H curves for air and a magnetic material and also compare magnetic and electric circuits.

(b) Explain the construction and working principles of single phase transformers.

Q. 6. (a) A 3300 / 250 V, 50 Hz single phase transformer is built on a core having an effective cross sectional area of 125 cm^2 and 70 turns on the low voltage winding. Calculate :

Q. 7.

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(i) The value of the maximum flux density.

(ii) The number of turns on the high voltage winding.

(b) Draw a layout of a power supply network showing various voltage levels.

Q. 7. (a) A 3-phase, 6 pole, 50 Hz induction motor has a slip of 1% at no load and 3% at full load. Determine :

(i) Synchronous speed

(ii) No-load speed

(iii) Full load speed

(iv) Frequency of rotor current at stand still

(v) Frequency at rotor current at full load

(b) Explain the type of DC motor.

Q. 8. (a) Explain the slip torque characteristics of three phase induction motor.

(b) Describe briefly the construction and working of a synchronous generator.

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B.Tech. Examination, 2014

(Second Semester)

(ME & EC Branches)

Paper - II

ELECTRICAL ENGINEERING

Time Allowed : Three Hours

Maximum Marks : 100

Note : Attempt any five questions.

Q. 1. (a) (i) Determine the average value, effective value and form factor of a sinusoidally varying alternating current whose half wave is rectified in each cycle.

(ii) By taking an example of Thever
theorem, how Norton's equivalent ca
achieved with Thevenin's equivalent.

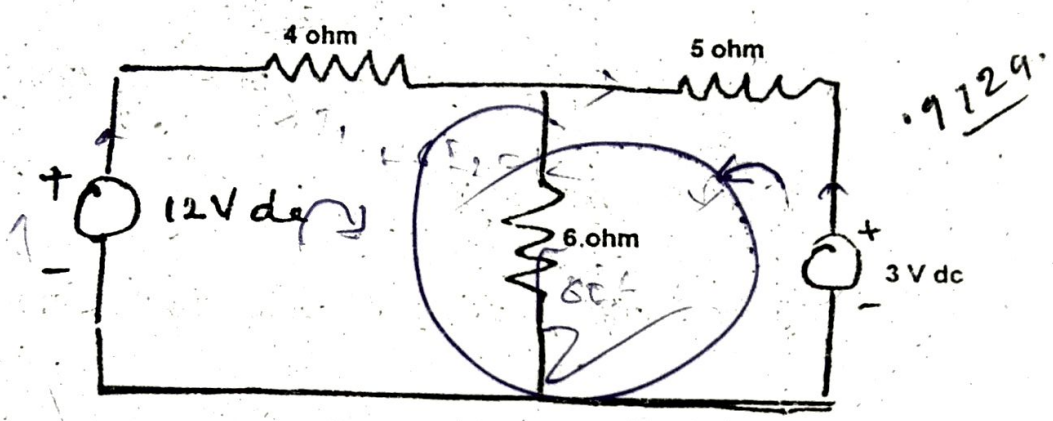
(b) A non inductive resistance of 10 ohm
connected in series with an inductive
across 200 V, 50 Hz ac supply. The cur
drawn by the series combination is 10 An
The resistance of coil is 2 ohm. Determine

(i) Inductance of the coil

(ii) Power factor

(iii) Voltage across the coil

Q. 2. (a) Use Norton theorem to find the current in 6 ohm resistor in the circuit given below. State the Norton theorem also.



(b) Derive the relationship between line and phase voltage/current in star/delta connected system. Compare star and delta connection.

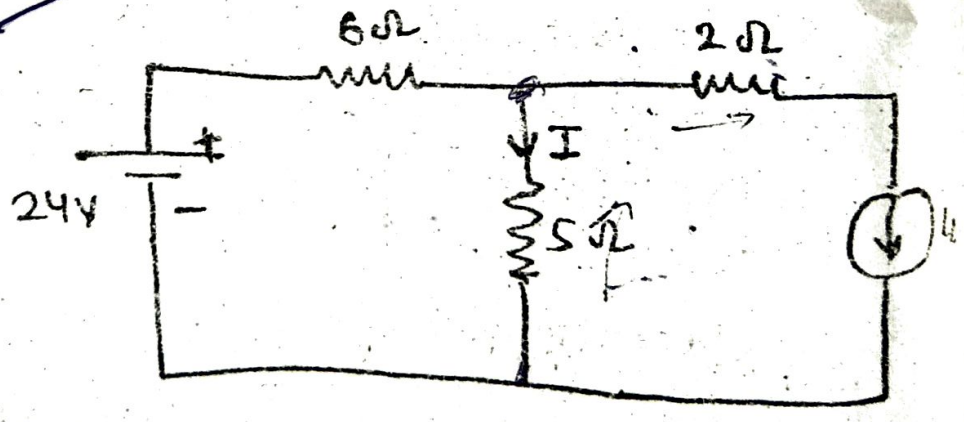
Q. 3. (a) Explain the principle operation and application different types of instruments used for

measurements. Give the use of shunt a
series multipliers.

(b) Explain equivalent circuit of single pha
transformer. How the parameters of it
determined ? Define efficiency and state wh
it will be maximum ?

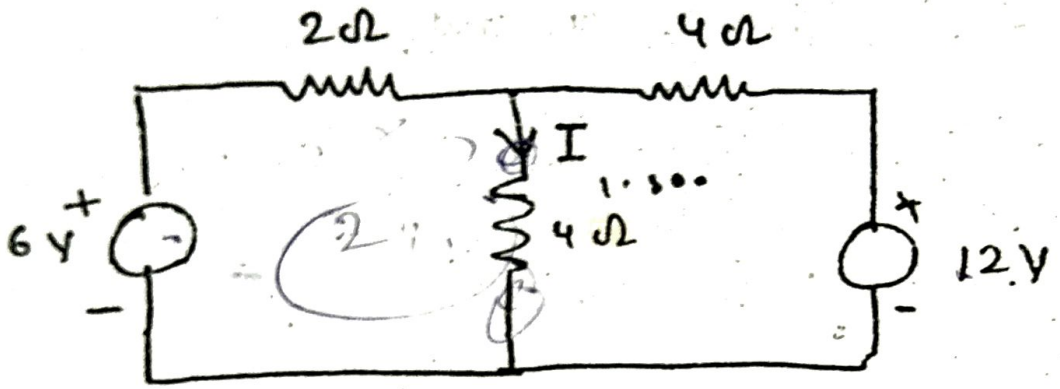
Q. 4. (a) Explain the working of auto transform
Derive the expression of EMF in DC generat
Give the applications of DC generators.

(b) (i) Find the current in the following circuit.



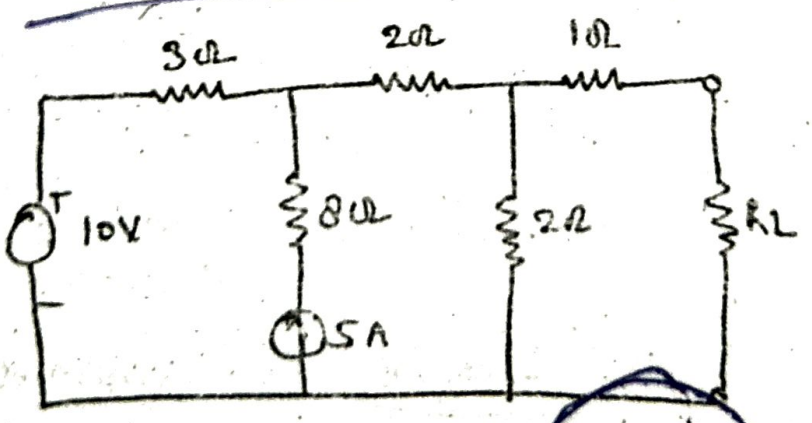
m = 3(2-1
= 2

(ii) Find the current I using Thevenin's theorem in the following circuit.



Q. 5: (a) Explain maximum power transfer theorem.

Using this theorem find the value of load resistance R_L for maximum power flow through it in the given figure.



(b) Explain the working of single phase induction type of energy meter with neat diagram.

Q. 6. (a) For star connected system in a 3 phase circuit prove that $V_L = \sqrt{3}\ V_{ph}$ and $I_L = I_{ph}$.

A 3 phase, 400 V supply is connected to a 3-phase star connected balanced load. The line current is 20 A and the power consumed by the load is 12 kW. Calculate the impedance of the load, phase current and power factor.

(b) Explain the methods to measure power in 3 phase circuits. In a 3 wattmeter method power measured was 30 kW at 0.7 pf lagging. Find the reading of each wattmeter.

Q. 7. (a) Explain the external load characteristics of DC shunt generator by drawing suitable diagram. Why voltage drop occurs when it is loaded ? Give the conditions of voltage facture.

(b) Explain the working principle of synchronous motor. Draw V-curve and give its applications.

Q. 8. (a) Rotor of 3 phase induction motor cannot run at synchronous speed. Explain a three phase slip ring, 4 pole induction motor has rotor frequency 2.0 Hz while connected to 400 V, 3 phase, 50 Hz supply. Determine slip and rotor speed.

(b) Why single phase induction motor is not self starting ? Explain the method for starting single phase induction motor.

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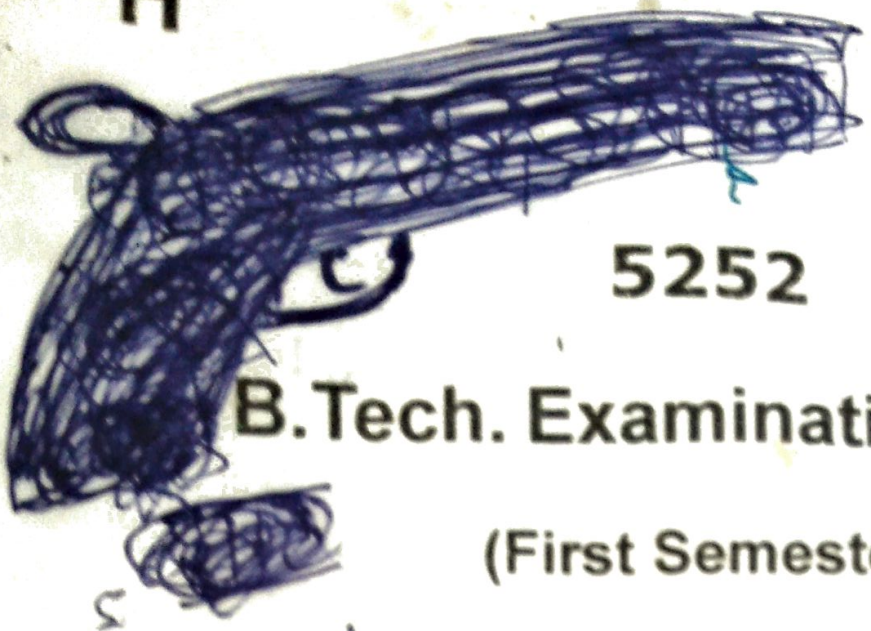

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B.Tech. Examination, 2013

(First Semester)

(C. S. and I. T. Branch)

Electrical Engineering

ELECTRICAL ENGINERRING

Paper - II

Time : Three Hours] **[Maximum Marks : 100**

Note :– Attempt **any five** question.

1. (a) Prove that maximum power transfer occurs in a d.c. network when the resistive load is equal to the Thevenin equivalent resistance of the network. Also determine the maximum power transferred and the efficiency at maximum power. 10

(b) State and explain Thenenin's theorem. Replace the Network of Fig. 1 to the left of terminals AB by its Thevenin equivalent circuit. Hence determine I.

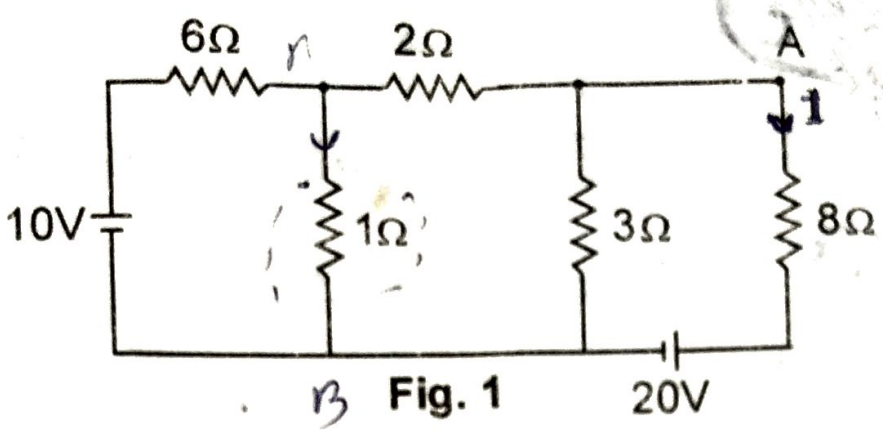

Fig. 1

2. (a) Find the value of current in 8Ω resistor of the network shown in Figure 2, using Mesh current method.

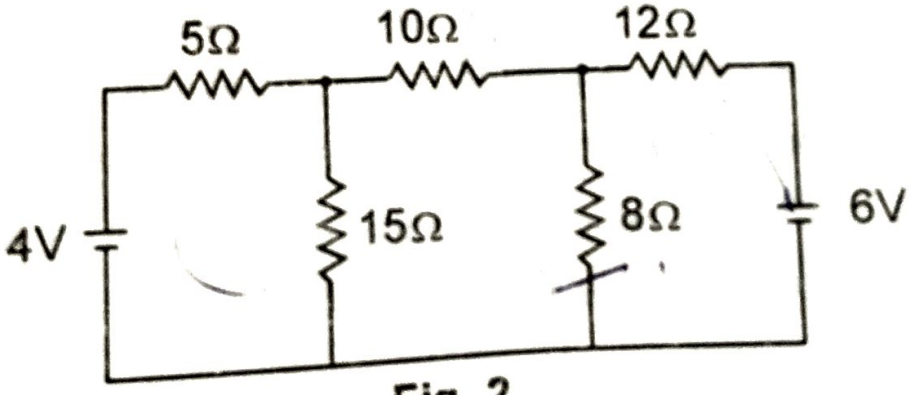

Fig. 2

(b) Three sinusoidal voltages acting in series are given by : 10

$V_1 = 10 \sin(440\,t + 0)$

$V_2 = 10\sqrt{2} \sin(440t - 45^\circ)$

$V_3 = 20 \cos(440\,t + \pi/2)$

Determine :

(i) an expression for the resultant voltage.

(ii) the frequency and RMS value of the resultant voltage.

3. (a) A load having impedance of $1+j1\,\Omega$ is connected to an AC voltage represented as $v = 20\sqrt{2} \cos(wt + 100^\circ)$ volts.

(i) Find the current in load, expressed in the form of $i = I_m \sin(wt \div \phi)$ A.

(ii) Find real power consumed by the load.

(b) A series R-L-C circuit has R=10 Ω, L=0.1 H and C = 8 μF.

Determine :

(i) Resonant frequency

(ii) Q-factor of the circuit at reasonance

(iii) The half-power frequencies. 10

4. (a) Each phase of a delta-connected load has a resistance of 25 Ω, an inductance of 0.15 H and a capacitance of 120 μF in series. The load is connected across a 400 V, 50 Hz, 3-phase supply. Determine the line current, active power and reactive volt-amperes. 10

(b) Explain two wattmeter method to measure three phase power considering both delta as well as star connection. 10

5. (a) Explain the construction and working principle of repulsion type moving iron instrument. 10

(b) Explain working of single phase induction type energy meter with neat diagram. 10

6. (a) Discuss general layout of electrical power system and indicate standard transmission and distribution voltages at various points. 10

(b) Compare electric and magnetic circuits with respect to their similarities and dissimilarities. 10

7. (a) Draw the equivalent circuit and phasor diagram of a practical single phase transformer with lagging power factor load. 10

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2014

B.Tech. Examination, 2012

(Second Semester)

(ME & EC Branch)

Paper - II

ELECTRICAL ENGINEERING

Time Allowed : Three Hours

Maximum Marks : 100

Note : Attempt any five questions. Each question carry equal marks.

Q.1. (a) State and explain the "KIRCHHOFF'S LAWS" associated with circuit theory. Also mention its drawbacks.

(b) Consider the circuit shown in Fig. 1.

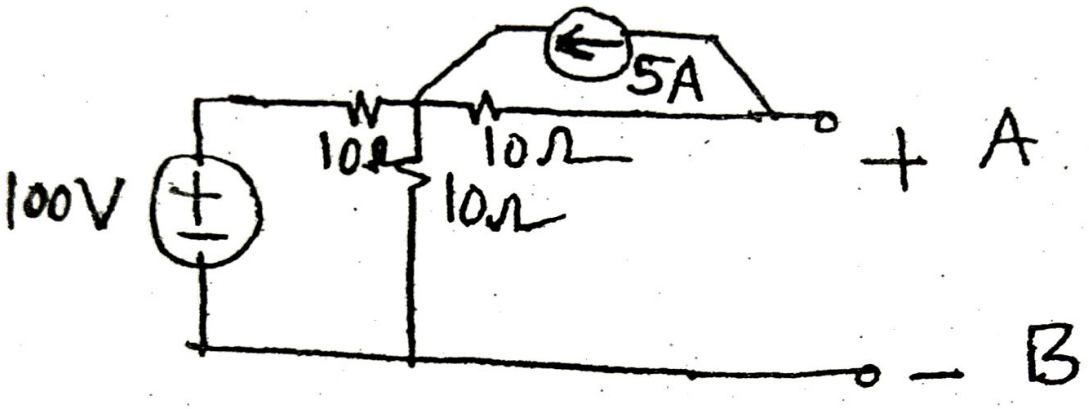

Fig. 1

(i) Determine the Thevenin's equivalent circuit across the AB terminals of above Fig. 1.

(ii) Also find the Norton's equivalent circuit from Thevenin's equivalent circuit as part (i).

(i) What should be the value of R_L for maximum power transfer from source to load ?

(ii) What is the value of maximum power transfer from source to load ?

(b) Consider the circuit shown as Fig. 4.

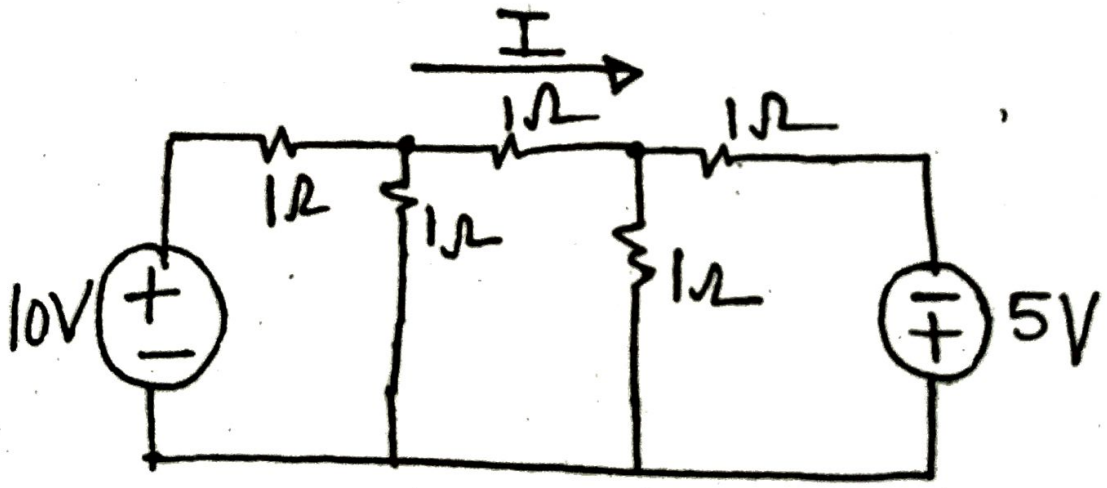

Fig. 4

Find the value of I in above circuit shown in

Fig. 4 by "SUPERPOSITION PRINCIPLE".

Q. 4. (a) Consider the series R-L circuit as shown in

Fig. 5.

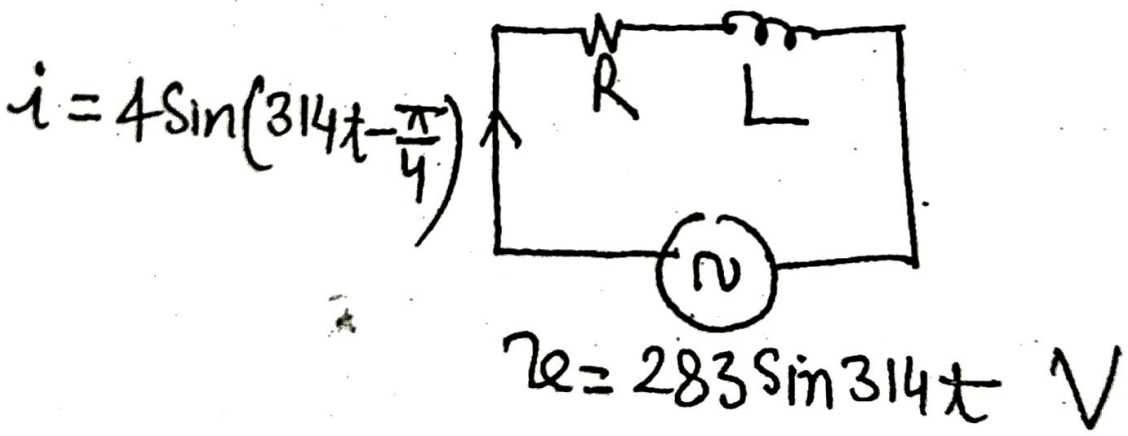

Fig. 5

Determine the value of R & L of above circuit

shown in Fig. 5.

Determine the following :

(i) Line current (I_L)

(ii) Phase voltage (V_{ph})

(iii) Real power & reactive power of load

(R = Q)

Q. 6. (a) What are the similarities and dissimilarities between "MAGNETIC CIRCUITS" and "ELECTRIC CIRCUITS" ? Also mention their significances.

(b) Explain the magnetizing current in 3-ϕ transformer is 2-6% of rated value whereas in case of 3-ϕ induc motors, the magnetizing current is 30-50% of rated value ? Explain in details.

Q. 7. (a) Write short notes on the following :

(i) Principle of electro-mechanical energy conversions.

(ii) Introduction to auto-transformers

(b) Derive the expressions for back e.m.f. and torque of D.C. machines. Also mention the importances of back e.m.f. in d.c. machines.

Q. 8. (a) (i) Explain why 3-ϕ INDUCTION MOTORS always runs at below the synchronous speed (N_s = 120 f/p) ?

Q. 5. (a) Write short notes on the following :

(i) Three phase AC circuits

(ii) MI type instruments

(iii) PMMC type instruments

(b) Consider the circuit shown in Fig. 7.

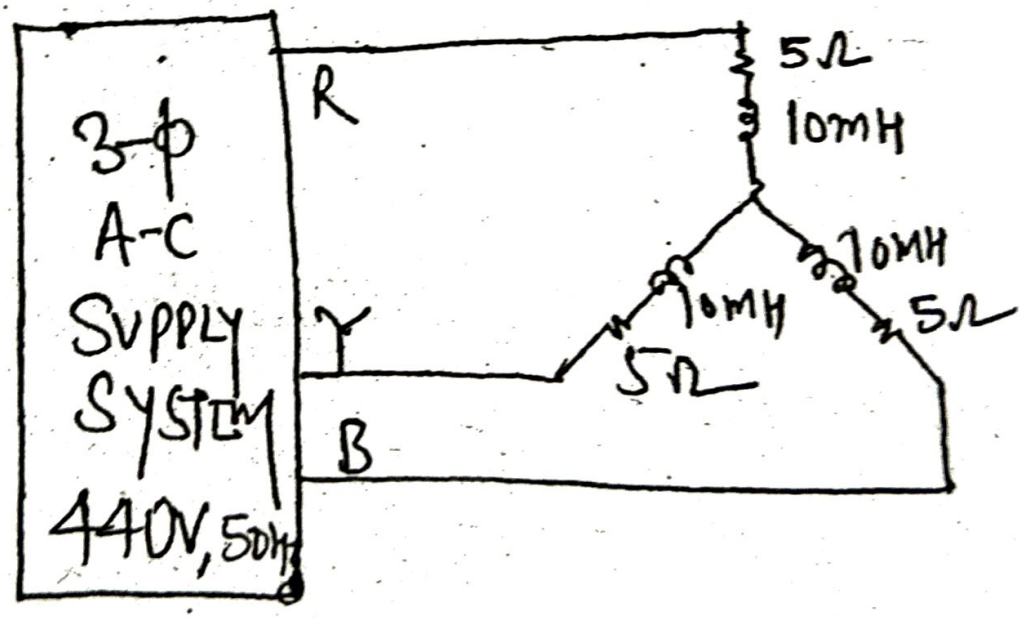

Fig. 7

(b) Consider the circuit shown in Fig. 6

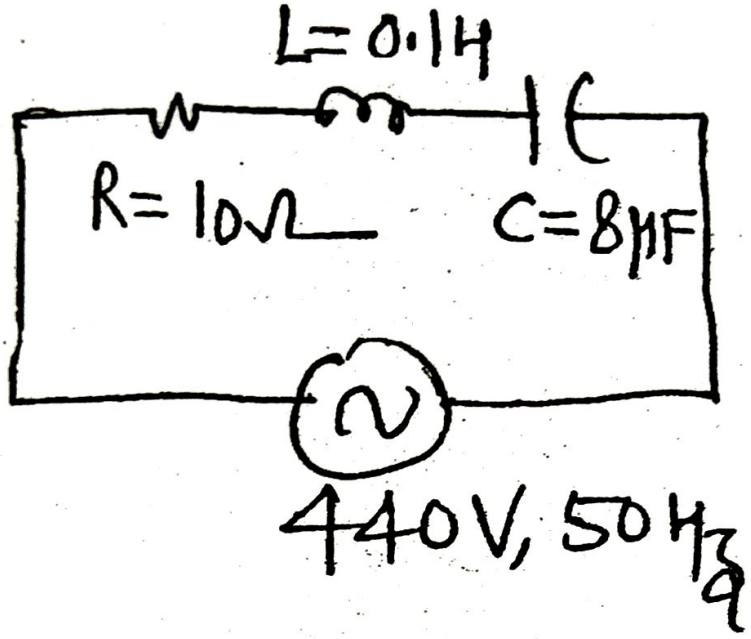

Fig. 6

Determine the following :

(i) Resonant frequency

(ii) Q-factor of the circuit at resonant frequency

(iii) The lower and upper half-power frequency

(b) What are the similarities and dissimilarities between the "SERIES RESONANCE" and "PARALLEL RESONANCE"? Also mention their applications.

Q. 3. (a) Consider the circuit shown in Fig. 3.

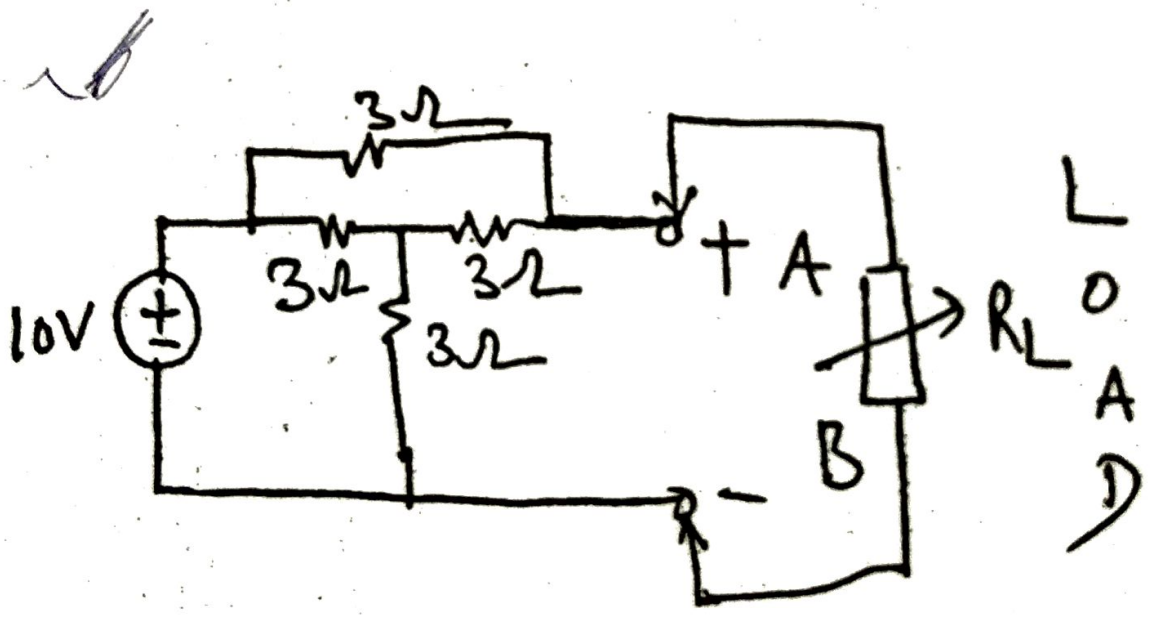

Fig. 3

Q. 2. (a) Consider the series R-L-C circuit as shown in Fig. 2.

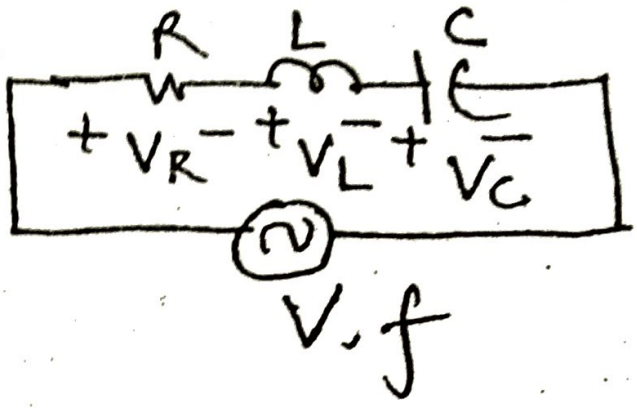

Fig. 2

Draw and explain the voltages phasor diagram of above Fig. 2 in the following cases :

(i) $X_L > X_C$

(ii) $X_L < X_C$

(iii) $X_L = X_C$

P.T.O.