Paper Code: EE-201/EE_101 **Roll No.** | | | | | | | | | | |

B.Tech.
(SEM II) EVEN SEMESTER THEORY EXAMINATION, 2015-16
ELECTRICAL ENGINEERING

[Time: 3 Hours] **[Max Marks: 100]**

Note: Attempt all questions.

1. Attempt any four parts of the following:- **[5x4=20]**

   (a) What are bilateral elements? How do they differ from unilateral elements? Explain.
   (b) Explain: Ideal and practical Voltage source, Ideal and practical Current source.
   (c) Derive the expression for delta to star transformation.
   (d) What is meant by source transformation? Explain taking an example.
   (e) Find the power dissipated in the 4 ohm resistor in fig1. by using Norton's theorem.

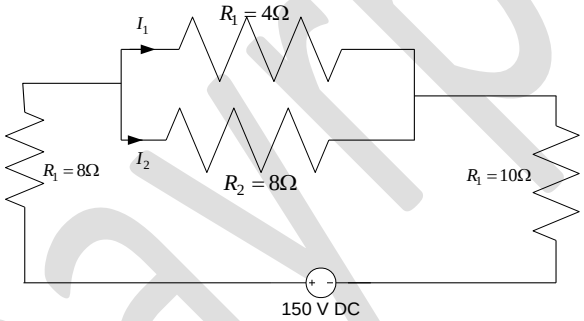

Fig. 1

   (f) What is the current through the 4 ohm resistor in fig.2? Use Thevenin theorem to find it.

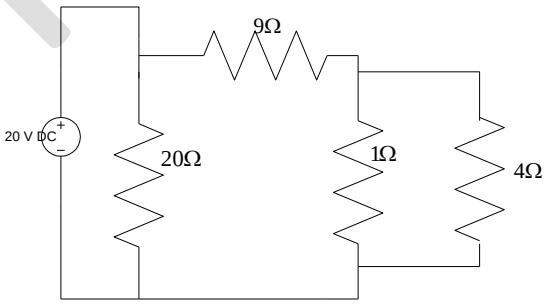

Fig. 2

2. Attempt any four parts of the following:- [**5x4=20]**

   (a) What is a phasor? How is a phasor helpful in simplifying the AC steady state analysis? Explain.
   (b) Prove that the in sinusoidal supply, the current in an inductive circuit lags it's respective voltage by 90 degrees and that in a capacitive circuit leads it's respective voltage by 90 degrees.
   (c) A resistance of 4 ohm is connected in series with an inductive reactance of 3 phm. What is power factor? Find what needs to be done to improve this power factor to unity?
   (d) Find the currents and the three powers, in fig3.
   (e) What is quality factor? Derive at least two of its expressions and explain them.
   (f) Find the frequency of resonance in fig.4

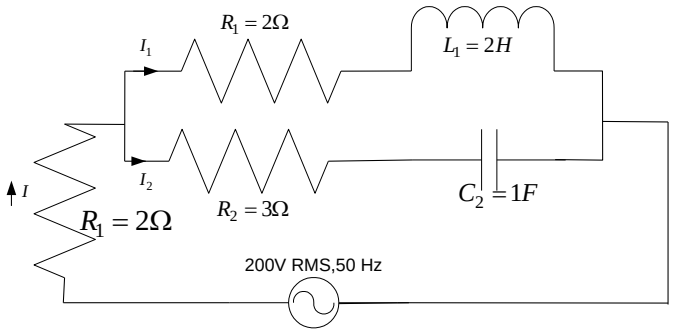

Fig. 3

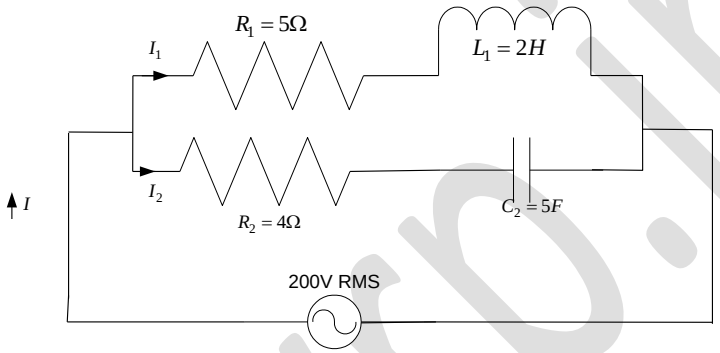

Fig. 4

3. Attempt any two parts of the following:- **[10x2=20]**

   (a) Prove that the sum of two wattmeter readings give the total three phase real power. Also derive the expression for the power factor of the load. Can the three phase reactive power be obtained by this method? Explain.
   (b) Draw and explain the principle of operation of a permanent magnet moving coil instrument.
   (c) Explain the construction and principle of operation of an attraction type moving iron instrument.

4. Attempt any two parts of the following:- **[10x2=20]**

   (a) Enlist the uses of a transformer. Explain its principle of operation. Derive the necessary condition for the occurrence of maximum efficiency in a transformer.
   (b) Describe the analogies and differences between the electric and magnetic circuits
   (c) Explain the constituents of the equivalent circuit of a single phase transformer. What is the difference between the exact and approximate equivalent circuit? Explain.

5. Attempt any four parts of the following:- **[5x4=20]**

   (a) What are the basic electro-mechanical energy conversion principles? Explain.
   (b) Explain the principle of operation of a three-phase Induction motor.
   (c) Why is a three phase Synchronous motor not self starting? How is it made self starting?
   (d) Explain the starting methods of single phase Induction motor (any three).
   (e) Explain the necessary conditions of the voltage build up of a self excited DC generator.
   (f) Derive the torque equation of a DC motor.