1. Find the power supplied by different sources using KCL and KVL equations in the following given circuit shown in figure 1.   [15]

Figure: 1
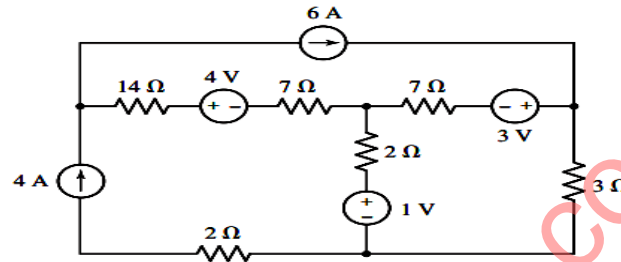
2. Find the Thevenin's equivalent with respect to the terminals 'a-b' for the circuit in the following figure 2.   [15]
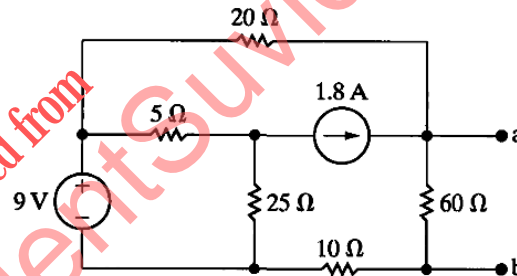

Figure: 2

3.a) What is the phasor diagram, draw the phasor diagrams of RL parallel circuit under steady state conditions?
  b) Two loads in parallel are supplied by a single phase 230 V, 50-Hz supply:
      Load A: 10 kVA at 0.8 power factor leading
      Load B: 15 kW at 0.8 power factor lagging
   Find the real power, reactive power and line current drawn from the supply by the combined load.   [7+8]

4.a) A coil having an inductance of 2 H is connected in series with a resistance of 10 Ω and a capacitor of 50 µF. The whole combination is connected to a 200 V variable frequency supply. Determine i) the resonant frequency, ii) the current in the circuit at resonance iii) corresponding voltage developed across the capacitor.
  b) A balanced delta-connected load with a per-phase impedance of $(12 + j9)$ Ω is supplied by a 400 V, 50 Hz three-phase source, determine phase voltage, line voltage and currents in each phase.   [7+8]

5.a)   Discuss various losses occurred in a single phase transformer.

  b)   The parameters of approximate equivalent circuit of a 4 kVA 200/400 V, 50 Hz single phase transformer are

$R_p = 0.15\,\Omega$, $X_p = 0.37\,\Omega$, $R_0 = 600\,\Omega$ and $X_0 = 300\,\Omega$

When rated voltage of 200 V is applied to the primary, a current of 10 A at lagging power factor of 0.8 flows in the secondary winding. Calculate i) the current in the primary, I_p ii) terminal voltage at the secondary side. [8+7]

6.a)   Describe the operation of auto transformer? How does the current flow in different parts of its winding?

  b)   What are the distinguished features of Y-Y and Δ-Y three phase transformers? [8+7]

7.a)   Explain various speed control methods of separately excited dc motor.

  b)   Describe briefly the construction and working of any single phase induction motor. [8+7]

8.a)   Describe the PVC cables of different types and their sizes which are used for low voltage ratings?

  b)   What are the important features of ELCB, where it is used for protection? [8+7]

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