

B. TECH, B. TECH + MBA DUAL DEGREE  
PROGRAMMES (CSE, IT, CE) &  
B. TECH (CSE) – EVENING

SECOND SEMESTER END TERM EXAMINATION :  
APRIL, 2014

**BASIC ELECTRICAL ENGINEERING**

Time : 3 Hrs.

Maximum Marks : 70

Note: Attempt questions from all sections as directed.

**SECTION – A (30 Marks)**

Attempt any 5 questions.

Each question carries 6 marks.

1. Explain what do you understand by voltage dependent current source and current dependent current source. Find the current  $I_1$  and  $I_2$  in the passive elements of the network given below :

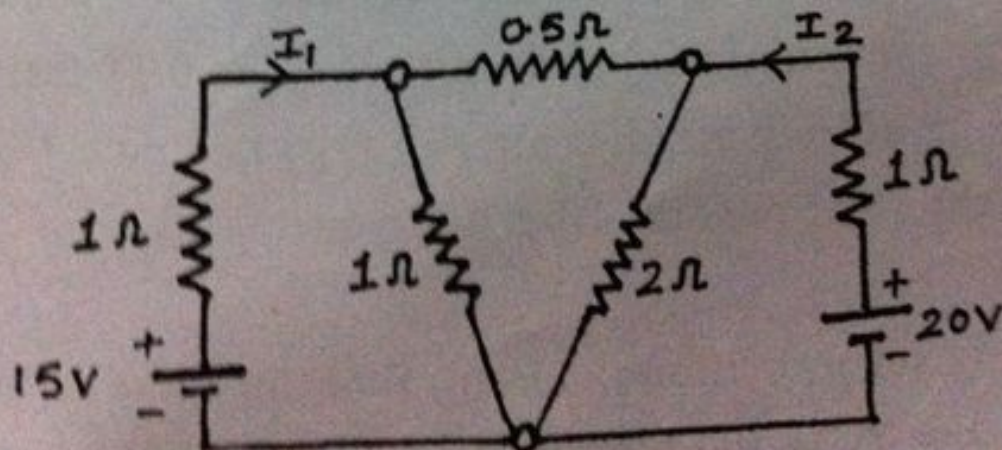


Fig. 1

2. Find the current drawn from the source and each resistor of Figure 2 using star-delta transformation. Take  $R_1 = 300 \Omega$  and  $R_2 = 100 \Omega$ .

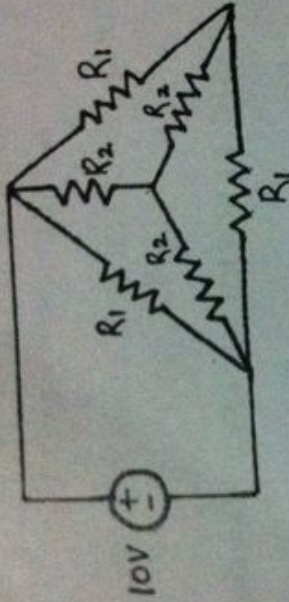


Fig. 2

3. A four-pole dc machine having wave winding has 294 conductors in armature. Find the following :
- Flux per pole to generate 230 V when rotating at 1500 rpm.
  - Torque at this flux when rated armature current of 120 A is flowing.
  - Interpole ampere-turn is required with this current if the interpole gap density is to be 0.15 tesla and the effective radial air gap (lg) is 8 mm. Neglect the mmf absorbed by the iron.
4. Using superposition theorem, find the value of output voltage  $V_o$  in the circuit shown in Fig. 3.

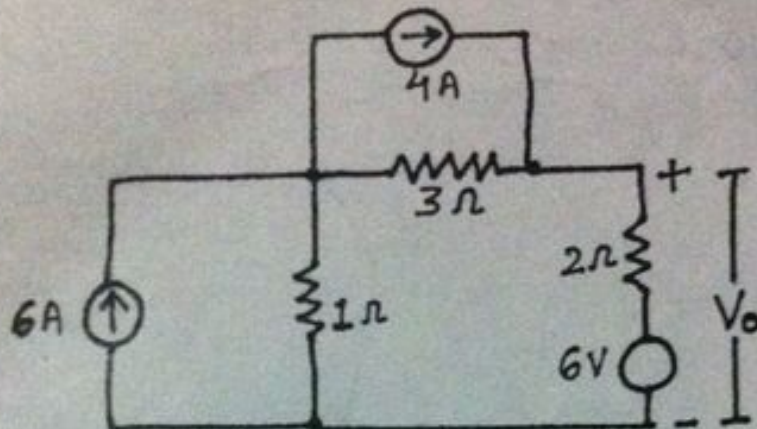


Fig. 3

5. Define the terms : Impedance, Admittance, Power factor, Active Power and Reactive Power.
6. State Thevenin Theorem and find the thevenin equivalent circuit lying to the right of terminals x-y in Fig. 4.

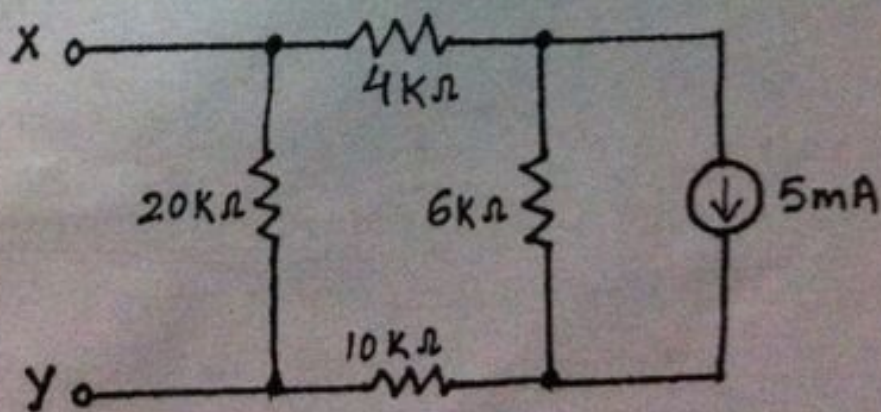


Fig. 4

## SECTION - B (20 Marks)

*Attempt any two questions.*

*Each question carries 10 marks.*

7. Derive the EMF equation of a single phase transformer. In a 50 Kva, 1-phase 3300/230 V, transformer, the iron losses and full-load copper losses were found to be as 500 W and 650 W respectively. Calculate efficiency at half load and 0.9 js power factor. Determine maximum efficiency and corresponding load.
8. A balanced 3-phase star-connected load of 140 K w takes a leading current of 85 amp., when connected across a 3-phase 1,200 volts, 50 Hz supply. Obtain the values of the resistance, impedance and capacitance of the load per phase and also calculate the power factor of the load.
9. Explain with proper diagram the working of dynamometer type instrument and also derive the relevant expression for torque produce by the moving coil in dynamometer. Explain how dynamometer type instrument is different from PMMC instrument give at least five differences.

## SECTION - C (20 Marks)

*(Compulsory)*

10. (a) What do you understand by series Resonance? Discuss the variations of Impedance, admittance and current with frequency in series RLC circuit. Explain quality factor, selectivity and bandwidth. Draw graph of parallel resonant circuit w.r.t. impedance and output current.
- (b) A 12 mH coil is connected in series with a loss free capacitor to a variable frequency source of 40V. The current in the circuit has maximum value of 0.2 A at a frequency of 100 kHz. Calculate :  
(i) the value of capacitance (ii) the Q-factor of the coil (iii) the half-power frequencies.