

25 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division

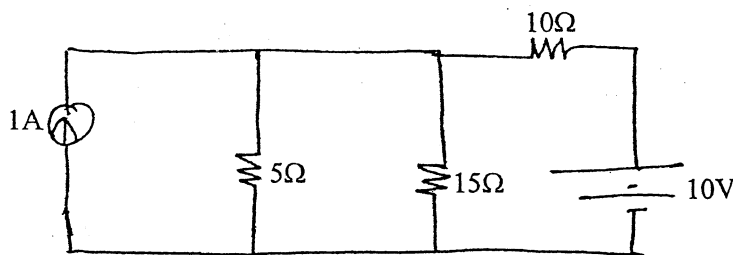
2067 Ashadh

Exam.	Regular/Back		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT, BIE, B.Agric.	Pass Marks	32
Year / Part	I / I	Time	3 hrs.

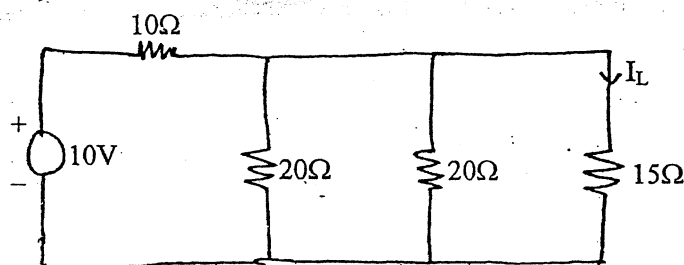
Subject: - Basic Electrical Engineering

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt any **Five** questions.
- ✓ **All** questions carry equal marks.
- ✓ Assume suitable data if necessary.

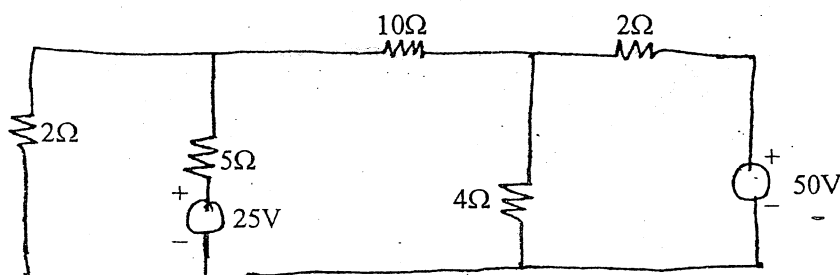
1. a) The temperature rise of the machine field winding was determined by the measurement of the winding resistance. At 20°C the field resistance was $150\ \Omega$. After running the m/c for 6 hours at full load, the resistance was found to be $175\ \Omega$. If the temperature coefficients of resistance of the copper winding is $1.57 \times 10^{-5}/^{\circ}\text{C}$ at 0°C , determine the temperature rise of the machine.
- b) What are ideal and practical voltage and current sources? Explain.
2. a) Calculate the current in the $15\ \Omega$ resistor in the network shown in figure below using superposition theorem.



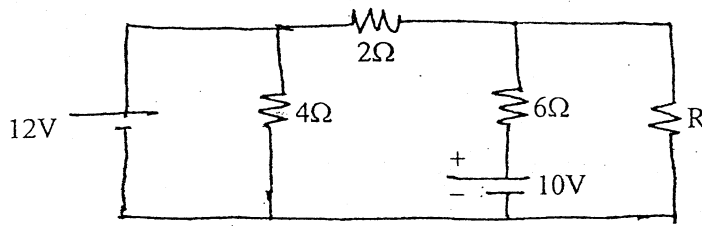
- b) Determine the current I_L through $15\ \Omega$ resistor in the network by Norton's theorem.



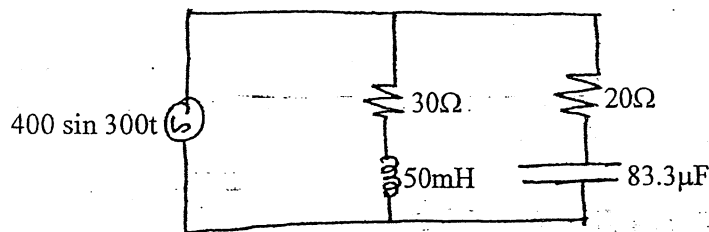
3. a) Use nodal method to find the current through $10\ \Omega$ resistor for circuit shown below.



- b) Calculate the value of R to receive maximum power and the maximum power received by it for the circuit shown below.



4. a) A series circuit consists of a resistance equal to 4Ω and inductance of 0.01H . The applied voltage is $v = 283 \sin(300t + 90^\circ)$ volts. Find
- The power dissipated in the circuit
 - The expression for $i(t)$
 - Power factor and
 - Draw a phasor diagram
- b) For the circuit below, calculate
- Magnitude and phase angles of current in each of the branches,
 - Active, reactive and apparent power and power factor of the circuit, and
 - Draw the vector diagram indicating branch currents and supply voltage



5. a) Describe the advantages of three phase AC system over single-phase AC system.
- b) Three phase balanced load consists of three similar coils, each of resistance 50Ω and inductance of 0.3H . The supply voltage is 415V , 50Hz . Calculate (i) The line current (ii) The power factor (iii) Total power consumed and (iv) Draw the phasor diagram. Take $R \times B$ as phase sequence.
6. a) Define power factor and explain the disadvantages and causes of low power factor?
- b) A single-phase 50Hz motor takes 20A at 0.65 power factor lagging from a 230V sinusoidal supply. Calculate the KVar rating and capacitance to be connected in parallel to raise the power factor to 0.9 lagging. What is the new supply current?
