

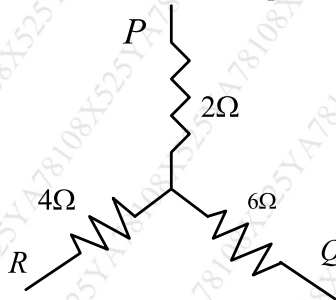
(3 Hours)

Max. Marks:- 80

- Note: - 1) Question No1. is compulsory.  
2) Attempt any Three out of remaining.

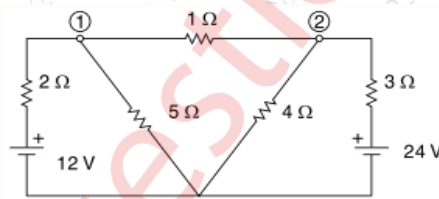
Q1 Attempt any **FOUR** (20)

- Derive an emf equation of a transformer (5)
- Two wattmeters are used to measure power in a three-phase balanced load. The wattmeter readings are 8.2 kW and 7.5 kW. Calculate total power, power factor and reactive power. (5)
- In a circuit a voltage of  $200 \angle 40^\circ \text{V}$  is applied to a two-element circuit. A current of  $20 \angle -20^\circ \text{A}$  is flowing through it. Find elements of impedance. (5)
- Convert star into its equivalent delta. (5)

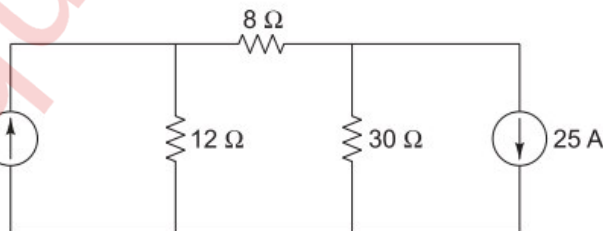


- Two currents are meeting at a point. Find the resultant current. (5)  
 $i_1 = 100 \sin(\omega t) \text{A}$ ,  $i_2 = 25 \cos(\omega t - \frac{\pi}{3}) \text{A}$ ,

Q2 a) Obtain the current through the  $1\Omega$  resistor using nodal analysis method for the circuit. (10)

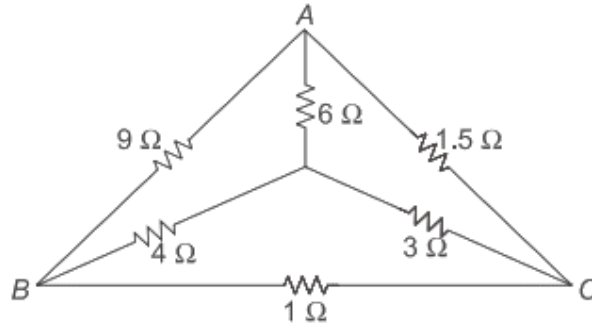


- Find current through  $8\Omega$  by mesh analysis. (10)



Find current through  $8\Omega$  by mesh analysis.

- Q3 a) Find equivalent resistance between A & B in the network shown. (10)



- b) A current of 5 A flows through a non-inductive resistor in series with a choke coil when supplied at 250 V, 50 Hz. If the voltage drops across the coil and noninductive resistor are 200 V and 125 V respectively, calculate the resistance and inductance of the impedance coil, value of non-inductive resistor and power drawn by the coil. (10)

- Q4 a) Voltage and current in an ac circuit are given by (10)

$$v = 200 \sin 377 t \quad i = 8 \sin (377 t - \pi/6)$$

Determine true power, reactive power and apparent power drawn by the circuit

- b) Explain working principle of three phase induction motor and mention its types. (5)  
 c) Explain working of variable reluctance stepper motor. (5)

- Q5 a) A symmetrical three-phase 400 V system supplies a basic load of 0.8 lagging power factor and is connected in star. If the line current is 34.64 A, find the (i) impedance, (ii) resistance and reactance per phase, (iii) total power, and (iv) total reactive voltamperes. (10)

- b) Derive relation between line & phase voltage and line & phase current in three phase delta connected circuit. (10)

- Q6 a) A 230/110 V, single-phase transformer takes an input of 350 VA at no load and at rated voltage. The core loss is 110 W. Find (i) no-load power factor, (ii) the iron loss component of no-load current, and (iii) magnetizing component of no-load current. (10)

- b) Describe parts of DC machines and their use. (10)