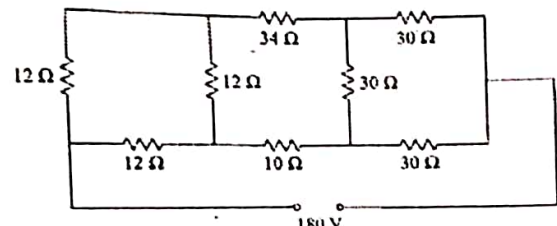
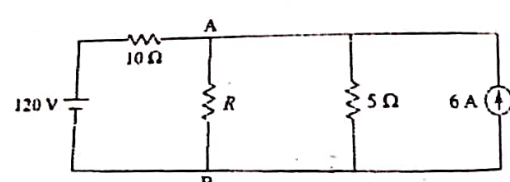
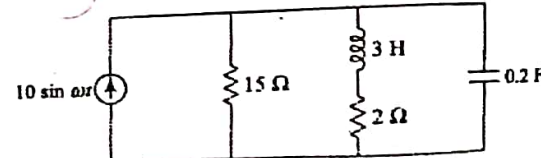


NOTE: Attempt five questions in all, selecting atleast two questions from each Part.

x-x-x

PART - A

Q.I	<p>a) Find the current in the 10 Ohm resistor in the network shown below by star-delta transformation</p>  <p>b) Calculate the value of R which will absorb maximum power from the circuit, Also, compute the value of maximum power.</p> 	Mark 5,5
Q.II	<p>a) Drive relation between line current and phase current, line voltage, and phase voltage in case of delta connected 3-phase circuit.</p> <p>b) Define Resonant frequency and hence determine the same for the parallel circuit shown below:</p> 	5,5
Q.III	<p>(a) Two wattmeters are used to measure the power in a three-phase balanced circuit. What is the power factor of the load when (i) both the meters read equal, (ii) both the meters read equal but one is negative, and (iii) one reads twice the other.</p> <p>(b) A balanced star connected load of per phase is connected to a 400 V, three-phase, 50Hz supply. Find the (i) line current, (ii) power factor, (iii) real power, (iv) reactive power, and (v) apparent power.</p>	5,5
Q.IV	<p>a) In a series RL circuit, <math>R=10\Omega</math> while <math>L=30\text{mH}</math>. The input current lags the supply voltage by <math>60^\circ</math>. Obtain the value of applied frequency and find the real power supplied if the voltage is <math>V=120\sin\omega t</math>.</p>	5,5

b) Prove using phasor diagram that the three phase power remain same in star and delta connected load.

PART-B

Q.V a) Explain the term permeability of free space and relative permeability. How is reluctance related to permeability?  
b) A coil of 200 turns and resistance of  $20 \Omega$  is wound uniformly on an iron ring of mean circumference 20 cm and cross section area  $3 \text{ cm}^2$ . It is connected to a 10 V dc supply. Under these conditions, the relative permeability of iron is 1000. Calculate the values of:  
(a) the reluctance of the ring (b) magnetizing force  
(c) the MMF

Q.VI a) Draw the phasor diagram for a leading power load connected transformer. Hence show various quantities used in the phasor.  
b) The no-load test is conducted on a single phase transformer. The following test data are obtained:  
Primary voltage,  $V_1 = 230 \text{ V}$ , secondary voltage,  $V_2 = 115 \text{ V}$   
Primary current,  $I_0 = 0.6 \text{ A}$ , Power input,  $W_0 = 32 \text{ W}$   
Resistance of the primary winding,  $R_1 = 0.5 \Omega$   
Find the following:  
1) Turns Ratio  
2) The magnetizing components of the no-load current  
3) Its working (or) loss component  
4) Iron loss  
Draw no-load phasor diagram to scale.

Q.VII a) Deduce the expression for the voltage regulation of a transformer. When is the voltage regulation of transformer zero?  
b) Explain the concept of slip in an induction motor. What is the maximum possible speed of the induction motor when the slip is 4 %.

Q.VIII a) Give the construction features of a squirrel cage induction motor. Hence explain why rotor bars are short circuited by end rings.  
b) Explain the applications of DC shunt and series machines. Give reasons for the same.