Instructions :   (1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Assume suitable data if necessary.
(5) Preferably, write the answers in sequential order.

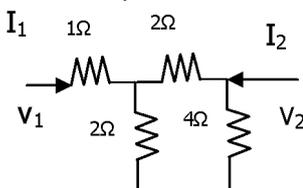**1.** Attempt any **FIVE** of the following :   **[10]**
(a) What is Power factor and its significance?
(b) Write a equation of impedance R_L and R_C circuit.
(c) Draw power triangle for series circuit.
(d) Three resistances of 3Ω each are connected in star find equivalent resistance when connected in delta.
(e) What are the advantage and disadvantages of Superposition theorem?
(f) Write the equation of Open circuit Z parameters.

2. Attempt any **THREE** of the following :   **[12]**
(a) Draw voltage triangle, power triangle, impedance triangle of series RC circuit.
(b) State and explain the Norton's theorem.
(c) What do you mean by redundant sources?
(d) Define impedance. What is its unit? State the factors on which it depends.

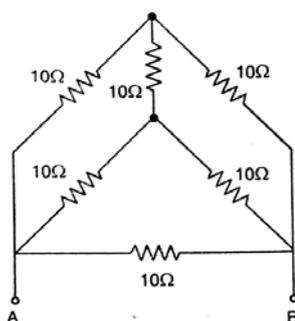**3.** Attempt any **THREE** of the following :   **[12]**
(a) A 50 Hz voltage of 230 volt rms value is applied across a capacitor of 26.5 μF. Calculate :
(i)   The capacitive reactance
(ii) Write the time equation for voltage and the resulting current. Let the zero axis of the voltage be at t = 0
(b) Find the z parameters for the network shown in Figure.

(c) Prove that $\omega_0 = \sqrt{\omega_1 \omega_2}$.
(d) How to convert from Pi to T and vice versa?

4. Attempt any **THREE** of the following :   **[12]**
(a) A choke coil takes a current of 2.5 Amp when connected across 250 V, 50 Hz a.c. supply and consumes 400 Watts. Calculate :
(i) Power factor   (ii) Resistance of coil and   (iii) Inductance of coil
(b) Calculate equivalent resistance R_{AB} using delta star transformation (Refer figure).
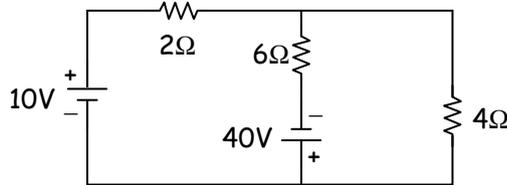
(c) Obtain ABCD parameters for the network shown in figure.
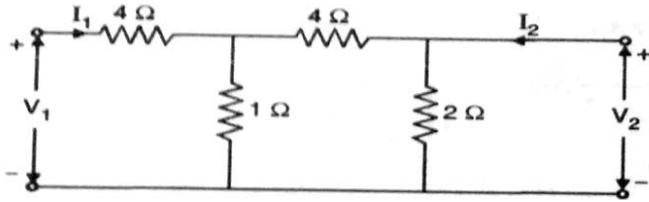
(d) $v = 150 \sin(314t)$ and $i = 10 \sin\left(314 + \dfrac{\pi}{4}\right)$. Find circuit component connected in series.

(e) Determine the current in 2Ω resistance in figure using Mesh analysis.
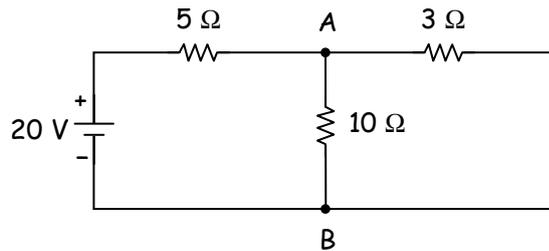

5. Attempt any **TWO** of the following : [12]
   (a) A coil having resistance of 5Ω and inductance of 0.2 H is arranged in parallel with another coil having resistance of 1Ω and inductance of 0.08 H. Calculate the current through the combination and power absorbed when a voltage of 100 V, 50 Hz is applied. Use impedance method.
   (b) Calculate the current in $10\ \Omega$ resistance using Norton's theorem shown in figure.

   (c) A coil of resistance $15\ \Omega$ and inductance of 0.05 H connected in series with 100 μF capacitor across 230 V, 50 Hz ac supply find :
   (i) Current   (ii) Power factor of circuit
   (iii) Voltage drop across coil   (iv) Voltage across capacitor

6. Attempt any **TWO** of the following : [12]
   (a) A series circuit has the following characteristics $R = 10\ \Omega$, $L = \dfrac{100}{\pi}$ mH, $C = \dfrac{500}{\pi}$ μF.
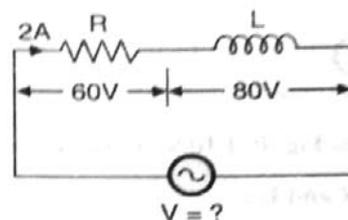
   Find : (i)   The current flowing when the applied voltage is 100 V at 50 Hz.
           (ii) The power factor of the circuit
           (iii) What value of supply frequency would produce series resonance?
   (b) Determine the current through 20 ohm resistance in figure using node analysis method.
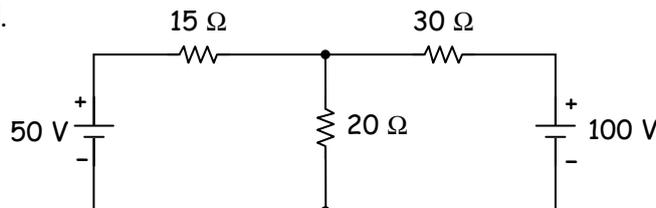
   (c) For a circuit shown in figure. Find :
   (i)   Values of R and L
   (ii) Total voltage
   (iii) Impedance
   (iv) Power factor

□ □ □ □ □

S.Y. Diploma Sem-III: Paper Discussion Schedule

Branches	Date	Day	Timing	Centres
Electronics Group	8 Nov. 2018	Thursday	9 a.m. to 11 a.m.	Dadar

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