3RD SEM./AE & IE./ETC & COMM./E&TC/ 2023(W) NEW
### Th-2 Circuit Theory

**Full Marks: 80**   **Time- 3 Hrs**

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1.   Answer **All** questions   2 x 10
   a.   List the advantages of Maximum Power Transfer theorem.
   b.   Define the following terms:
        RMS value and Form factor
   c.   What are Open Circuit Impedance parameters?
   d.   Explain the dot convention used in coupled circuits.
   e.   Write the limitations of Ohm's Law.
   f.   State Reciprocity theorem.
   g.   Define Neper & Decibel .
   h.   How will you express the Norton's equivalent circuit from Thevenin's equivalent circuit?
   i.   With proper description of parameters , write the time constant of series RC circuit.
   j.   Define Power Factor and Power Triangle.

2.   Answer **Any Six** Questions   6 x 5
   a.   Derive the equation for the step response of the RL series Circuit.
   b.   Determine the maximum power delivered to the load in the circuit shown in the figure.
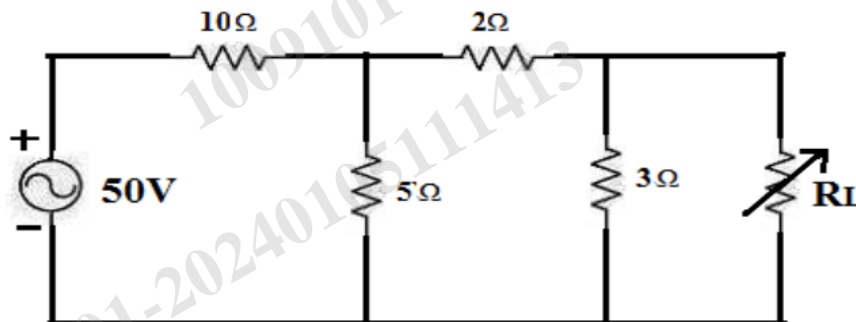
   c.   Determine the current in 10Ω resistor for the following network by using nodal analysis.
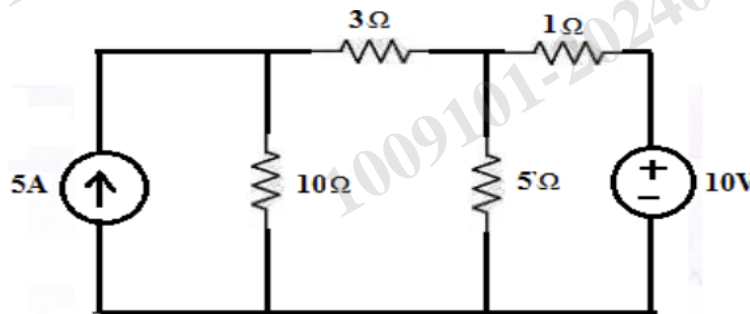
   d.   State the condition for resonance in Series RLC circuit and derive the expression of the
   resonance frequency.

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e. Explain the Constant K Bandpass filter.

f. Two resistances when connected in series, the effective value of resistance are 100 Ohms. When connected in parallel the effective value is 24. Formulate the value of resistance R1 and R2.

g What are the initial conditions? Why are they needed? Explain.

3   The network shown has acquired a steady state with the switch closed for t < 0. At t = 0, the switch is opened. Obtain i(t) for t>0.   10
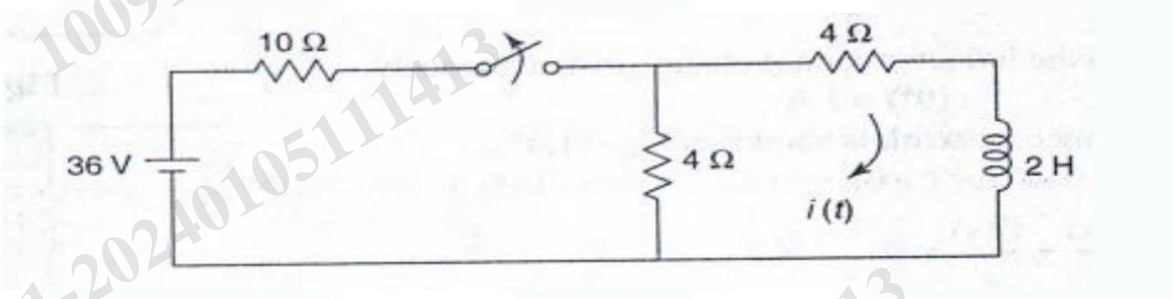
4   Explain the Transient response of Series RC Circuit with DC excitation.   10

5   Find the equivalent Inductance for the given circuit.   10
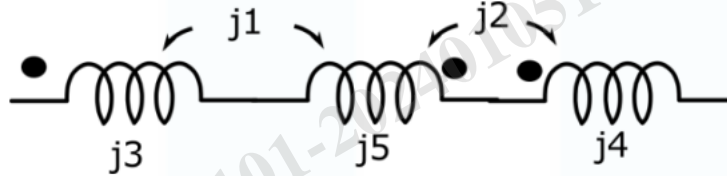
6   Write short notes on: 5+5
(i)Power Factor
(ii) KCL

7   The Z parameters of a two-port network are Z11=20Ω, Z12=Z21=10Ω, Z22=30Ω. Find Y and ABCD parameters.   10