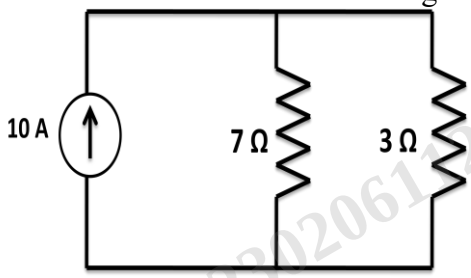
3RD Sem./AE & IE /ETC & COMM./ ETC & TELECOMM / 2022(W)
Th-2 CIRCUIT THEORY

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

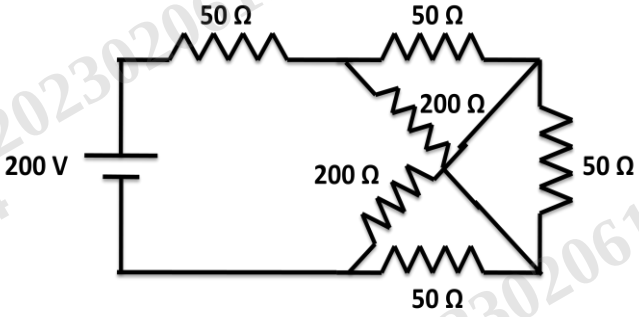
a. What is resonance condition?
b. State KVL and KCL.
c. Write down the difference between linear and non-linear element.
d. Define quality factor for series resonance circuit.
e. State Maximum power transfer theorem.
f. What do you mean by form factor?
g. Draw the circuit constant K high pass filter.
h. What is co-efficient of coupling?
i. Find current across 7Ω resistor in the circuit as shown in figure.



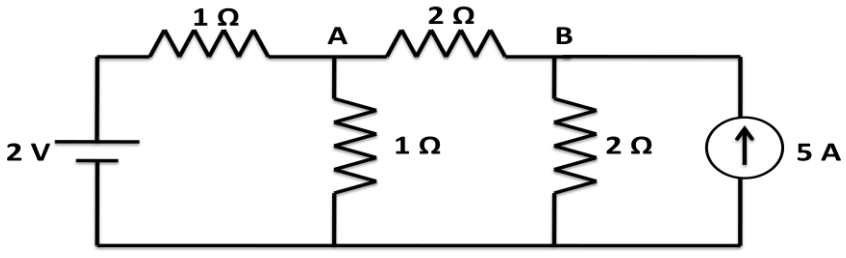
j. Define reluctance in magnetic circuit.

2. Answer Any Six Questions 6 x 5

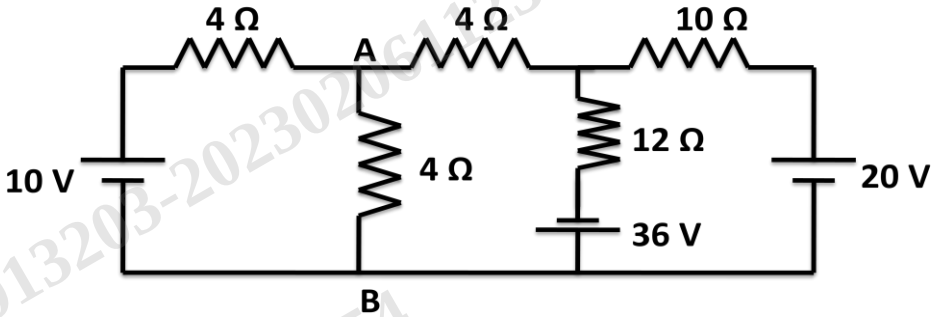
a. Explain about different steps for solving a network by Thevenin's theorem.
b. Classify the difference between leading and lagging power factor.
c. Determine the current supplied by the battery given in the figure by KVL method.



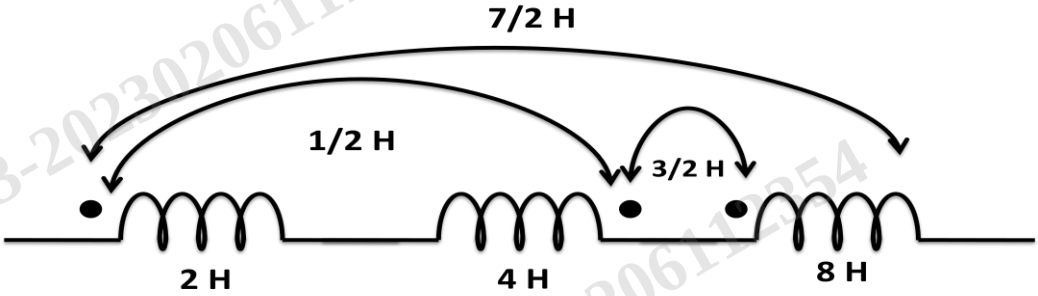
d. Two impedance Z_1 =10+j15Ω and Z_2 =8+j6Ω are connected in parallel. If total current taken is 20A. Find the current taken by each branch and total power consumed by the circuit.
e. Find the current across AB using nodal analysis.



f. Using source conversion technique reduces the following circuit to a single current source across AB.



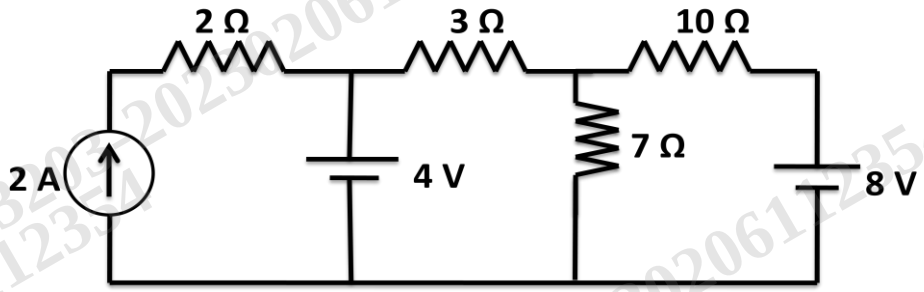
g. Find the total inductance of the three series connected coupled coil as shown in figure.



3. Design a band stop, constant K filter with cut off frequencies of 5KHz to 10 KHz and nominal characteristics impedance of 300Ω. 10

4. Compare the parallel resonance circuit with a series resonance circuit. 10

5. Using superposition theorem to calculate the voltage drop across the 3 ohm resister of figure below. All resistance value is in ohm. 10



6. Explain in detail T-Network & π-Network 10

7. Write short note on: 10
   1) Band pass filter
   2) Y-parameter