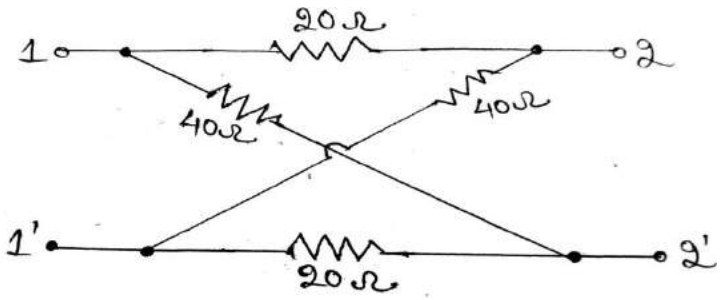
AMRITSAR COLLEGE OF ENGINEERING AND TECHNOLOGY, AMRITSAR

(AUTONOMOUS COLLEGE)

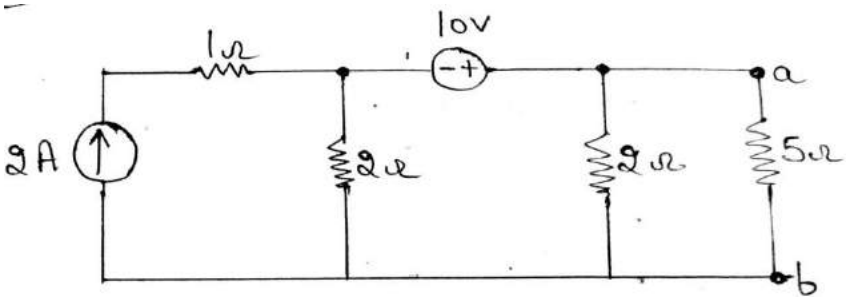
B.Tech. (EE) – 3rd Sem
Circuit Theory
ASSIGNMENT- 1

1. What do you mean by electrical network?
2. State and explain Kirchhoff's laws
3. Write Laplace transform of exponential function and step function.
4. What are the requirements of a polynomial to be Hurwitz polynomial?
5. Why Routh Hurwitz criterion is used?
6. The voltage and current in AC circuit is V=100 sin(314t); I=10 sin(314t). Determine the average power and r.m.s. power.
7. Determine Laplace transform of f(t) = t sin 2t.
8. A function is given by Z(s) = $\frac{2s}{s^2+16}$. Draw its pole zero plot.
9. What are the different types of network synthesis techniques?
10. What is the condition for transfer of maximum power in a network? What is the efficiency at the maximum power?

11. State and prove Convolution Theorem.
12. Design a m-derived low pass filter having cut-off frequency of 1 kHz impedance of 400Ω, and the resonant frequency 1100 Hz.(For both T-section and π section).
13. Design a constant-k Band Pass Filter with cut off frequencies of 3kHz and 7.5 kHz and nominal characteristic impedance or R_o = 900Ω.
14. Design a LPF to have a cut-off at 796 Hz when terminated in a 600 Ω resistance, in both the T and π configurations.
15. Check whether the given polynomial
    $P(s) = s^4+s^3+5s^2+3s+4$ is Hurwitz or not.
16. Write note on:
    (a) Composite Filter.
    (b) Transient Response of Series R-L circuit having DC Excitation.
17. Define driving point impedance and admittance. State restrictions on location of poles and zeros in driving point functions. What are the various necessary conditions for transfer function?
18. For a symmetrical lattice network shown below, find characteristic impedance and propagation constant.

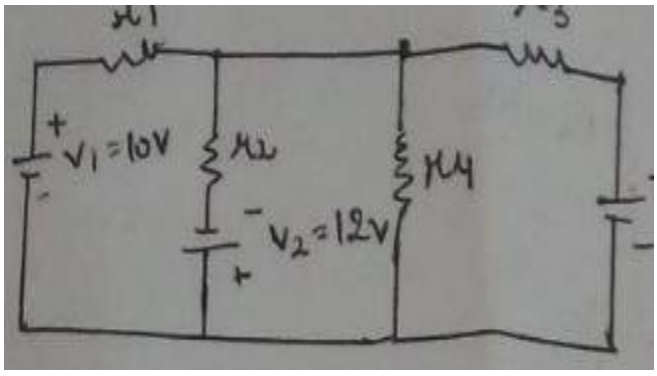


19. What is the current in the 5Ω resistor across a-b terminals of the network shown in figure. Use Norton's theorem**.**

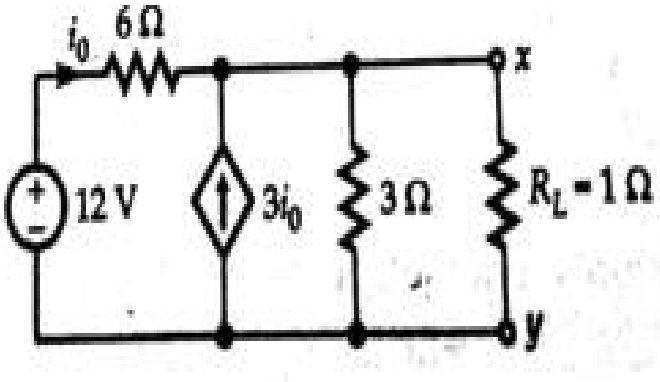


20. Design a Composite low pass filter to have a cut-off frequency of 1 kHz and a characteristic impedance of 600 ohms. Use one constant k T-section, one m-derived T-section and two terminating half sections with m = 0.6. The frequency of infinite attenuation is 1050 Hz.

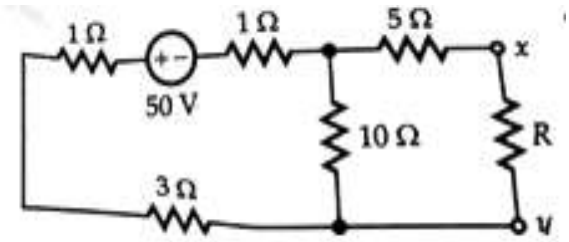
21. In The Network through the 10Ω Resistor utilizing Thevenin's Theorem.



22. Find the current through RL in the circuit, using Norton's Theorem.



23. Assuming maximum power transfer from the source to R. Find the value of this amount of power in the circuit.



24. Determine the power loss across the 5Ω resistor.