SANTHIRAM ENGINEERING COLLEGE, NANDYAL

Department of Electrical and Electronics Engineering

Name of the Laboratory: **Network Theory** ***Regulation:*** **R19**

Branch: **Electronics and Communication Engineering** ***Year & Sem:*** **I- II**

Course Objective

- To gain hands on experience in verifying Kirchhoff's laws and network theorems
- To analyze transient behaviour of circuits
- To study resonance characteristics
- To determine 2-port network parameters

Course Outcomes

- Verify Kirchhoff's laws and network theorems (L4)
- Measure time constants of RL & RC circuits (L3)
- Analyze behaviour of RLC circuit for different cases (L4)
- Design resonant circuit for given specifications (L6)
- Characterize and model the network in terms of all network parameters (L3)

List of Experiments

1. Any 10 of the following experiments are to be conducted in Hardware & Simulation (Multisim/Open source software):
2. Verification of Kirchhoff's Laws
3. Apply Mesh & Nodal Analysis techniques for solving electrical circuits (problems with dependent sources also)
4. Verification of Superposition & Reciprocity Theorem
5. Verification of Thevenin's and Norton's Theorem
6. Verification of Maximum Power Transfer Theorem
7. Verification of Millman and Miller Theorem
8. Measure and calculate RC time constant for a given RC circuit
9. Measure and calculate RL time constant for a given RL circuit
10. Measure and analyze (settling time, overshoot, undershoot, etc.) step response of for a given series RLC circuit for following cases:
11. $\zeta = 1$ (critically damped system) (ii) $\zeta > 1$(over damped system) (iii) $\zeta < 1$ (under damped system) Choose appropriate values of R, L, and C to obtain each of above cases one at a time.
12. Design a series RLC resonance circuit. Plot frequency response and find resonance frequency , Bandwidth , Q – factor.
13. Design a parallel RLC resonance circuit. Plot frequency response and find resonance frequency , Bandwidth , Q – factor.
14. Measure and calculate Z, Y parameters of two-port network.
15. Measure and calculate ABCD & h parameters of two-port network.

List of Equipments

1. Regulated Power Supply
2. Rheostats, Ammeters (MI & MC), Voltmeters (MI & MC), Wattmeter (UPF & LPF)
3. Decade Resistance Box, Decade Inductance Box, Decade Capacitance Box
4. Cathode Ray Oscilloscope (CRO's), Function Generators
5. Breadboard, Digital Multimeters

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