GATE 2018 EE and ECE Prep Tips for Network Theory

Updated on: Jul 10, 2017

Shiksha Knowledge Series

590 Views

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Network Theory is one of the most consistent subjects in Electronics and Communications Engineering(ECE) and Electrical Engineering (EE) GATE papers and mostly the problems are not very much tricky but rather simple and

hence it becomes a scoring topic and so mistakes must be avoided as they can have immense negative impact on your GATE Score.

What I have observed during my preparation twice is that un-necessary information is provided in most of the coaching institute's modules which is not at all important for GATE exam. Most of the topics in EC and EE curriculum for the Network Theory is same except the Three Phase Circuits which is additional topics in EE curriculum.

Network Theory is a problem-based subject where mostly practicing the problems is much more important than reading the theory and the books that you can follow for problem solving is GATE MCQ by RK Kanodia. Also, you can refer to problems given in Electric Circuit by AK Chakraborathy.

The following topics are part of Network Theory.

Graph Theory

The questions from this topic in GATE are very rare but still this topic should be prepared for the sake of completeness. Here small topics are very much important like the number of trees possible for a given network but the concepts like Incidence, Cut-Set and Tie-Set Matrix are not very much important but still should be once looked at as there is no harm. Also, different terminology should be remembered like twigs, links etc.

Network Basics

The solution methods listed are Nodal and Mesh Analysis and the usage as to where to use which method is something that you will get by practice as using the appropriate method will lessen the effort and save you a lot of valuable time. Also, a strong knowledge of these basics will help you a lot in GATE exam as these concepts also carry over to other subjects. This analysis is pre-requisite for other chapters in Network Analysis.

Network Theorems

For GATE, the names of theorems are not very much important but for IES they can come in handy for Objective Paper. So, it is better to remember the name

and usage of theorems and the most important theorems are Thevenin and Norton Theorem as sometimes the equivalent circuit can be directly asked, other than that theorems like Superposition, Tellegen's theorem are not very important.

Here, Star-Delta Transformation is important as it can be used with other subjects as like Electrical guys can use the same for Transient Stability Analysis for Fault away from line ends in Power Systems and Maximum Power Transfer Theorem is also important. These theorems must be prepared for AC as well as DC circuits and for AC circuits the maximum power transfer theorem has multiple cases and hence each case must be prepared carefully.

Steady-State Sinusoidal Analysis

The most important concept under this topic is the concept of Phasors which I believe comes more naturally for Electrical guys as they encounter Phasors more often in Electrical Machines and Power Systems. This is important as it reduces the effort immensely for solving an AC Network and also for this topic, you need to learn to do complex calculations by hands because in GATE exam online calculator does not provide the polar

calculations. The concept of Resonance is also very important under this topic and the key to that is just to equate the imaginary part of Impedance and Admittance to zero based on the case under consideration.

Transient Analysis

The transient response for general circuits like RC and RL circuits should be directly remembered in terms of initial and final conditions as that will save you a lot of time and can be used many places else like Chopper circuits in Power Electronics for EE Guys. Other than that there is not much but you should always try to solve one or two problems completely by forming the differential equations and solving them so that you can always handle the non-standard cases.

Circuit Analysis using Laplace Transform

This topic is important as this comes in handy even for Control Systems also and here the important thing to remember is to include the initial conditions in the models for Inductor and Capacitor in the s-domain and also you need to remember some common Laplace Transforms which you may do anyways in Signals and Systems.

This method should only be used when the supply is not

DC in Transient Analysis because in that case standard transient equation cannot be used.

State Equations for Networks

The important thing to learn in this topic is to define the state variables as sometimes you may define more than required and even this topic is common with the Control Systems.

2-Port Networks

Here the important parameters are Z-parameters, Y-parameters, H-parameters and Transmission Parameters and you need to memorize the conditions for Symmetry and Reciprocity in terms of various parameters. Also, one more thing is important here as to what parameters are added or multiplied for different network configurations like Cascaded Connection, Parallel Connection and others. To find these parameters you just need to remember the Network Equations for various parameters and then decide which quantity should be equated to zero to find a particular parameter which avoids the need to memorize the formulas for these parameters.

Three Phase Circuits

Three Phase Circuits come more naturally to EE guys as they have to deal with three-phase circuits in Electrical Machines and Power Systems, so in Network Theory only the basics of those are covered and the thing to be remembered is the relationships between Phase and Line quantities (Voltage and Current) for both Star and Delta Connections.

These relationships are very handy as they can be used directly for balanced 3-phase circuits and unbalanced circuits will be solved completely step-by-step as there are no direct relations but the questions from this topic are very rare.

About the Author:

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