TUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

ELECTRICAL AND ELECTRONICS ENGINEERING

DEFINITIONS AND TERMINOLOGY QUESTION BANK

Course Name	:	**NETWORK ANALYSIS**
Course Code	:	**AEEB09**
Program	:	**B.Tech**
Semester	:	**III**
Branch	:	**EEE**
Section	:	**A & B**
Academic Year	:	**2019 - 2020**
Course Faculty	:	**Dr. D Shobharani, Professor** **Ms.S Swathi, Assistant Professor**

COURSE OBJECTIVES:

The course should enable the students to:	
I	Apply network theorems to obtain the equivalent circuit of electrical networks.
II	Analyze the transient response of series and parallel RL, RC, RLC circuits for DC and AC excitations.
III	Understand the concept of locus diagram for series and parallel circuits and also network functions for one port and two port networks.
IV	Evaluate the two port network parameters and Discuss their interrelation and interconnection of networks.
V	Design different types of filters and study their characteristics.

DEFINITIONS AND TERMINOLOGY QUESTION BANK

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
MODULE-I						
1	State Superposition Theorem?	It states that for a linear system the response(voltage or current) in any branch of a bilateral linear circuit having more than one independent source equals the algebraic sum of the responses caused by each independent source acting alone, where all the other independent sources are replaced by their internal impedances.	Remember	CO1	CLO1	AEEB09.01
2	State Tellegen's theorem?	In any electrical network which satisfies Kirchhoff's laws , the summation of instantaneous power in all the branches is equal to zero.	Remember	CO1	CLO1	AEEB09.01

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3	What Are The Applications Of Tellegen's Theorem?	It is applicable to a wide range of electrical networks, The only requirement for the validation of the Tellegen's theorem in any circuit is that it satisfies the Kirchhoff's Current Law and Kirchhoff's Voltage Law.	Remember	CO1	CLO1	AEEB09.01
4	State reciprocity Theorem?	In any branch of a network or circuit, the current due to a single source of voltage (V) in the network is equal to the current through that branch in which the source was originally placed when the source is again put in the branch in which the current was originally obtained.	Understand	CO1	CLO1	AEEB09.01
5	What are the applications of reciprocity theorem?	This theorem is used in the bilateral linear network which consists bilateral components.	Remember	CO1	CLO1	AEEB09.01
6	State maximum power transfer Theorem?	In order to obtain maximum external power from a source with a finite internal resistance, the resistance of the load must equal the resistance of the source as viewed from its output terminals.	Understand	CO1	CLO1	AEEB09.01
7	State Thevenin's Theorem?	"Any linear circuit containing several voltages and resistances can be replaced by just one single voltage in series with a single resistance connected across the load".	Remember	CO1	CLO2	AEEB09.02
8	What are the applications of Thevenin's theorem?	Useful in the circuit analysis of power or battery systems and other interconnected resistive circuits where it will have an effect on the adjoining part of the circuit.	Understand	CO1	CLO2	AEEB09.02
9	State Norton's Theorem?	it is possible to simplify any linear circuit, no matter how complex, to an equivalent circuit with just a single current source and parallel resistance connected to a load	Remember	CO1	CLO2	AEEB09.02
10	State Milliman's Theorem?	when a number of voltage sources (V_1, V_2, V_3…… V_n) are in parallel having internal resistance(R_1,R_2,R_3……R_n) respectively, the arrangement can replace by a single equivalent voltage source V in series with an equivalent series resistance R.	Understand	CO1	CLO2	AEEB09.02
11	State compensation Theorem?	in a linear time invariant network when the resistance (R) of an uncoupled branch, carrying a current (I), is changed by (ΔR). The currents	Remember	CO1	CLO2	AEEB09.02

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		in all the branches would change and can be obtained by assuming that an ideal voltage source of (V_C) has been connected such that V_C= I (ΔR) in series with (R + ΔR) when all other sources in the network are replaced by their internal resistances.				
12	What are the applications of superposition theorem?	Application of superposition theorem is, we can employ only for linear circuits as well as the circuit which has more supplies.	Remember	CO1	CLO1	AEEB09.01
13	what are the reciprocity theorem applications of theorem?	Used in many electromagnetic applications, such as analyzing electrical networks and antenna systems.	Understand	CO 1	CLO1	AEEB09.01
14	What are the theorem limitations of Norton's theorem?	a)Norton's theorem is not applicable to the circuits consists of unilateral elements or non linear elements b) not applicable to the circuits consists of load in series or parallel with controlled or dependent sources.	Remember	CO1	CLO2	AEEB09.02
15	what are the theorem applications of Norton's theorem?	Norton's theorem is valid only for linear elements. .	Remember	CO1	CLO2	AEEB09.02
MODULE-II						
1	Define Transient State?	Transient response can be referred as the the system's instant behavior against input change or disturbance	Understand	CO2	CLO3	AEEB09.03
2	Define Steady State?	A state or condition of a system or process (such as one of the energy states of an atom) that does not change in time	Understand	CO2	CLO3	AEEB09.03
3	What are initial conditions?	Initial Conditions Before we can solve transient problems involving inductors and capacitors we must understand the initial conditions that apply to the differential equations	Understand	CO2	CLO5	AEEB09.05
4	What are initial conditions of inductor?	For an inductor i(0-)=i(0+) where it is assumed that a switch has been opened or closed in the network at t=0.	Remember	CO2	CLO5	AEEB09.05

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5	What are initial conditions of inductor?	For a capacitor v(0-)=v(0+) where it is assumed that a switch has been opened or closed in the network at t=0.	Remember	CO2	CLO5	AEEB09.05
6	Define time constant?	The interval required for a system or circuit to change a specified fraction from one state or condition to another.	Remember	CO2	CLO5	AEEB09.05
7	What is the formula for time constant?	In a series RC circuit, the time constant is equal to the total resistance in ohms multiplied by the total capacitance in farads .For a series RL circuit L/R	Understand	CO2	CLO5	AEEB09.05
8	What is transient response of RL circuit?	The response of a circuit (containing resistances, inductances, capacitors and switches) due to sudden application of voltage or current is called transient response	Remember	CO2	CLO5	AEEB09.05
9	What is steady-state response circuit?	It is the behavior of a circuit after a long time when steady conditions have been reached after an external excitation.	Understand	CO2	CLO5	AEEB09.05
10	What is first order differential equation?	First order differential equation is an equation. (1) in which $f(x, y)$ is a function of two variables defined on a region in the xy-plane. The. equation is of first order because it involves only the first derivative dy dx	Remember	CO2	CLO5	AEEB09.05
11	What is over damped response?	The response that does not oscillate about the steady-state value but takes longer to reach steady-state than the critically damped case. Here damping ratio is greater than one.	Understand	CO2	CLO5	AEEB09.05
12	What is under damped response?	An under damped response is one that oscillates within a decaying envelope.	Remember	CO2	CLO5	AEEB09.05
13	define the term damping ratio?	The damping ratio is a dimensionless measure describing how oscillations in a system decay after a disturbance	Remember	CO2	CLO5	AEEB09.05
14	What are different responses depending on depend ratio?	The damping ratio is a system parameter,denoted by ζ (zeta), that can vary from undamped (ζ =0), underdamped (ζ <1) criticallydamped (ζ =1)	Understand	CO2	CLO5	AEEB09.05
15	What is un damped response?	When damping ratio ζ =0 isthe undamped response consisting more oscillations	Remember	CO2	CLO5	AEEB09.05

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MODULE-III						
1	What is locus diagram?	The locus traced out by tip of current/voltage phasor or complex impedance/admittance vector when subjected to variation in circuit parameters R/L/C and source frequency.	Understand	CO3	CLO7	AEEB09.07
2	What are types of locus diagrams?	current locus diagram (V phasor as refrence), voltage locus diagram (I phasor as reference), impedance locus diagram (R-X plane), admittance locus diagram (G-B plane).	Remember	CO3	CLO7	AEEB09.07
3	Define complex frequency?	type of frequency that depends on two parameters ; one is the " σ" which controls the magnitude of the signal and the other is "w", which controls the rotation of the signal	Understand	CO3	CLO7	AEEB09.07
4	Define One port network?	It is a two terminal electrical network in which, current enters through one terminal and leaves through another terminal	Understand	CO3	CLO8	AEEB09.08
5	Define two port network?	two port network is a pair of two terminal electrical network in which, current enters through one terminal and leaves through another terminal of each port	Remember	CO3	CLO8	AEEB09.08
6	Define pole of a system?	Poles of a transfer function are the frequencies for which the value of the denominator becomes zero	Understand	CO3	CLO9	AEEB09.09
7	Define zero of a system?	Zeros of a transfer function are the frequencies for which the value of numerator of transfer function becomes zero	Remember	CO3	CLO9	AEEB09.09
8	What is the need of finding poles and zeros?	The values of the poles and the zeros of a system determine whether the system is stable, and how well the system performs.	Understand	CO3	CLO9	AEEB09.09
9	What is transfer function?	The transfer function of a control system is defined as the ratio of the Laplace transform of the output variable to Laplace transform of the input variable assuming all initial conditions to be zero.	Remember	CO3	CLO8	AEEB09.08
10	What is the transfer function?	advantage of transfer functions is that they allow engineers to use simple algebraic equations instead of complex differential equations for analyzing ,designing systems.	Remember	CO3	CLO8	AEEB09.08

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11	Define network function?	A network function is the Laplace transform of an impulse response. Its format is a ratio of two polynomials of the complex frequencies	Remember	CO3	CLO8	AEEB09.08
12	What is driving point function?	The driving point functions relate the voltage at a port to the current at the same port these functions are a property of a single port	Remember	CO3	CLO8	AEEB09.08
13	What is driving point admittance function?	The driving point admittance function YIN(s) is the reciprocal of the impedance function.	Remember	CO3	CLO8	AEEB09.08
14	What is voltage transfer function?	The voltage transfer function, which is a ratio of one voltage to another voltage.	Understand	CO3	CLO8	AEEB09.08
15	What is current transfer function?	The current transfer function, which is a ratio of one current to another current	Remember	CO3	CLO8	AEEB09.08
MODULE-IV						
1	What are Z parameters?	Z parameters are called as impedance parameters because these are simply the ratios of voltages and currents. Units of Z parameters are Ohm (Ω).	Remember	CO4	CLO11	AEEB09.11
2	Why Z parameters called as open circuit parameters?	We can calculate two Z parameters, Z_{11} and Z_{21}, by doing open circuit of port2. Similarly, we can calculate the other two Z parameters, Z_{12} and Z_{22} by doing open circuit of port1. Hence, the Z parameters are also called as open-circuit impedance parameters	Remember	CO4	CLO11	AEEB09.11
3	What are Y parameters?	Y parameters are called as admittance parameters because these are simply, the ratios of currents and voltages. Units of Y parameters are mho.	Remember	CO4	CLO11	AEEB09.11
4	Why Y parameters called as open circuit parameters?	We can calculate two Y parameters, Y_{11} and Y_{21} by doing short circuit of port2. Similarly, we can calculate the other two Y parameters, Y_{12} and Y_{22} by doing short circuit of port1. Hence, the Y parameters are also called as short-circuit admittance parameters.	Remember	CO4	CLO11	AEEB09.11
5	What are transmission parameters?	The ABCD parameters are transmission Parameters .A and D do not have any units, since those are dimension less. the units of parameters, B and C are ohm and mho respectively.	Remember	CO4	CLO11	AEEB09.11

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
6	how to calculate h parameters?	we can calculate two parameters, h_{11} and h_{21} by doing short circuit of port2. Similarly, we can calculate the other two parameters, h_{12} and h_{22} by doing open circuit of port1.	Remember	CO4	CLO11	AEEB09.11
7	how to calculate ABCD parameters?	We can calculate two parameters, A and C by doing open circuit of port2. Similarly, we can calculate the other two parameters, B and D by doing short circuit of port2.	Remember	CO4	CLO11	AEEB09.11
8	What are inverse hybrid parameters?	g parameters are called as inverse hybrid parameters. The parameters, $g_{12}$and g_{21} do not have any units, since those are dimension less. The units of parameters, g_{11} and g_{22} are mho and ohm respectively.	Understand	CO4	CLO11	AEEB09.11
9	how to calculate g parameters?	We can calculate two parameters, g_{11} and g_{21} by doing open circuit of port2. Similarly, we can calculate the other two parameters, g_{12} and g_{22} by doing short circuit of port1.	Remember	CO4	CLO11	AEEB09.11
10	Condition for symmetry in y-paramers?	$y_{11} = y_{22}$	Understand	CO4	CLO12	AEEB09.12
11	Condition for reciprocity in y-paramers?	$y_{12} = y_{21}$	Understand	CO4	CLO12	AEEB09.12
12	Condition for symmetry in z-paramers?	$z_{12}= z_{21}$	Remember	CO4	CLO12	AEEB09.12
13	Condition for reciprocity in z-paramers	$z_{11} = z_{22}$	Remember	CO4	CLO12	AEEB09.12
14	Condition for symmetry in h-paramers?	$(h_{11}h_{22} – h_{12}h_{21}) = 1$	Remember	CO4	CLO12	AEEB09.12
15	Condition for reciprocity in y-paramers?	$h_{12} = –h_{21}$	Remember	CO4	CLO12	AEEB09.12
MODULE-V						
1	What Are Types Of Filters?	• Low Pass Filter • High Pass Filter • Band Pass Filter • Band Stop Filter	Remember	CO5	CLO15	AEEB09.15
2	What Is Low pass Filter?	It Allows (Passes) Only Low Frequency Components.	Remember	CO5	CLO15	AEEB09.15

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
3	What is Band pass filter?	Band pass filter as the name suggests, it allows (passes) only one band of frequencies. In general, this frequency band lies in between low frequency range and high frequency range. That means, this filter rejects (blocks) both low and high frequency components.	Remember	CO5	CLO15	AEEB09.15
4	What Is High Pass Filter?	High pass filter as the name suggests, it allows (passes)only high frequency components. That means, it rejects (blocks) all low frequency components.	Remember	CO5	CLO15	AEEB09.15
5	What is band stop filter?	Band stop filter as the name suggests, it rejects (blocks) only one band of frequencies. In general, this frequency band lies in between low frequency range and high frequency range. That means, this filter allows (passes) both low and high frequency components.	Understand	CO5	CLO15	AEEB09.15
6	Define pass band?	Pass band is the range of frequencies or wavelengths t hat can pass through a filter. For example, a radio receiver contains a band pass filter to select the frequency of the desired radio signal out of all the radio waves picked up by its antenna. The pass band of a receiver is the range of frequencies it can receive.	Remember	CO5	CLO15	AEEB09.15
7	Define stop band?	A stop band is a band of frequencies, between specified limits, through which a circuit, a filter or telephone circuit, does not allow signals to pass, or the attenuation is above the required stop band attenuation level.	Understand	CO5	CLO15	AEEB09.15
8	What is band width?	Bandwidth is the difference between the upper and lower frequencies in a continuous band of frequencies. It is typically measured in hertz.	Remember	CO5	CLO15	AEEB09.15
9	What is low cutoff frequency?	It is the frequency either above or below which the power output of a circuit, such as a line, amplifier, or electronic filter has fallen to a given proportion of the power in the pass band.	Understand	CO5	CLO15	AEEB09.15
10	How do you calculate cutoff frequency?	The cutoff frequency is defined as the frequency where the amplitude of $H(j\omega)$ is $1\sqrt{2}$ times the DC amplitude (approximately -3dB)	Understand	CO5	CLO15	AEEB09.15

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11	What are half power frequencies?	The frequency f_2 lies in high frequency region while frequency f_1 lies in low frequency region. These two frequencies are also called as half-power frequencies since gain or output voltage drops to 70.7% of maximum value and this represents a power level of one half the powers at the reference frequency in mid-frequency region.	Remember	CO5	CLO15	AEEB09.15
12	Define attenuation?	Attenuation is a general term that refers to any reduction in the strength of a signal. Attenuation occurs with any type of signal, whether digital or analog.	Remember	CO5	CLO15	AEEB09.15
13	What are applications of attenuators?	Used as volume controls in broadcasting stations and Variable attenuators are used in laboratories, when it is necessary to obtain small value of voltage or current for testing purposes.	Remember	CO5	CLO15	AEEB09.15
14	What are applications of Active Low Pass Filters?	Used in audio amplifiers, equalizers or speaker systems to direct the lower frequency bass signals to the larger bass speakers or to reduce any high frequency noise or "hiss" type distortion.	Remember	CO5	CLO15	AEEB09.15
15	What are applications of Active High Pass Filters are	Used in audio amplifiers, equalizers or speaker systems to direct the high frequency signals to the smaller tweeter speakers or to reduce any low frequency noise.	Remember	CO5	CLO15	AEEB09.15

Signature of the Faculty **HOD, EEE**