INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

Department of Electrical and Electronics Engineering

QUESTION BANK

Course Name	**:**	**Electrical Circuits**
Course Code	**:**	**A30204**
Class	**:**	**II B. Tech I Sem**
Branch	**:**	**EEE**
Year	**:**	**2016 - 2017**
Course Faculty	**:**	Mr. T. Anil Kumar, Associate Professor

UNIT - I
SINGLE STAGE AMPLIFIER DESIGN AND ANALYSIS

Part – A (Short Answer Questions)

S. No	Question	Blooms Taxonomy Level	Course Outcome
1	Define circuit representing its parts.	Understand	2,3
2	Define the potential difference.	Understand	2,3
3	Define current.	Understand	2,3
4	Define resistance.	Understand	2,3
5	Write the expression for voltage in terms of C and Q.	Remember	2,3
6	What is the charge of an electron?	Remember	2,3
7	State OHM's law.	Remember	2,3
8	State kirchoff's laws.	Remember	2,3
9	Write the expressions of star-delta transformation.	Remember	2,3
10	Define the power and energy.	Understand	2,3
11	What is super mesh?	Analyze	2,3
12	What is super node?	Analyze	2,3
13	Write the limitations of mesh analysis.	Remember	2,3
14	Write the limitations of nodal analysis.	Remember	
15	Calculate the equivalent resistance of the circuit if applied voltage is 23V and current flowing through circuit is 4A, receving an power 92W.	Apply	2,3
16	If the charge developed between two plates is 2C and capacitance is 4.5 F, calculate the voltage across the plates.	Apply	2,3
17	If three capacitors are connected in series which are 2F, 3.2F and 6F calculate equivalent capacitance.	Apply	2,3
18	If the three inductors are in parallel with 20mH, 25mH and 50mH, calculate the equivalent inductance.	Apply	
19	Take an series circuit and prove that power delivered is equal to power received.	Analyze	1,2
20	Transform voltage to current and current to voltage using source transformation.	Analyze	1,2
21	Across AB terminal an voltage source of 25V is in series with 15 ohms resistor, apply source transformation and redraw the circuit across AB terminals.	Apply	1,2
22	If three equal value resistors are in delta , find their equivalent values in star connection.	Apply	1,2
	Part – B (Long Answer Questions)		
1	Write short notes on voltage-current relations in RLC parameters.	Understand	2,3
2	Write short notes on source transformation.	Understand	2,3
3	Explain the kirchoff's laws with neat example.	Understand	2,3
4	Derive the expressions for star-delta transformations.	Understand	2,3

5	Explain the inspection method to write mesh equation for an network.	Understand	2,3
6	Explain the inspection method to write nodal equation for an network.	Understand	2,3
7	Explain the terms super mesh and super node and apply to electrical network.	Understand	2,3
8	Classify types of elements and explain in detail.	Analyze	2,3
9	Distinguish between ideal and practical energy sources.	Analyze	2,3
10	State ohm's law and give its applicability to electrical network. Explain convention current direction and voltage across an element?	Remember, understand	2,3
11	Explain super mesh analysis with an neat example?	Understand	2,3
12	Explain super nodal analysis with an neat example?	Understand	2,3
13	Write the conventions to study any electrical circuit?	Understand	
14	Define the terms voltage, current, power, energy, node and degree of the node.	Remember	2,3
15	State voltage and current division rules and explain with neat example.	Remember	2,3
	UNIT – II **BJT & FET FREQUENCY RESPONCE**		
	Part – A (Short Answer Questions)		
1	Define the alternating quantity.	Understand	2,3
2	Give the difference between periodic and non-periodic wave form.	Analyze	2,3
3	Define the peak, peak to peak, average, RMS value also peak and form factor of sine function.	Understand	2,3
4	Represent the alternating current and voltage in terms of sine function.	Remember	2,3
5	What is reactance? Explain in detail.	Understand	2,3
6	What is impedance? Explain in detail.	Understand	2,3
7	What is admittance? Explain in detail.	Understand	2,3
8	If two impedances of (2 + 3j)ohms and (4 + 5j)ohms are in series find the total impedance, source current and power absorbed by 3 ohms if voltage applied is 50V Ac.	Apply	1,2
9	Draw the impedance triangle and explain in detail.	Understand	2,3
10	Draw the power triangle and explain in detail.	Understand	2,3
11	An AC circuit consists of 20 ohms resistance and an inductor in series, find the value of inductance if total impedance is (20 + 25j) ohms.	Apply	1,2
12	Write the expressions for voltage wave forms if wave form B lags wave form A by 30 degrees from reference axis.	Apply	1,2
13	For the given alternating voltage find peak, peak to peak, average, RMS values. V(t) = 25 sinwt.	Apply	1,2
14	why form factor is defined for half cycle of sine wave?	Analyze	2,3
15	In an AC circuit source applied is 100 sin100t across series combination of 4 ohms and 13 F, calculate source current flowing through circuit.	Apply	1,2
16	If the voltage applied is (3 + 7j)V and current flowing through circuit is (4 + 8j)A , calculate complex power and circuit constants.	Apply	1,2
17	If the voltage applied is 50V with 45 degrees and current flowing through circuit is 15A with 15 degrees , calculate complex power and circuit constants.	Apply	1,2
18	Define the power factor of the circuit and give its importance.	Understand	2,3
19	In an ac circuit two parallel impedances are in series across AB terminals, where AB terminals are fed by 100V 0 degrees. Calculate total impedance, power factor and source current. Z1 = (0.8 + j)ohms Z2 = (1 + 2j)ohms Z3 = (2 + 5j)ohms	Apply	1,2
20	In an ac circuit two parallel impedances are in series across AB terminals, where AB terminals are fed by 100V 0 degrees. Calculate total impedance, admittance and current flowing through each element Z1 = (0.8 + j)ohms Z2 = (1 + 2j)ohms Z3 = (2 + 5j)ohms.	Apply	1,2

Part – B (Long Answer Questions)			
1	Define the terms peak, peak to peak, average, RMS values and peak and form factor of sine wave.	Remember	2,3
2	Derive the expression for average and RMS values of sine wave.	Understand	2,3
3	Explain the concept of reactance and impedance offered by RLC parameters.	Understand	2,3
4	Explain the concept of susceptance and admittance offered by RLC parameters.	Understand	2,3
5	Explain all types of relations between two wave forms and write the relevant expressions.	Analyze	2,3
6	Explain the concept of active, reactive and apparent power and draw the power triangle.	Understand	2,3
7	Co-relate the impedance triangle with power triangle and explain In detail.	Analyze	2,3
8	Explain the steady state analysis of series RL circuit.	Understand	2,3
9	Explain the steady state analysis of series RC circuit.	Understand	2,3
10	Explain the steady state analysis of series RLC circuit.	Understand	2,3
11	Explain the terms phase, phase difference and phasor diagram with neat example.	Understand	2,3
12	Compare current in DC and AC circuits.	Analyze	2,3
13	Explain the nature of power factor in inductive and capacitive circuits.	Understand	2,3
14	Derive the expression for true power in ac circuits.	Understand	2,3
15	Derive the expressions for reactance and admittance of inductor and capacitor.	Understand	2,3
UNIT - III MULTIVIBRATORS			
Part – A (Short Answer Questions)			
1	What is locus diagram and give its importance?	Understand	2,3
2	Define electrical resonance.	Understand	2,3
3	Give the condition for circuit to be under resonance.	Analyze	2,3
4	Define series and parallel resonance.	Understand	2,3
5	What is the importance of cut-off frequency.	Analyze	2,3
6	Write the expression for bandwidth in terms of resonant frequency and quality factor.	Remember	2,3
7	Define quality factor and write Q-factor of inductor and capacitor.	Understand	2,3
8	Write the expression for resonant frequency of series and parallel RLC circuit.	Remember	2,3
9	In an series RLC circuit R = 1K ohms, L = 10mH and C = 0.01 µF, calculate resonant frequency, cut –off frequencies, bandwidth and quality factor.	Apply	1,2
10	Plot the locus diagram of series RL circuit with R as variable once and then XL as variable.	Analyze	2,3
11	In an series RLC circuit , R = 10 ohms, XL = 25 ohms , calculate the C value if circuit is under resonance at 40Hz and then determine impedance of the circuit at 50 Hz.	Apply	1,2
12	What are the properties of coil?	Understand	2,3
13	State faraday's law of electro-magnetic induction.	Remember	2,3
14	Write the expression for co-efficient of coupling and Define perfect coupling.	Remember	2,3
15	Define reluctance and write the expression their suggest Core to be chosen for magnetic circuit.	Understand	2,3
16	Explain the dot convention for coil to write voltage equation.	Analyze	2,3
17	Two coils of are connected in series , when they are aiding with each other total inductance is 25H and when they are opposing each other is 15H, calculate the mutual inductance and write all combinations of L1 and L2.	Apply	1,2
18	Two coils of are connected in parallel , when they are aiding with each other if self inductance of each coil is 10H and mutual inductance is 1H, calculate equivalent inductance.	Apply	1,2
19	Write flux density in terms of field intensiy.	Remember	2,3
20	Calculate equivalent inductance if three coils are coupled with coil 1 has 8H self inductance with current entering the dot, coil 2 has self inductance of 5 H with	Apply	1,2

	current entering the dot and self inductance of coil3 is 8H with current leaving the dot, Mutual inductances are, between 1 & 2 = 2H, 2 & 3 = 3H and 3 & 1 = 4H.		
Part – B (Long Answer Questions)			
1	Draw and explain the locus diagram of series RL circit with R as variable.	Understand	2,3
2	Draw and explain the locus diagram of series RL circit with XL as variable.	Understand	2,3
3	Draw and explain the locus diagram of series RLC circit with R as variable.	Understand	2,3
4	Define series resonance. Explain the voltage plots in series RLC circuit with resonance phenomenon.	Analyze	2,3
5	Define cut-off frequencies and bandwidth .Derive the expressions for cut-off frequencies and bandwidth of series RLC circuit.	Remember	2,3
6	Define Q-factor. Derive the expressions for Q-factor of inductor and capacitor element in series RLC circuit.	Remember	2,3
7	Explain the concept of DOT convention and state right hand thumb rule for coupled coils.	Analyze	2,3
8	Derive the expression for co-efficient of coupling.	Remember	2,3
9	Explain the concept of composite magnetic circuit?	Understand	2,3
10	Explain the concept of more than two coils coupled?	Understand	2,3
11	Derive the expression total inductance for two coils coupled with each other and connected in parallel with dot convention both the currents entering the dot.	Understand	2,3
12	Drive the expression for quality factor in series and parallel RLC circuits.	Understand	2,3
13	Drive the expression for bandwidth in series RLC circuits.	Understand	2,3
14	Drive the expression for bandwidth in parallel RLC circuits.	Understand	2,3
15	Explain the impedance and admittance curves in series and parallel RLC circuits respectively.	Understand	2,3
UNIT - IV LARGE SINGLE AMPLIFIERS			
Part – A (Short Answer Questions)			
1	What is network topology and write their applications?	Analyze	2,3
2	Define tree and co-tree.	Remember	2,3
3	Write the expression for number of links.	Remember	2,3
4	Write the importance and properties of incidence matrix.	Analyze	2,3
5	For 8 element 5 node graph , determine number of links.	Apply	1,2
6	Explain the steps to form tie-set matrix.	Analyze	2,3
7	Explain the steps to form cut-set matrix.	Analyze	2,3
8	Draw the graph of wheat stone bridge and find incidence matrix.	Understand	2,3
9	Draw the graph of wheat stone bridge and find tie-set matrix.	Understand	2,3
10	Draw the graph of wheat stone bridge and find cut-set matrix.	Understand	2,3
11	Define the duality and the dual elements.	Understand	2,3
12	What is the importance of tie-set matrix with electrical networks.	Analyze	2,3
13	What is the importance of cut-set matrix with electrical networks.	Analyze	2,3
14	How many fundamental cutest and tie-set are possible for a graph.	Apply	2,3
15	Take any original network and draw the dual network for that original network.	Analyze	2,3
Part – B (Long Answer Questions)			
1	What is network topology and its importance with electrical networks?	Understand	2,3
2	Give the rules, properties of incidence matrix an explain with an example.	Understand	2,3
3	Give the rules, properties of tie-set matrix an explain with an example.	Understand	2,3
4	Give the rules, properties of cut-set matrix an explain with an example.	Understand	2,3
5	Drive the relation between link currents and branch currents and write mesh equations.	Remember	2,3
6	Drive the relation between twig voltages and branch voltages and write current equations.	Remember	2,3

7	Define duality and explain how to form dual network for original network.	Understand	2,3
8	Take any graph and draw all possible trees and explain condition to form tree.	Apply	2,3
9	Define terms graph, oriented and non-oriented graph, planar and non- planar graph, tree and co-tree, branches and links, nodes and degree of the node.	Remember	2,3
10	Get the difference between basic and _augmented tie-set and cut-set.	Analyze	2,3
11	Explain the dual elements and dual network with neat example.	Understand	2,3
12	Explain incidence, tie-set and cut-set matrices wth neat example.	Understand	2,3
13	Compare incidence, tie-set and cut-set matrices.	Analyse	2,3
14	Explain the loop-set matrix in detail.	Understand	2,3
15	Write the conditions for formation of incidence, tie-set and cut-set matrices along their properties.	Understand	2,3
UNIT - V SWICTHING CHARATERISTICS OF DEVICE			
Part – A (Short Answer Questions)			
1	State tellegen's theorem.	Remember	2,3
2	State theveninn's theorem.	Remember	2,3
3	State nortan's theorem.	Remember	2,3
4	State super-position theorem.	Remember	2,3
5	State reciprocity theorem.	Remember	2,3
6	State compensation theorem.	Remember	2,3
7	State milliman's theorem.	Remember	2,3
8	What is the importance of thevenin's theorem?	Understand	2,3
9	What is the importance of nortan's theorem?	Understand	2,3
10	What is the importance of super-position theorem?	Understand	2,3
11	What is the importance of milliman's theorem?	Understand	2,3
12	What is the importance of compensation theorem?	Understand	2,3
13	Give the application of reciprocity theorem.	Analyze	2,3
14	If the thevenin's equivalent consists of 25v with 10 ohms draw the nortan's equivalent.	Apply	1,2
15	If 25v, 15v and 10v are connected across AB terminals, what is voltage measured across AB terminals?	Apply	1,2
16	Can be super-position theorem used to find power in an element? Justify your answer.	Analyze	1,2
17	The nortan's equivalent circuit consists of 10A in parallel with 8 ohms, find the load resistance for which maximum power transfer takes place.	Apply	1,2
18	If two branches are in parallel with 15V in series with 5 ohms and 5V in series with 1 ohm across AB terminals , find the current and power absorbed by 5 ohms resistor if it is connected across AB terminals.	Apply	1,2
Part – B (Long Answer Questions)			
1	State and prove tellegen's theorem with an example for DC excitation.	Remember and Understand	2,3
2	State and prove thevenin's theorem with an example for DC excitation.	Remember and Understand	2,3
3	State and prove nortan's theorem with an example for DC excitation.	Remember and Understand	2,3
4	State and prove super-position theorem with an example for DC excitation.	Remember and Understand	2,3
5	State and prove reciprocity theorem with an example for DC excitation.	Remember and	2,3

		Understand	
6	State and prove compensation theorem with an example for DC excitation.	Remember and Understand	2,3
7	State and prove milliman's thoerem theorem with an example for DC excitation.	Remember and Understand	2,3
8	State and prove thevenin's theorem with an example for AC excitation.	Remember and Understand	2,3
9	State and prove super-position theorem with an example for ACexcitation.	Remember and Understand	2,3
10	State and prove nortan's theorem with an example for AC excitation.	Remember and Understand	2,3
11	Prove the condition for maximum power transfer with DC excitation and explain	Understand	2,3
12	Prove the condition for maximum power transfer with AC excitation and explain	Understand	2,3
13	State and explain the milliman's theorem .(DC)	Understand	2,3
14	State and explain the milliman's theorem .(AC)	Understand	2,3
15	Explain the thevenin's equivalent and norton's equivalent circuit with their importance.	Understand	

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