

ANURAG Engineering College
(An Autonomous Institution)

II B.Tech I Semester Supplementary Examinations, Jan/Feb-2024

ELECTRICAL CIRCUIT ANALYSIS
(ELECTRICAL AND ELECTRONICS ENGINEERING)

Time: 3 Hours

Max. Marks: 75

Section – A (Short Answer type questions)

(25 Marks)

Answer All Questions

1. State Millman's theorem.
2. Define (i) Form Factor (ii) Peak Factor
3. What is the steady state response?
4. Define the Time Constant.
5. Define Locus diagram
6. Write the relation between resonant frequency, bandwidth and quality factor?
7. Write the conditions for reciprocity for Z and ABCD parameters.
8. Draw constant-k low pass filter (prototype).
9. Define i) Tree ii) Co-Tree
10. Write the relationship between line and phase quantities in a 3-phase delta balanced connected system.

Course Outcome	B.T Level	Marks
CO1	L2	2M
CO1	L2	3M
CO2	L1	2M
CO2	L2	3M
CO3	L2	2M
CO3	L1	3M
CO4	L1	2M
CO4	L2	3M
CO5	L2	2M
CO5	L1	3M

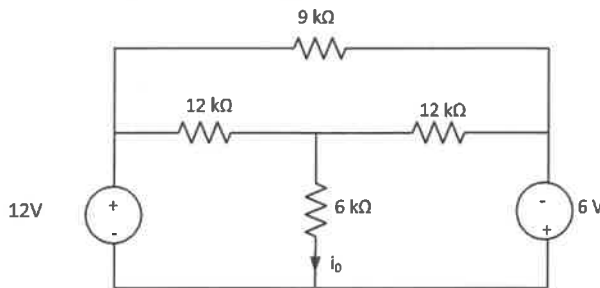
Section B (Essay Questions)

Answer all questions, each question carries equal marks.

(5 X 10M = 50M)

11. A) Find i_0 by using the nodal analysis.

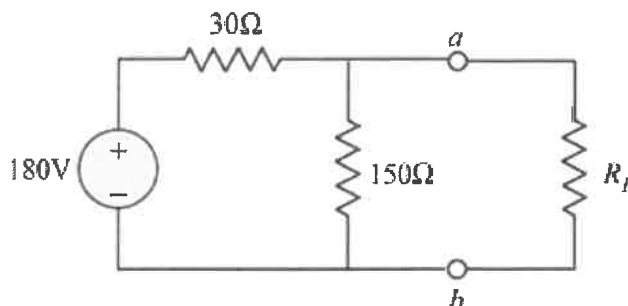
CO1 L3 10M



OR

- B) i) Find the load R_L that will result in maximum power delivered to the load given below figure Also determine the maximum power P_{max} .

CO1 L3 5M



- ii) Derive the expression for Average value and RMS value for sinusoidal wave form.

CO1 L3 5M

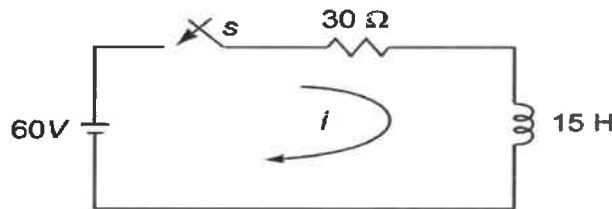
12. A) Derive the expression for transient response of RC Circuit excited by Sinusoidal Voltage Source.

CO2 L3 10M

OR

- B) A series RL circuit with $R = 30\Omega$ and $L = 15H$ has a constant voltage $V = 60V$ applied at $t = 0$ as shown in below in figure. Determine the current i , the voltage across resistor and the voltage across the inductor.

CO2 L3 10M



13. A) Construct the Locus diagram for series R-C circuit with constant R and variable X_L ?

CO3 L3 10M

OR

- B) A series resonant circuit contains a 10Ω resistor, 20 mH inductance and a $2\mu F$ capacitance. Determine i) Resonance Frequency
ii) Cut off frequencies iii) Band Width iv) Quality Factor.

CO3 L3 10M

14. A) i) The Z parameters of a two-port network are $Z_{11} = 6\Omega$, $Z_{22} = 4\Omega$, $Z_{12} = Z_{21} = 3\Omega$. Compute h and ABCD Parameters and write the describing equations.

CO4 L3 6M

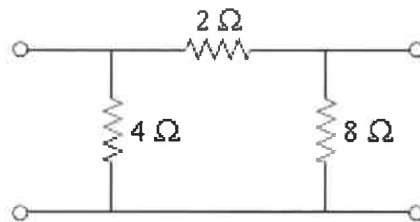
- ii) Find the relationship between Transmission Parameters & Admittance Parameters.

CO4 L3 4M

OR

- B) i) Obtain Y Parameters for the network shown in below figure.

CO4 L3 5M

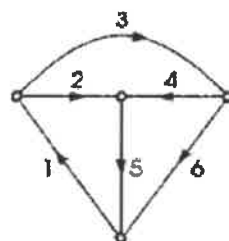


- ii) Construct the circuit diagram of a Band Pass Filter. Explain the design procedure of the Band Pass Filter in detail.

CO4 L3 5M

15. A) Determine the basic cut-set schedule for the oriented graph shown in figure below by selecting 2, 4 and 5 branches as Tree?

CO5 L3 10M



OR

- B) i) Derive the relationship between line and phase quantities in a 3-phase balanced star connected system.

CO5 L3 5M

- ii) A balanced delta-connected load of $(2 + j3)$ W per phase is connected to a balanced three-phase 440 V supply. The phase current is 10 A. Find the a) total active power b) reactive power.

CO5 L3 5M