

B.Tech I Year (R13) Supplementary Examinations December 2017

NETWORK ANALYSIS

(Common to ECE & EIE)

Time: 3 hours

Max. Marks: 70

PART – A

(Compulsory Question)

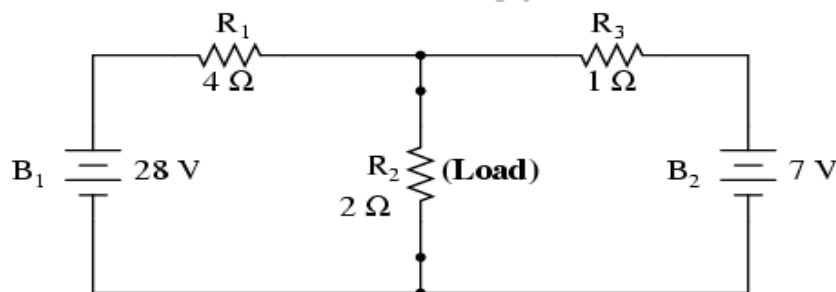
- 1 Answer the following: (10 X 02 = 20 Marks)
- Distinguish between a Branch and a node of a circuit.
 - State Thevenins theorem.
 - What is meant by poles and zeros?
 - Write a note on free and forced responses.
 - What are the conditions for resonance?
 - What is meant by quality factor?
 - Express Z-parameters in terms of the h-parameters.
 - Define state variable.
 - Discuss the drawbacks of constant k- low pass filter.
 - Define band elimination filter.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

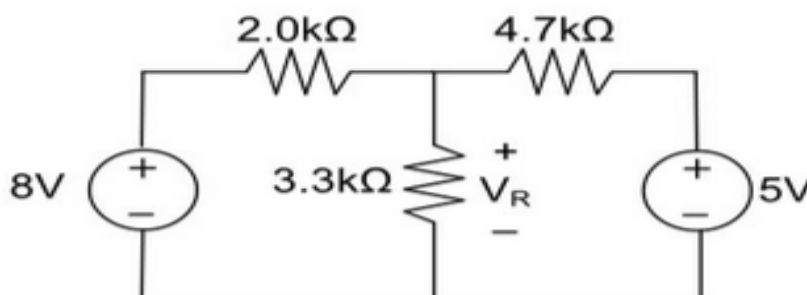
UNIT – I

- 2 (a) Explain the properties of incidence matrix.
 (b) Find the Norton equivalent of the following circuit by taking $2\ \Omega$ resistance as load.



OR

- 3 (a) Explain the terms: (i) Cut set and Cut – set schedule. (ii) Tie set.
 (b) Using the superposition theorem, determine the voltage drop and current across the resistor $3.3\text{ k}\Omega$ as shown in figure below.



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UNIT – II

- 4 Explain sinusoidal response of series RLC circuit with circuit diagram, phasor diagram and waveforms with mathematical expressions.

OR

- 5 Explain in detail about instantaneous power, average power, apparent power and power factor.

UNIT – III

- 6 (a) Compare series resonance and parallel resonance circuits.
(b) A sinusoidal voltage $V(t) = (200v)\sin\omega t$ is applied to a series RLC circuit with $R = 20 \Omega$, $L = 10mH$, $C = 100nF$. Find the following quantities: (i) The resonant frequency. (ii) The amplitude e of the current at resonance. (iii) The quality factor of the circuit.

OR

- 7 (a) Obtain an expression for coefficient of coupling.
(b) Two similar coils connected in series gave a total inductance of 600mH and when one of the coil is reversed, the total inductance is 300mH. Determine the mutual inductance between the coils and coefficient of coupling.

UNIT – IV

- 8 The Z parameters of two port network are $Z_{11} = 20 \Omega$, $Z_{22} = 30 \Omega$, $Z_{12} = Z_{21} = 10 \Omega$. Find Y parameters and ABCD parameters of the network.

OR

- 9 (a) Explain the advantages of state variable analysis.
(b) Derive the State and Output equations.

UNIT – V

- 10 (a) Explain in detail about characteristics impedance and propagation constant of symmetric T-network.
(b) Explain in detail about pass band, stop band and cut off frequency of filters.

OR

- 11 Design 'm' derived low pass T-section filter having cut-off frequency of 1000 Hz. Design impedance $R_o = 500 \Omega$ and Resonant frequency of 1200 Hz.
