**Code: 13A04101**

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

**PART – B**
(Answer all five units, 5 X 10 = 50 Marks)
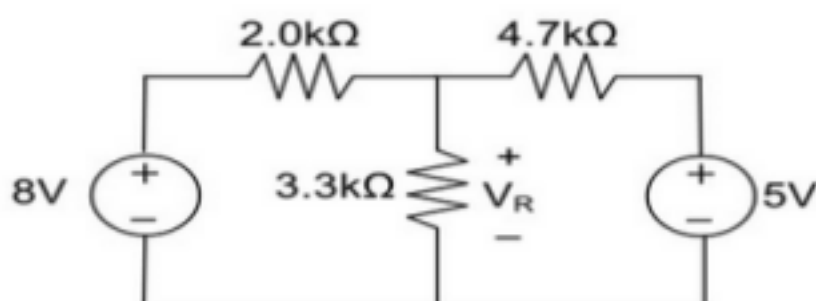UNIT – I

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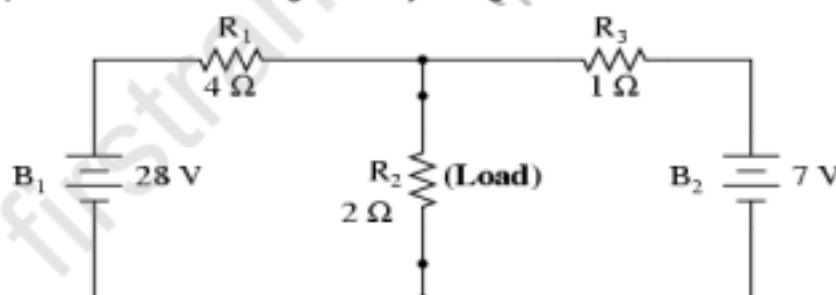


**OR**

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 kΩ 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.

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