Code: 13A04101

B.Tech II Year II Semester (R13) Supplementary Examinations December 2017
NETWORK ANALYSIS
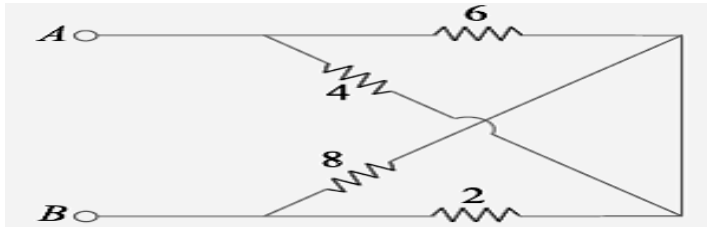(Electronics & Communication Engineering)

Time: 3 hours   Max. Marks: 70
PART – A
(Compulsory Question)
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1   Answer the following: (10 X 02 = 20 Marks)
  (a)   Write about Tie-set and Cut-set.
  (b)   What is the equivalent resistance of the circuit given below between terminals A and B? All resistances
        are in ohms.

  (c)   Define form factor & crest factor.
  (d)   Define RMS value or effective value of an alternating quantity.
  (e)   Define quality factor of the coil.
  (f)   Write the condition for resonance in series RLC circuit
 (g)   Find the h parameters for the network shown below.

  (h)   If $Z_{11} = 2\ \Omega$, $Z_{12} = 1\ \Omega$, $Z_{21} = 1\ \Omega$, and $Z_{22} = 3\ \Omega$, calculate the determinant of admittance matrix.
  (i)   Write the applications of different types of Filters.
  (j)   Define high pass filter.

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

UNIT – I

2   Define Thevenin's theorem and Obtain the current flowing through the 1 ohms resistor for the given
        circuit using Thevenin's theorem.
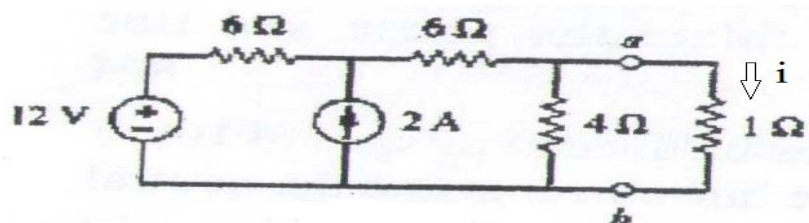
OR

3   Calculate the direction and magnitude of the current through the 5 ohm resistor between points A and B
        for given circuit by using nodal voltage method. Verify it by using mesh analysis.
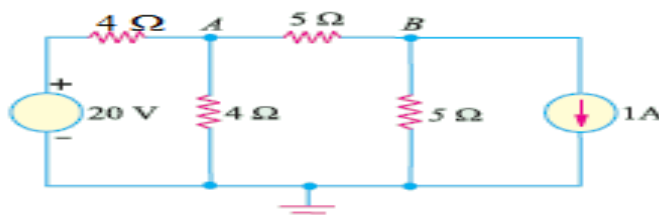
UNIT – II

4 Two circuits, the impedance of which are given by $Z_1 = 10 + j15$ and $Z_2 = 6 - j8$ ohm are connected in parallel. If the total current supplied is 15 A, what is the power taken by each branch? Find also the p.f of individual circuits and of combination. Draw vector diagram.

OR

5 Explain sinusoidal response of series RL circuit with circuit diagram, phasor diagram and waveforms along with mathematical expressions.

UNIT – III

6 Define and derive the bandwidth of an RLC series circuit. In the series RLC circuit assume that $R = 2\ \Omega$, $L = 1$ mH and $C = 0.4$ μF. Calculate resonant frequency, quality factor and band width.

OR

7 A coil of resistance $20\ \Omega$ and inductance 200μH is in parallel with a variable capacitor. This combination is in series with a resistor of 8000 Ω. The voltage of the supply is 200 V at a frequency of 10^6 Hz. Calculate: (i) The value of C to give resonance. (ii) The Q of the coil. (iii) The current in each branch of the circuit at resonance.

UNIT – IV

8 Derive the Transmission parameters and inverse transmission parameters and find the transmission parameters for the circuit shown in figure.
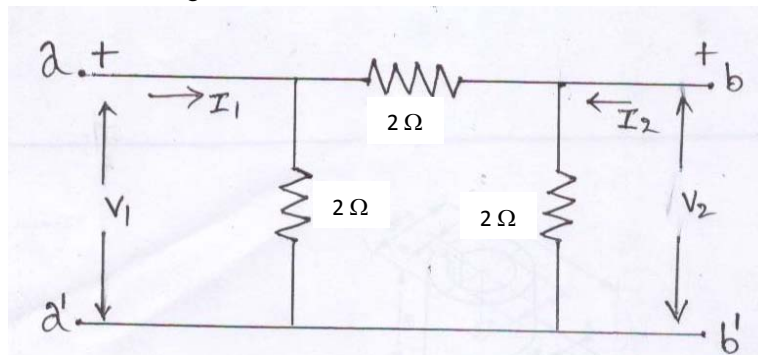
OR

9 Define Z – parameters and Y – parameters of a two port network and convert Z-parameters in terms of Y – parameters and vice versa.

UNIT – V

10 Derive and design equations for Constant-k Low Pass Filter and also design a constant–k low pass T and π section filters having cut-off frequency of 2 kHz and nominal characteristic impedance of 500 ohms.

OR

11 Determine the characteristic impedance of m- derived filter and design a m-derived high pass T section filter with a cut off frequency of 10 kHz, design impedance of 5 ohms and m = 0.4.

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