Code No: 07A1EC05 **Set No. 1**

**I B.Tech Regular Examinations, May/Jun 2008**
**NETWORK ANALYSIS**
**( Common to Electronics & Communication Engineering, Electronics & Instrumentation Engineering, Bio-Medical Engineering, Electronics & Control Engineering, Electronics & Telematics and Electronics & Computer Engineering)**

**Time: 3 hours** **Max Marks: 80**

**Answer any FIVE Questions**
**All Questions carry equal marks**

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1. A circuit consisting of three resistances 12 Ω, 18Ω and 36 Ω respectively joined in parallel is connected in series with a fourth resistance. The whole circuit is applied with 60V and it is found that the power dissipated in the 12 Ω resistor is 36 W. Determine the value of the fourth resistance and the total power dissipated in the circuit. [16]

2. Derive expression for R.M.S. and average value of a sinusoidal alternating quantity. [16]

3. An impedance $Z_1 = 10 + j10\ \Omega$ is connected in parallel with another impedance of resistance 8.5 Ω and a variable capacitance connected in series. Find C such that the circuit is in resonance at 5 KHz. [16]

4. For the network shown in figure 4 draw oriented graph and draw all possible trees. [16]

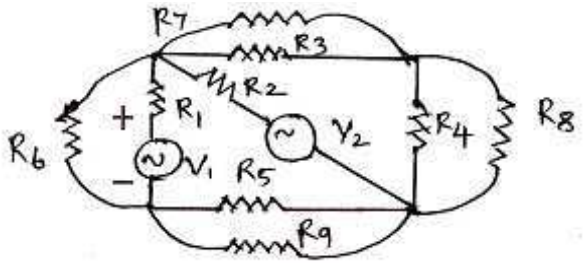


Figure 4

5. Using Norton's theorem, find the current through the load impedance $Z_L$, for the network as shown in figure 5. [16]

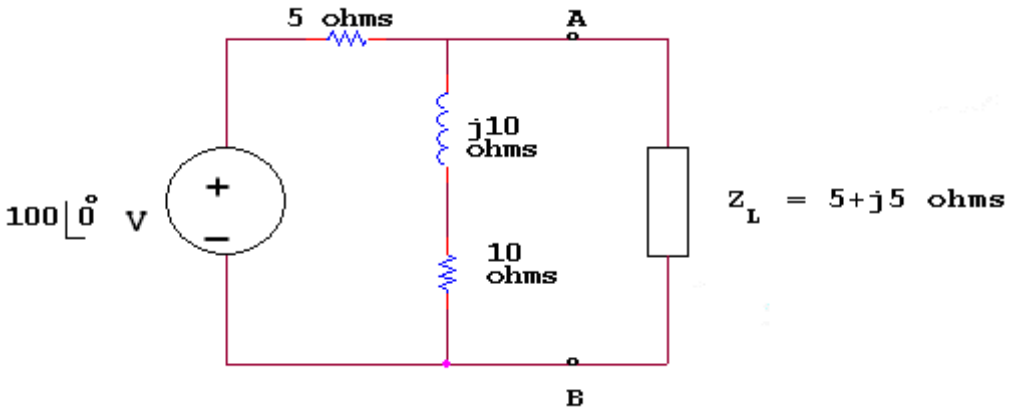


Figure 5

6. For the two port network shown in the figure 6, the currents $I_1$ and $I_2$ entering at port 1 and 2 respectively are given by the equations.
   $I_1 = 0.5\ V_1 - 0.2\ V_2$
   $I_2 = -0.2V_1 + V_2$

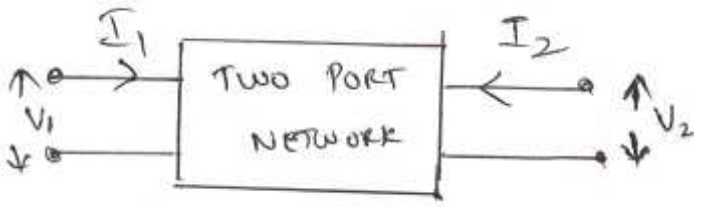


Figure 6

Where $V_1$ and $V_2$ are the port voltages at port 1 and 2 respectively. Find the Y, Z, ABCD parameters for the network. Also find its equivalent Π network. [16]

7. Derive the transient response of RLC series circuit with unit step input. [16]

8. Design a symmetrical T attenuator to give 20 db attenuation to have a characteristic impedance of 75 Ω. [16]

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Code No: 07A1EC05 **Set No. 2**

**I B.Tech Regular Examinations, May/Jun 2008**
**NETWORK ANALYSIS**
**( Common to Electronics & Communication Engineering, Electronics & Instrumentation Engineering, Bio-Medical Engineering, Electronics & Control Engineering, Electronics & Telematics and Electronics & Computer Engineering)**

**Time: 3 hours** **Max Marks: 80**

**Answer any FIVE Questions**
**All Questions carry equal marks**

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1. A circuit consists of three resistors 3 ohms, 4 ohms and 6 ohms in parallel and a fourth resistor 4 ohms in series. A battery of emf 12 V and internal resistance 6 ohms is connected across the circuit. Find the total current in the circuit and terminal voltage across the battery. [16]

2. A metal filament lamp, rated at 750 Watts, 100V is to be connected in series with a capacitor across a 230V, 60 Hz supply. Calculate [16]

   (a) The capacitance required

   (b) The power factor.

3. Determine the value of the capacitance C in order that the circuit in the figure 3 is resonant at 6366 Hz. [16]

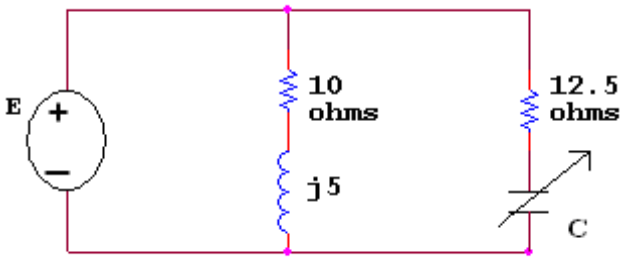


Figure 3

4. For the network shown in figure 4 find the tie-set matrix loop current. [16]

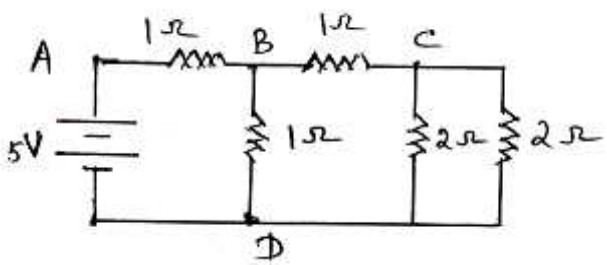


Figure 4

5. Use Thevenin's Theorem and find the current through (5+j4) ohms impedance, for the network as shown in figure 5. [16]

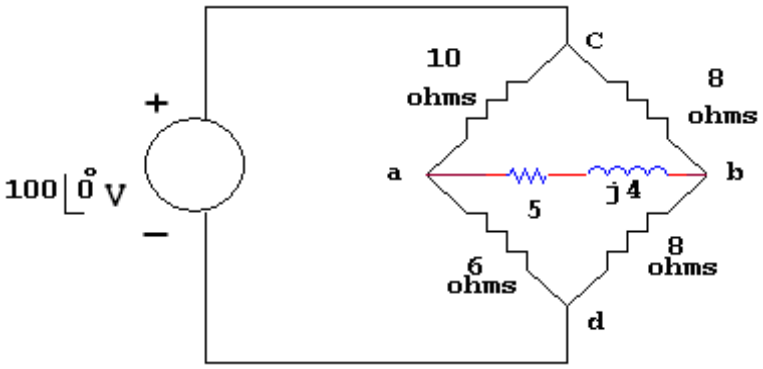


Figure 5

6. Determine the Z parameters of the network shown in figure 6. [16]

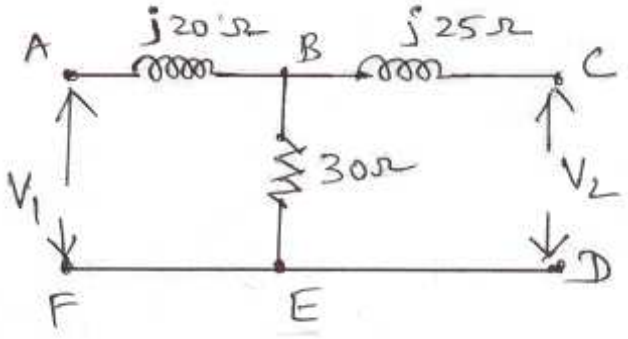


Figure 6

7. Derive the transient response of RLC series circuit with unit step input. [16]

8. Design a composite high pass filter to operate into a load of 600 ohms and have a cutoff frequency of 1.2 kHz. The filter is to have one constant K section, one m-derived section with infinite frequency of 1.1kHz and suitable termination half section. [16]

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Code No: 07A1EC05 **Set No. 3**

**I B.Tech Regular Examinations, May/Jun 2008**
**NETWORK ANALYSIS**
**( Common to Electronics & Communication Engineering, Electronics & Instrumentation Engineering, Bio-Medical Engineering, Electronics & Control Engineering, Electronics & Telematics and Electronics & Computer Engineering)**

**Time: 3 hours** **Max Marks: 80**

**Answer any FIVE Questions**
**All Questions carry equal marks**

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1. (a) Derive the expression for energy stored in an indicator.
   (b) A 50 ohm resistor is in parallel with a 100 ohm resistor. The current in 50 ohm resistor is 7.2A. What is the value of third resistance to be added in parallel to make the line current as 12.1A? [6+10]

2. (a) Define
      i. frequency,
      ii. phase
      iii. form factor and
      iv. peak factor
   (b) Explain the term phase difference. [4×3+4]

3. (a) Write down the relationship between phase voltage and line voltage and phase current and line current in a delta connected circuit.
   (b) Draw a 3 phase sinusoidal voltage system waveform with RYB sequence.
   (c) Draw the phasor diagram for delta and star connected loads. [6+5+5]

4. Write the matrix loop equation for the network shown in figure 4 and determine the loop currents. [16]

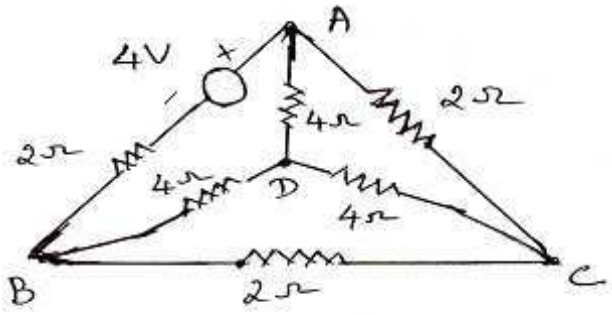


Figure 4

5. Find $V_a$ using Super position principle in the circuit shown in the figure 5. [16]

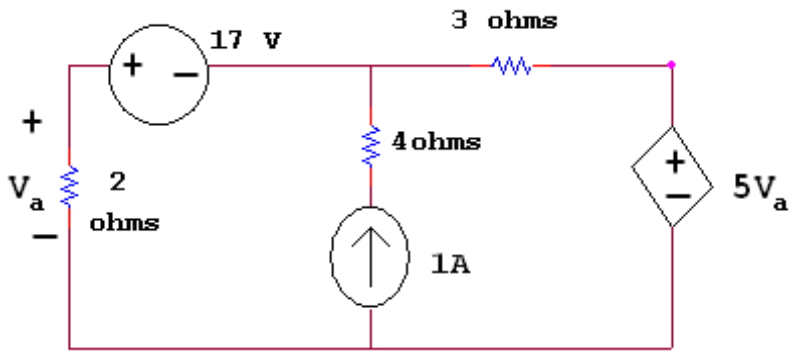


Figure 5

6. Find the Y - parameters of the network shown in figure 6: [16]

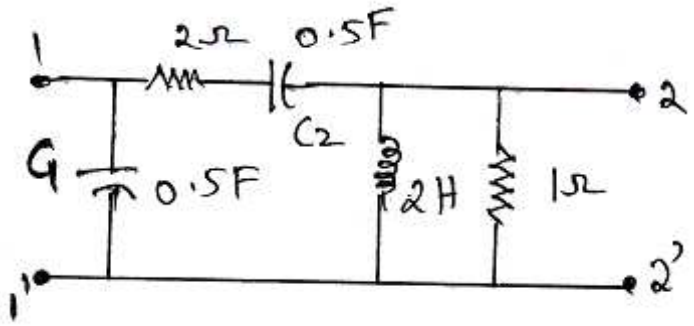


Figure 6

7. In the circuit shown in figure 7, $E_g$ (t) = 2.5 t Volts. What are the values of i(t) and VL(t) at t = 4 seconds. [16]

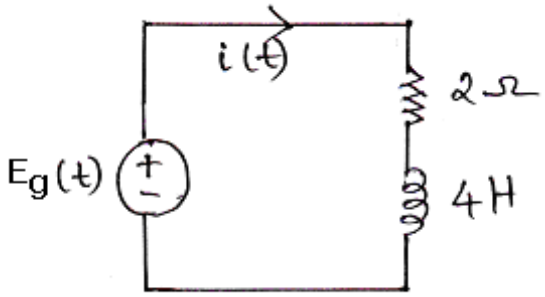


Figure 7

8. Design a symmetrical T-attenuation to give 20 dB attenuation and to have characteristic impedance of 300Ω. [16]

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Code No: 07A1EC05 **Set No. 4**

**I B.Tech Regular Examinations, May/Jun 2008**
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**Time: 3 hours** **Max Marks: 80**

**Answer any FIVE Questions**
**All Questions carry equal marks**

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1. (a) State Ohm's law and Kirchoff's voltage law.
   (b) Obtain the potential difference $V_{AB}$ in the circuit shown in figure 1 using Kirchoff's laws. [6+10]

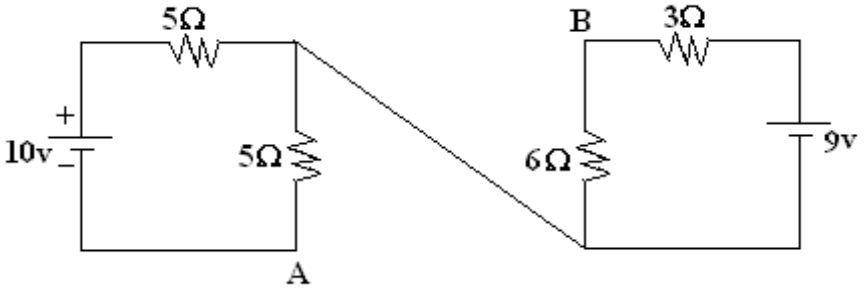


Figure 1

2. A current i = 4 sin (314t - 100) produces a voltage drop v = 220 sin (314t - 200) in a circuit. Find the values of the circuit parameters assuming a series circuit. [16]

3. Three impedances, each consisting of 20Ω resistance and 15 Ω inductive reactance in series, connected in star, are across a 400V, 3 phase supply. Calculate
   (a) line current
   (b) phase current
   (c) total power consumed
   (d) power factor of the load. Also draw the phasor diagram. [16]

4. For the graph in the figure 4, write the cut set schedule and obtain the relation between tree branch voltages and branch voltages. [16]

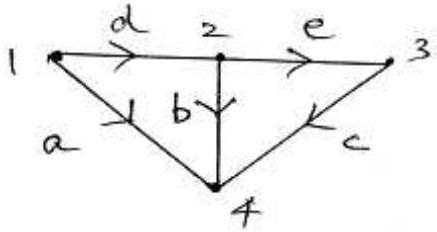


Figure 4

5. (a) State and explain Thevenin's Theorem.
   (b) What are the limitations of Thevenin's Theorem.
   (c) Explain the steps to apply Thevenin's Theorem and draw the Thevenin's equivalent circuit. [6+4+6]

6. For the two port network shown in the figure 6, the currents $I_1$ and $I_2$ entering at port 1 and 2 respectively are given by the equations.
   $I_1 = 0.5\ V_1 - 0.2\ V_2$
   $I_2 = -0.2V_1 + V_2$

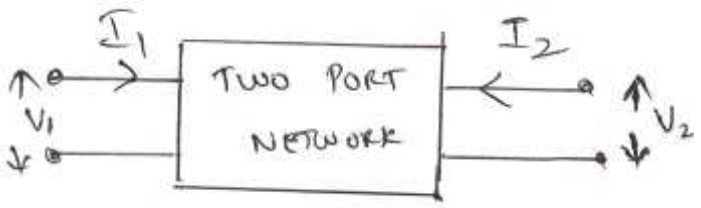


Figure 6

Where $V_1$ and $V_2$ are the port voltages at port 1 and 2 respectively. Find the Y, Z, ABCD parameters for the network. Also find its equivalent Π network. [16]

7. In a series RL circuit, with R = 3Ω & L = 1H, a D.C. Voltage of E = 50V is applied at t=0. Find the transient response of current. Plot the response also. [16]

8. Design a m-derived HPF with a cut-off frequency of 10KHz. Design impedance of 500Ω and m = 0.4. [16]

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