Code :R5100406

R5

B.Tech I Year (R05) Supplementary Examinations, December 2010
NETWORK ANALYSIS
(Electronics & Communication Engineering, Electronics & Instrumentation Engineering, Biomedical Engineering, Electronics & Computer Engineering)

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

Answer any FIVE questions
All questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. (a) State and Explain the Volt-Ampere relation Ships for R,L and C Parameters.
   (b) Draw the Wave forms for i_R, i_L, i_c for the Circuit show in figure. When it is excited by a Voltage source having a Waveform shown in Figure 1.

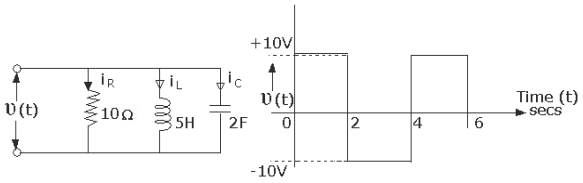

Figure 1:

2. (a) Explain the Dot Convention for mutually coupled coils.
   (b) Derive the Expression for coefficient coupling between pair of magnetically coupled coils.
   (c) Write the Loop Equations for the Coupled circuit shown in Figure 2.

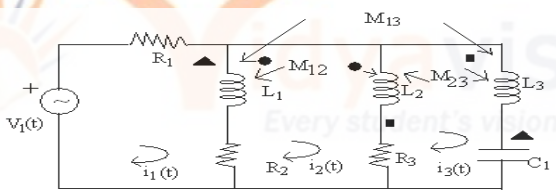

Figure 2:

3. (a) Show that in a series R-L-C circuit, the resonant frequency is the geometric mean of half power frequencies.
   (b) The voltage applied to a circuit and the current drawn are V= (200 – j100)V and I= (60 + j40) A respectively. Determine the circuit parameters and power dissipated.
   (c) Derive the expression for i(t) when the switch S is suddenly Closed at t=0 in the circuit shown in Figure 3. Sketch the variation of i(t) with Respect to time.

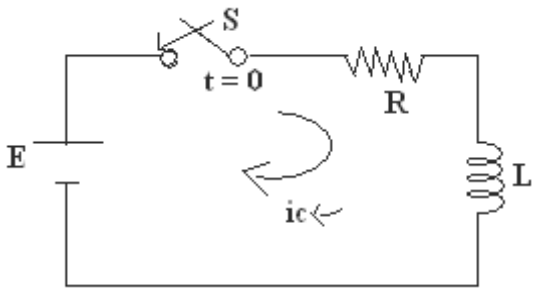

Figure 3:

4. (a) A Voltage V Sin(wt+ϕ) is applied to an initially relaxed RL series circuit. Find the value of ϕ for which there will be no transient current in the circuit. Use Laplace Transform method.
   (b) Find RMS and average value of Voltage wave form shown in Figure 4.

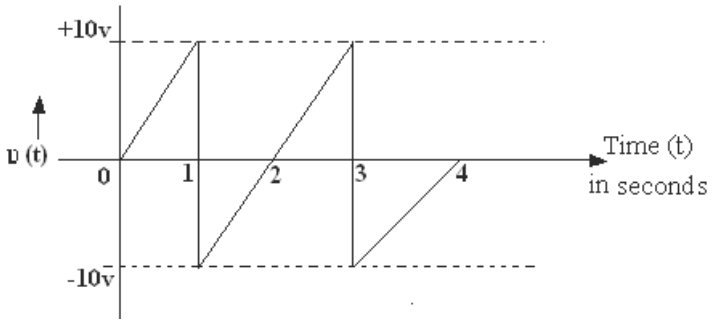

Figure 4:

5. (a) State and explain Max. Power transfer theorem which a circuit is excited by a.c. source.
   (b) Find the load impedance for max. power transfer in the network of Figure 5? If the load is purely resistive, what will be its value for max. power transfer? Also, find the max. power taken by the load in both cases.

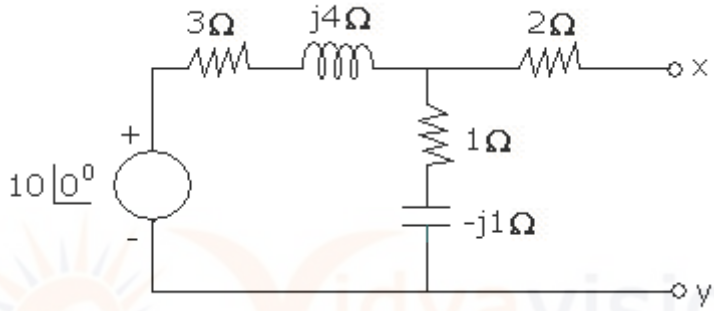

Figure 5:

6. (a) Obtain the expressions of ABCD parameters in terms of z parameters.
   (b) Determine the ABCD parameters of given network as shown in Figure 6.

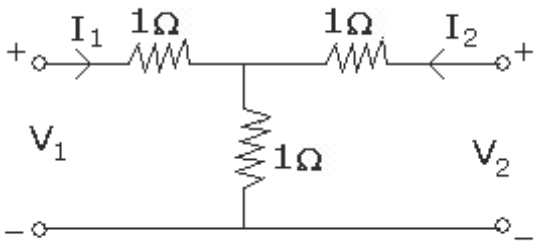

Figure 6:

7. (a) For a standard T section, show that $Z_{o(T)}$ is given by $\sqrt{z_1 z_2\left(1+\frac{z_1}{4z_2}\right)}$
   (b) For a T-network, the total series inductance in 40 mH and the total shunt capacitance is 0.2 μF. Calculate
      i. cut off frequency
      ii. the image impedance
      iii. Attenuation constant and phase constant at 3500 Hz and 4500 Hz.
8. What is composite filter? Draw its circuit diagram? Give a general procedure for its design?

$\star\star\star\star\star$