Code :R5100406

R5

B.Tech I Year (R05) Supplementary Examinations, May 2011
NETWORK ANALYSIS
(Common to 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

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1. (a) State and Explain Kirchoff's Laws.
   (b) Derive the expression for energy stored in an ideal capacitor.
   (c) Find the value of R and the current flowing through it when the branch AD carries no current. (Figure 1)

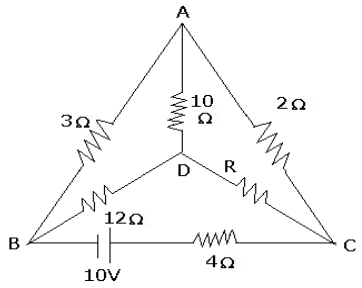

Figure 1:

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.

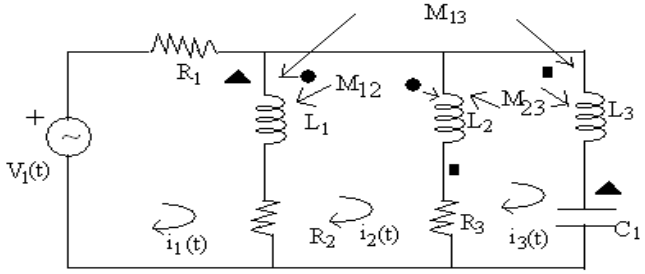

Figure 2:

3. (a) Derive the expression for "Band Width" in a series R-L-C circuit. Discuss the effect of Resistance of the circuit on Band Width.
   (b) In the circuit shown in Figure 3, the switch 's' is in position 1 for a long time and is moved to position 2 at t=0. Determine the expression for $V_R(t)$ and $V_C(t)$.

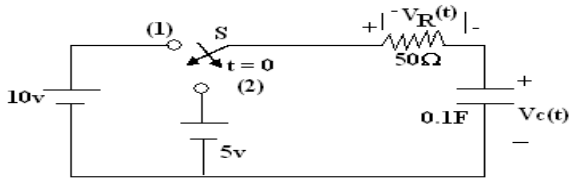

Figure 3:

4. (a) Determine the current i(t) in the network (Figure 4) shown using Laplace Transforms.
   (b) Define RMS value, Average value, Form factor & peak factor of a periodic quantity. Determine the above values for a full wave rectified sine wave.

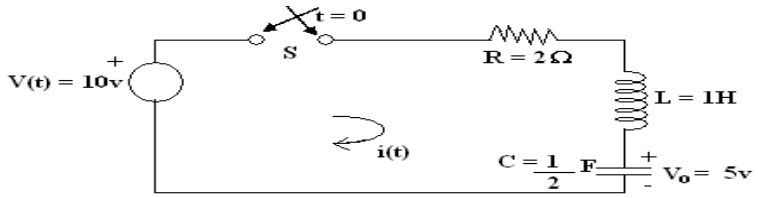

Figure 4:

5. (a) A heating element pure resistive rated for 450 watts, 110 V is to be worked from 220V, 50Hz main supply by connecting a series inductor. Calculate the value of the inductance needed?

   (b) A load consumes 100 watts at 0.8 p.f lagging. If the load voltage and current phasors are expressed as follows, evaluate A and B:
   V=(25+jA) volts
   I=(B+j1) Amps.

6. (a) A typical two-port network is characterized by the equation $2V_1+4I_2=I_1$ and $V_2+6V_1=8I_2$. Determine the values of
   i. y_{11}
   ii. z_{21} and
   iii. h_{21}

   (b) Obtain the input and output impedances of an amplifier having $h_{11}=2\Omega$; $h_{12}=1\Omega$; $h_{21}=5$ and $h_{22}=2\Omega$, if it is driven by a source having an internal resistance of 4Ω and is terminated through a load which draws maximum power from the amplifier.

7. (a) Draw the circuit of symmetrical Bridged T-attenuator. Derive the design equations for the symmetrical Bridged T-attenuator.

   (b) Design symmetrical bridged T-attenuator with design impedance of 300Ω amd attenuation of 60dB.

8. (a) Explain the variation of attenuation, phase shift and characteristic impedance of m derived low pass filter?

   (b) Design a low pass m derived T section having a cut off frequency of 2.5 KHz, a frequency of infinite attenuation 2.65 KHz and a design impedance of 600 ohm.

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