CODE NO: R09220205 | R09 | SET No - 1

II B.TECH - II SEMESTER EXAMINATIONS, APRIL/MAY, 2011

NETWORK THEORY

(ELECTRICAL AND ELECTRONICS ENGINEERING)

Time: 3hours **Max. Marks: 75**

Answer any FIVE questions
All Questions Carry Equal Marks

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1.a) Derive the expression for the power measured and power factor in the two watt meter method applied for balanced loads.

b) A 3-phase 500 V motor operates at a power factor of 0.4 and takes an input power of 30 kW. Two watt meters are employed to measure the input power. Find readings on each instrument. [7+8]

2.a) The circuit shown in the figure 1 has no stored energy. Find the Laplace transform of current supplied by the battery up on the closure of switch at t = 0. Hence find the initial and final values of the current.

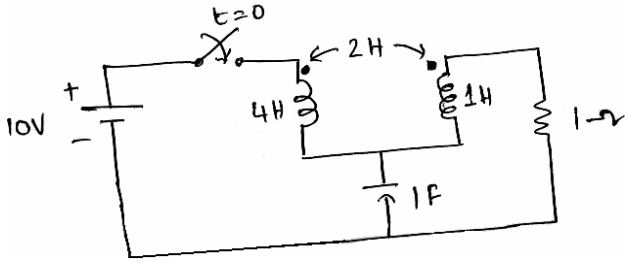

Figure 1

b) Explain the procedure adopted for the evaluation of initial conditions. [8+7]

3.a) Derive expression for the transient response of an R L series circuit excited by sinusoidal excitation.

b) A series R C circuit with R = 100 Ω and C = 25 μF has a sinusoidal excitation V(t) = 250 Sin 500t. Find the total current assuming that the capacitor is initially uncharged. [7+8]

4.a) Find the transform impedance of the network shown in below figure 2.

b) What is a transfer function? Explain the necessary conditions for transfer functions. [8+7]

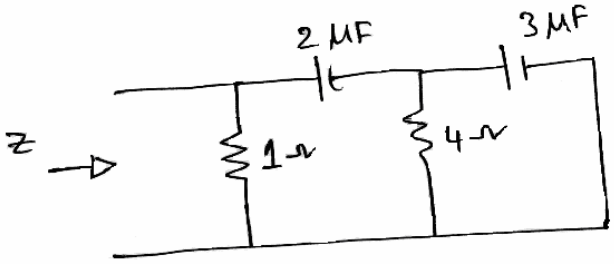

Figure 2

5.a) For the circuit shown in the figure 3 find Z and Y parameters.

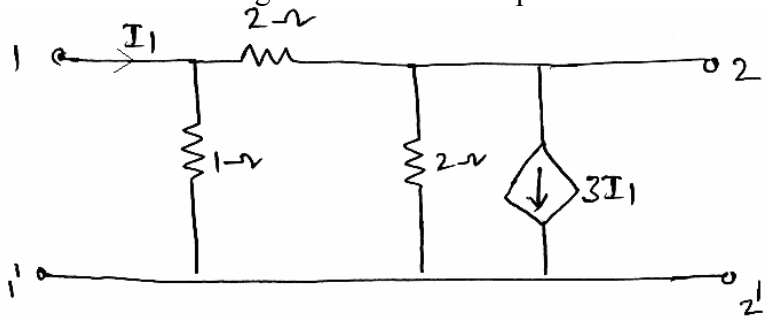

Figure 3

b) Express Y – parameters in terms of h – parameters. [8+7]

6. Find the Y – parameters and ABCD parameters for the following network (figure 4). [15]

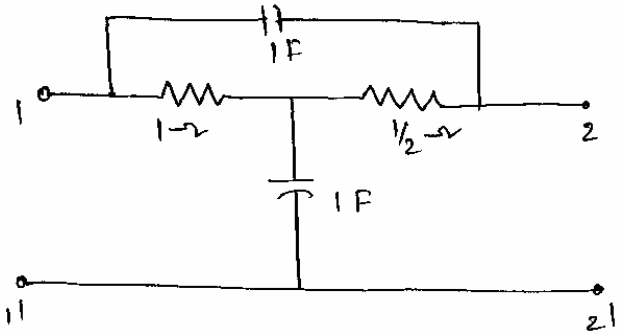

Figure 4

7.a) Explain the general configuration and parameters of a constant - K low pass filter T and π - Sections.

b) Design a constant – K T-Section and π - section low pass filter having cut off frequency f_c = 2kHz and normal impedance Z0 = 600 Ω. [7+8]

8.a) Determine the function f(t) if the Fourier Transform of the function is

$$F(jw) = \begin{cases} A\, e^{j\pi/2} & -w_0 < w < 0 \\ A\, e^{-j\pi/2} & 0 < w < w_0 \end{cases}$$

b) Determine the Fourier series of the wave form shown in figure 5using Trigonometric series. [7+8]

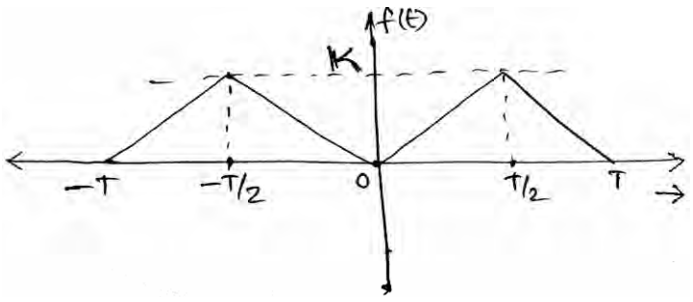

Figure 5

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CODE NO: R09220205 | R09 | SET No - 2

II B.TECH - II SEMESTER EXAMINATIONS, APRIL/MAY, 2011

NETWORK THEORY

(ELECTRICAL AND ELECTRONICS ENGINEERING)

Time: 3hours **Max. Marks: 75**

Answer any FIVE questions
All Questions Carry Equal Marks

\- - -

1.a) Derive expression for the power measured in two watt meter method for un balanced loads.

b) The two watt meter readings in a 3 - phase power measurement are 800 W and 400 W. The latter reading is being obtained after the reversal of current coil. Calculate the total power and power factor of the load. [7+8]

2.a) A current source of the figure 1 shown below supplies at current

$i(t) = 0, \quad t \le 0$

$i(t) = t, \quad t > 0.$

Find $V_0(t)$

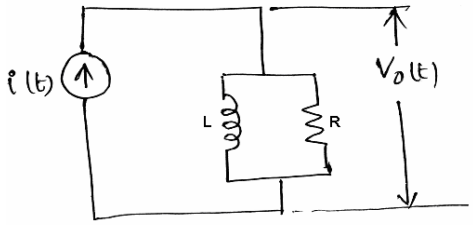

Figure 1

b) Derive the expression for the transient response of RC series circuit excited by a dc voltage source. Use Laplace technique. [8+7]

3.a) Derive the expression for the transient response of an RLC series circuit excited by a Sinusoidal source.

b) A Sinusoidal Voltage of 12 sin 8 t Volts is applied at t = 0 to a RC series of R= 4Ω and L = 1 H. By Laplace transform method determine the circuit current i (t) for $t \ge 0$. Assume zero initial condition. [7+8]

4.a) Explain the necessary conditions for driving point functions.

b) Find the transform impedance of the following circuit (figure 2). [8+7]

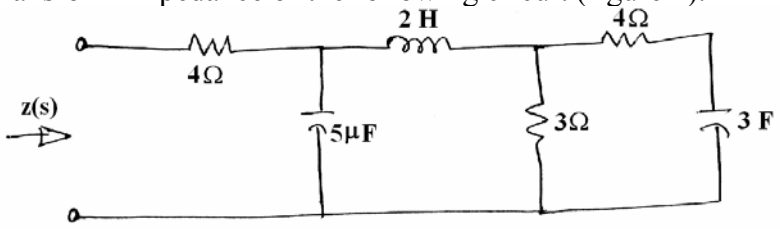

Figure 2

5.a) Express ABCD parameters in terms of h – parameters.
b) Determine Y – parameters of the network shown in figure 3. [8+7]

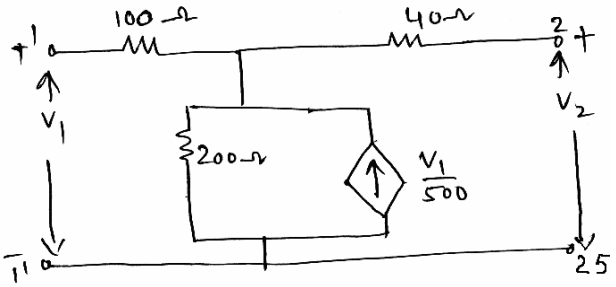

Figure 3

6. For the network shown in the figure 4. Find Y and Z – parameters. [15]

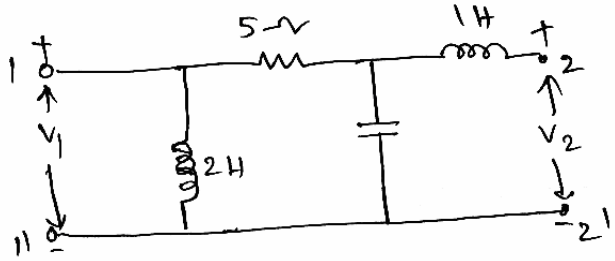

Figure 4

7.a) What is high pass filter? Explain the general configuration and parameters of a constant – K high pass filter.
b) Design a constant - K T – section and π - section high pan filters having cut off frequency f_c = 10 KHz and characteristic impedance $Z_0 = 600\Omega$. Also find the characteristic impedance at 25 KHz. [7+8]

8.a) What is Fourier transform? What are its properties?
b) Find the Fourier transform of the triangular wave shown in the figure 5 given below. [7+8]

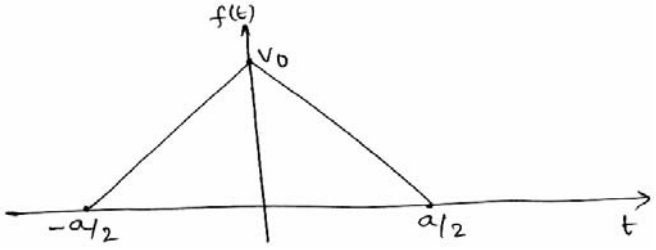

Figure 5

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CODE NO: R09220205 | R09 | SET No - 3

II B.TECH - II SEMESTER EXAMINATIONS, APRIL/MAY, 2011

NETWORK THEORY

(ELECTRICAL AND ELECTRONICS ENGINEERING)

Time: 3hours **Max. Marks: 75**

Answer any FIVE questions
All Questions Carry Equal Marks

\- - -

1.a) Discuss the effect of variation of power factor on the readings of two watt meters used in 3-phase power measurement.

b) Calculate the active and reactive components of the currents in each phase of a star connected generator supplying at 11 kV to a load of 5 MW at 0.8 pf lagging. What is the value of new output if the total current is same and the pf is raised to 0.85? [7+8]

2.a) Derive the expressions for the transient current of RL series circuit when excited by a dc voltage.

b) The network shown in figure 1 the switch in position 1 at t = 0 and after 200 ms it is moved to position 2. What is the expression for the current flowing through the capacitor? [7+8]

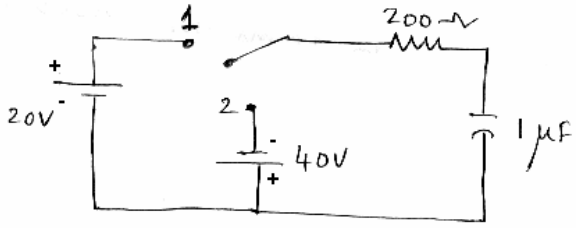

Figure 1

3.a) Derive expression for transient response of RC series circuit excited by a sinusoidal source.

b) A series RL circuit with R = 50 ohms and L = 0.2 H has a sinusoidal voltage source V = 150 $Sin(500t+\phi)$ volts applied at a time when ϕ=0. Find the expression for the total current. Use Laplace transforms method. [7+8]

4.a) What is a transfer function? What are the properties of a transfer function?

b) What are poles and zeros? Explain their significance.

c) Draw the pole-zero plots for a system with following network function.

$$Z(s)=\frac{\left(s^3+2s^2+3s+2\right)}{s^4+6s^3+8s^2}.$$ [4+4+7]

5.a) Express Y-Parameter in terms of ABCD parameters.

b) Find the h-parameters for the following network shown in figure 2. [7+8]

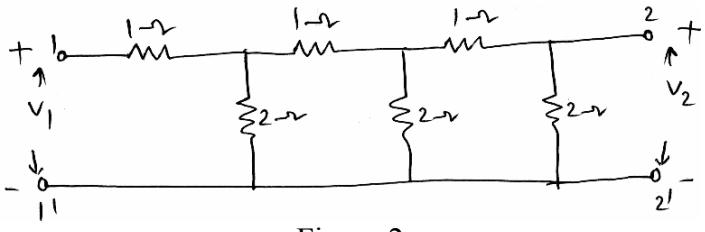

Figure 2

6. For the following network shown in figure 3 determine h-parameters and ABCD parameters. [15]

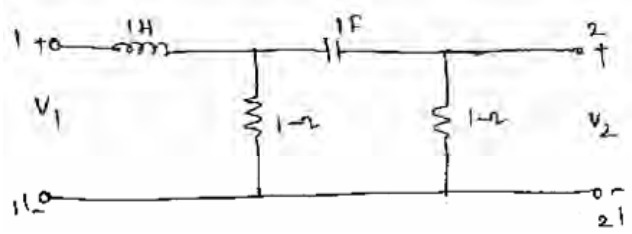

Figure 3

7.a) What is an m-derived filter? Explain the general configuration and parameters of m-derived low pass filter for T and Π-Sections.

b) Design an m derived high pass Π-Section filter having a cut off frequency 3250 Hz. The frequency of infinite attenuation may be taken at 2750 Hz. The characteristic impedance is 450Ω. [7+8]

8.a) State and explain Fourier Theorem.

b) The sweep voltage wave form is shown in the figure 4 given below. Find the exponential form of the Fourier series. Draw the frequency and phase spectrums. [7+8]

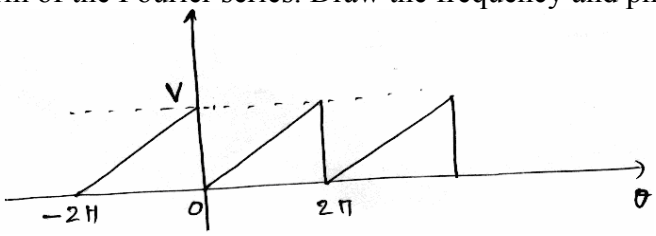

Figure 4

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II B.TECH - II SEMESTER EXAMINATIONS, APRIL/MAY, 2011

NETWORK THEORY

(ELECTRICAL AND ELECTRONICS ENGINEERING)

Time: 3hours **Max. Marks: 75**

Answer any FIVE questions
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1.a) Explain the measurement of reactive power in a 3-phase circuit single wattmeter method.

b) A balanced 3-phase star connected load of 200 kW takes a leading current of 150 amps with a line voltage of 1200 V at 60 Hz. What are the circuit constants of the load per phase? [7+8]

2.a) Derive the expression for the transient response in an RLC series circuit excited by a DC source.

b) A constant voltage is applied to a series RL circuit at t = 0. The voltage across the inductor at t = 3.46 ms is 20 V and 5 V at t = 25 ms. Obtain R if L = 2H. [7+8]

3.a) A series RLC circuit with R = 10 Ω, L = 0.1 H and C = 2μF is excited by a source with $v(t) = 200\ Cos\left(250t + \Pi/4\right)$. Determine the complete solution for the current when the circuit is closed at t = 0.

b) Derive the expression for the transient response of RC series circuit excited by a sinusoidal excitation. Use Laplace transform approach. [7+8]

4.a) How can you assess the nature of time domain response from pole-zero plot? Explain.

b) Find the transform impedance of the following circuit shown in figure 1. [7+8]

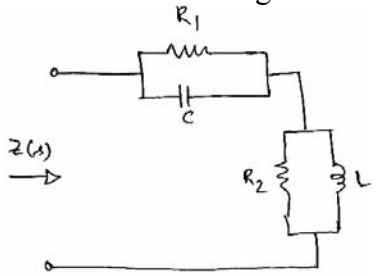

Figure 1

5.a) Find the relationship between z and h parameters.

b) For the following network shown in figure 2 determine Y parameters. [7+8]

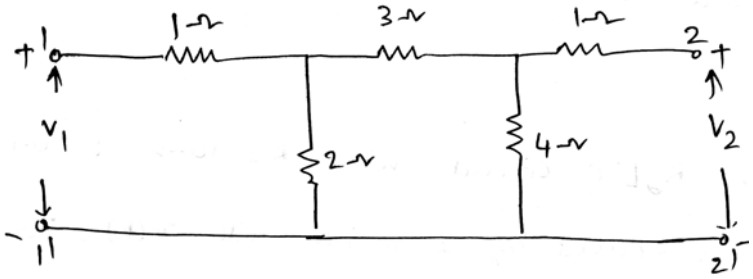

Figure 2

6. For the following network shown in figure 3 determine Y and Z parameters. [15]

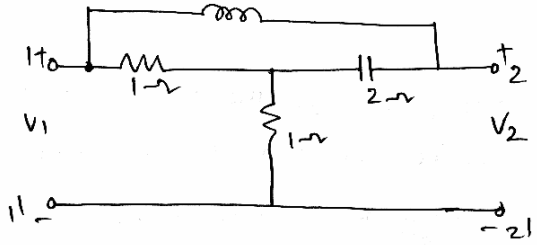

Figure 3

7.a) What is a band pass filter? Explain the general configuration and various parameters of constant-k band pass filters for T and Π-Sections.

b) What are the steps involved in design of composite filter? [7+8]

8.a) Find the exponential form of the Fourier Series expansion for the periodic rectangular pulse train shown in figure 4. Also draw frequency spectrum taking $\frac{T_p}{T} = \frac{1}{6}$.

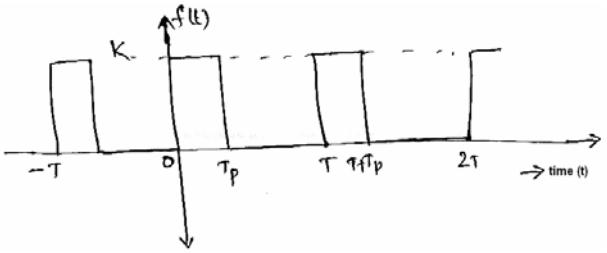

Figure 4

b) What are the properties of Fourier Transform? [8+7]

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