SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR
(AUTONOMOUS)
Siddharth Nagar, Narayanavanam Road – 517583

QUESTION BANK (DESCRIPTIVE)

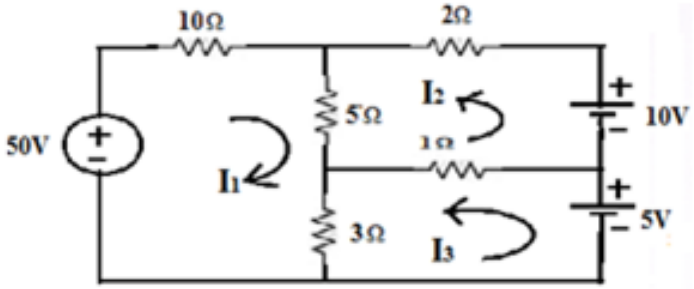
Subject with Code : NETWORK THEORY(19EE0242) **Course & Branch**: B.Tech - ECE

Year & Sem: II-B.Tech & I-Sem **Regulation:** R19

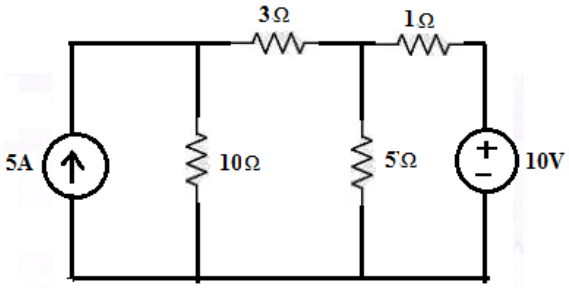
UNIT –I

CIRCUIT ANALYSIS TECHNIQUES

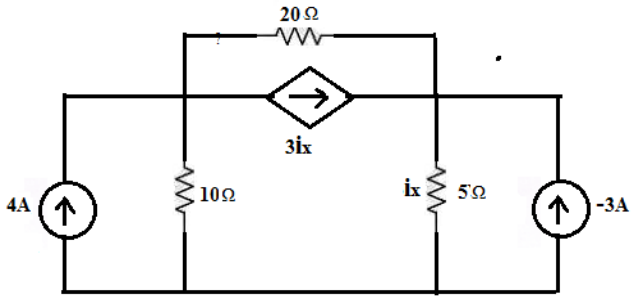
1. a) Explain about Nodal analysis and write the steps for applying nodal analysis. [L2][CO1][5M]
   b) Determine the mesh currents for the following network. [L4][CO1][5M]



2. a) Explain about Mesh analysis and write the steps for writing mesh analysis. [L2][CO1][5M]
   b) Determine the current in 10Ω resistor for the following network by using nodal analysis. [L4][CO1][5M]

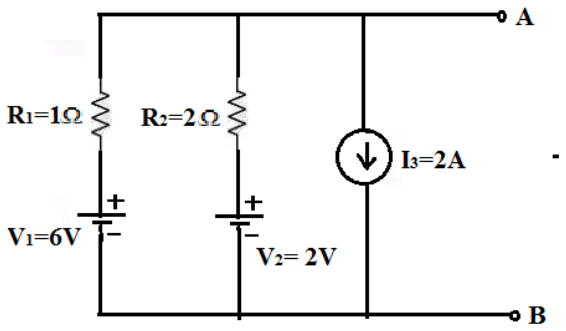


3. a) Determine i_x for the following network. [L4][CO1][5M]



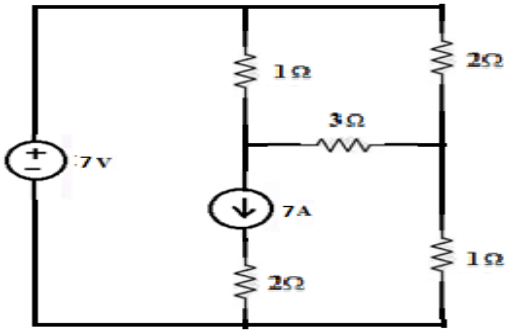
   b)Explain about source transformation briefly. [L2][CO1][5M]
4. a) State and prove Tellegen's theorem. [L2][CO2][5M]

b) Determine the equivalent current source between the terminals A and B. [L4][CO1][5M]



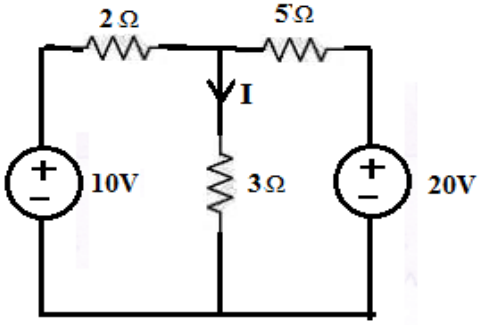
5. a) State and prove Reciprocity theorem. [L2][CO2][5M]

b) Determine the mesh currents for the circuit shown in below figure. [L4][CO1][5M]



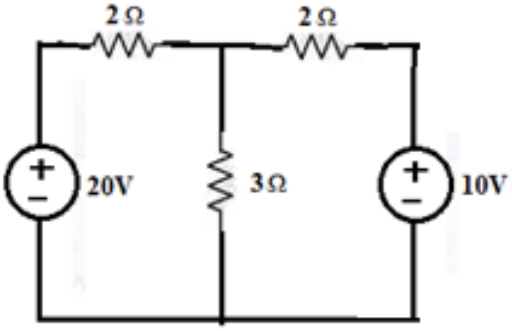
6. a) Explain about Super Nodal analysis and write the steps for applying nodal analysis. [L2][CO1][5M]

b) Calculate the current 'I' shown in below figure by using Milliman's theorem. [L4][CO2][5M]



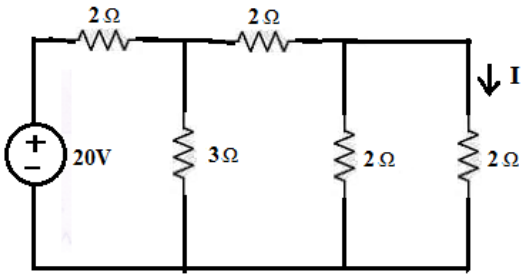
7. a) State and prove Compensation theorem. [L2][CO2][5M]

b) Verify Tellegen's theorem for the circuit shown in below figure. [L4][CO2][5M]

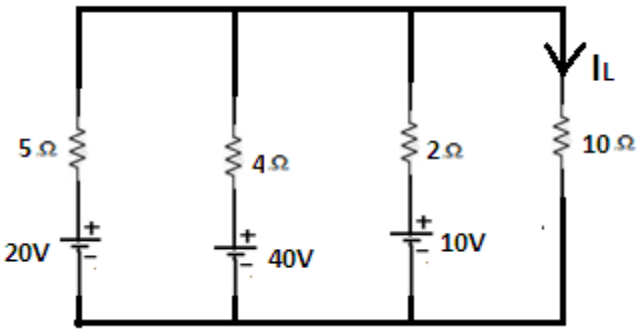


8 .a) State and prove Milliman's theorem. [L2][CO2][5M]

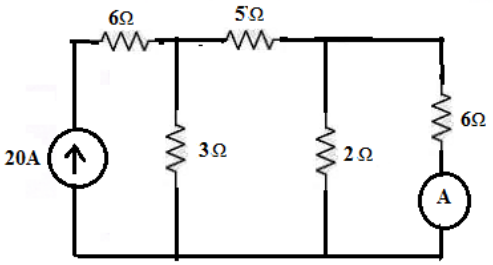
b)Verify reciprocity theorem for the network shown in below figure. [L4][CO2][5M]



9. a)) Find the current I_L, use millman's theorem as shown in figure below. [L4][CO2][5M]



b) Determine the ammeter reading where it is connected to 6Ω resistor as shown in below figure. The internal resistance of the ammeter is 2Ω.,by using compensation theorem. [L4][CO2][5M]



10. a) Write statement of millman's theorem . [L1][CO2][2M]
b) Define Super node and Super mesh. [L1][CO1][2M]
c) Write statement of Reciprocity theorem. [L1][CO2][2M]
d) Write statement of Tellegen's theorem. [L1][CO2][2M]
e) Draw a circuit diagram of volage source to current source by using source transformation. [L1][CO1][2M]

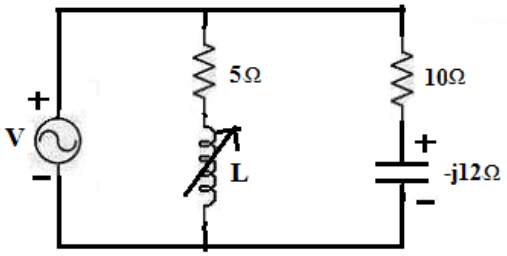
UNIT-II
RESONANCE AND FILTERS

1. a) A series RLC circuit has R=10Ω, L=0.1H and C=50μF. The applied voltage is 100V. Find Resonant frequency & Quality factor of a coil. [L4][CO1][5M]

b) Explain about Series resonance with phasor diagrams. [L2][CO1][5M]

2. a) Explain about Parallel resonance with phasor diagrams. [L2][CO1][5M]

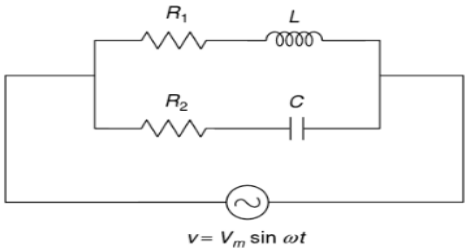
b) Find the value of 'L' at which the circuit resonates at a frequency of 1000 rad/sec in the circuit shown in figure. [L4][CO1][5M]



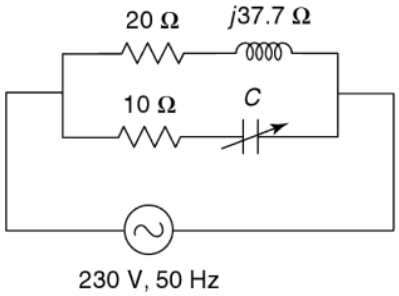
3. a) Explain about Quality factor and Band-width of Series resonance. [L2][CO1][6M]

b) Design constant-K band pass filter having a design impedance of 500Ω and cut-off frequencies f_1= 1kHz and f_2= 10 kHz. [L4][CO6][4M]

4.a) Derive the expression of resonant Frequency of the following circuit. [L4][CO1][5M]



b) Find the value of C in the circuit shown to get resonance. [L4][CO1][5M]



5. a) Explain about classification of filters. [L2][CO6][4M]

b) Explain about Propagation constant and Characteristic impedance in T-network filters.[L2][CO6][6M]

6. a) Explain about Propagation constant and Characteristic impedance in Π-network filters.[L2][CO6][6M]

b) Design Low Pass Filter in both T& Π section having a cut off frequency of 2KHz to operate with a terminated load resistance of 500 Ω . [L2][CO6][4M]

7. Explain about Constant-K low-pass filter in detail. [L3][CO6][10M]

8. a) Design a High –pass filter having a cut-off frequency of 1kHz with a load resistance of 600Ω. [L4][CO6][5M]

b) Design a Band-elimination filter having design impedance of 600Ω and cut-off frequencies f_1= 2kHz and f_2= 6 kHz. [L4][CO6][5M]

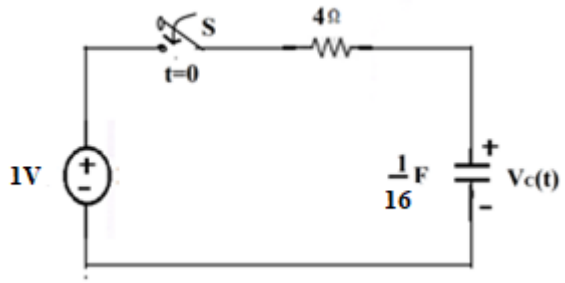
9. Explain about Constant-K band -pass filter in detail. [L3][CO6][10M]

10. a) Define Quality-factor and Selectivity. [L1][CO3][2M]
    b) Define Neper and Decibel. [L1][CO6][2M]
    c) Draw the block diagram of band-pass and band-elimination filters. [L1][CO6][2M]
    d) Draw the characteristics of Low-pass and High-pass filters. [L1][CO6][2M]
    e) Define Resonance and Resonant frequency. [L1][CO3][2M]

UNIT-III

TRANSIENT ANALYSIS

1. a) Derive the Transient Response of series RL-circuit with D.C excitation. [L2][CO3][6M]
   b)Determine The Current I for T>0 If $V_c(0)$ = 9V For The Circuit Shown In Fig. [L2][CO3][4M]



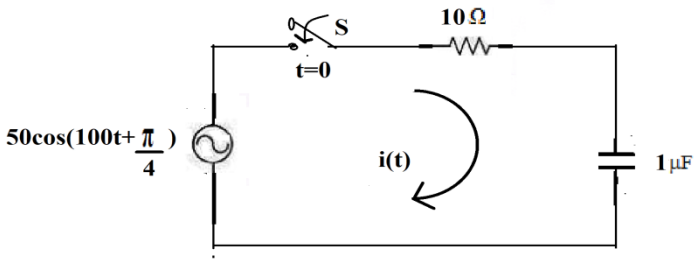
2. a) Derive the Transient Response of series RC-circuit with D.C excitation. [L2][CO3][5M]
   b) The Circuit Consists Of Resistance=20 Ohm, Inductance = 0.05H, Capacitance = 20uF in Series With a 100V Constant at t=0. Find The Current Transient. [L4][CO3][5M]

3. Derive the Transient Response of series RLC-circuit with D.C excitation. [L2][CO3][10M]

4. a) Derive the Laplace Transform of Series RL Circuit . [L2][CO3][5M]
   b) A series RC circuit consists of a resistor of 10Ω and capacitor of 0.1 F with a constant voltage of 20v, is applied to the circuit at t=0.Obtain the current equation. Determine the voltage across the resistor and the capacitor. [L4][CO3][5M]

5. Derive the Transient Response of Series RL circuit with Sinusoidal excitation. [L2][CO3][10M]

6. a) In the circuit shown in figure, determine the complete solution for the current when switch is closed at t=0,applied voltage is V(t)= 50 cos(10^2t+ Π/4), resistance R=10Ω and capacitance C= 1μF. [L4][CO3][5M]



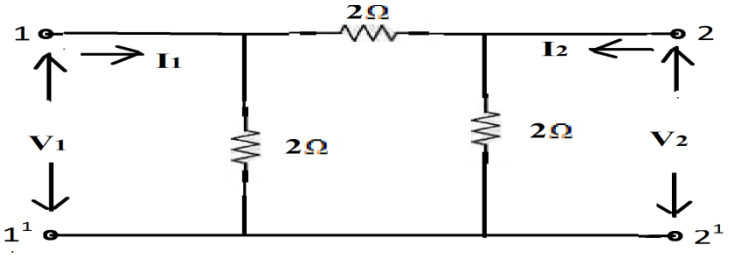
b) A voltage V=300sin(314t). is applied at t=2.14msec to a series RC circuit having resistance of 10Ω and a capacitance of 200μF. Find an expression for current. Also, find the value of current 1msec after Switching-On. [L4][CO3][5M]

7. Derive the Transient Response of Series RLC circuit with Sinusoidal excitation. [L2][CO3][10M]
8. a) Derive the Laplace Transform of Series RC Circuit . [L2][CO3][5M]
   b) A series RL circuit with R=30Ω and L= 15H has a constant voltage V=60v applied at t=0. Determine the current "I", voltage across resistor and voltage across inductor. [L4][CO3][5M]
9. Derive the Transient Response of Series RC circuit with A.C excitation. [L2][CO3][10M]
10. a) Define steady state and transient state [L1][CO3][2M]
    b) What area the initial conditions? Explain briefly. [L1][CO3][2M]
    c) What is the transient response of series RL and RC circuits with D.C excitation? [L1][CO3][2M]
    d) What is the behavior of Inductor in Initial and Steady state conditions? [L1][CO3][2M]
    e) What is the behavior of Capacitor in Initial and Steady state conditions? [L1][CO3][2M]

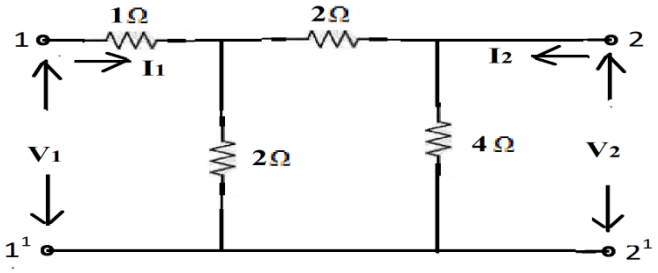
UNIT-IV

TWO PORT NETWORKS

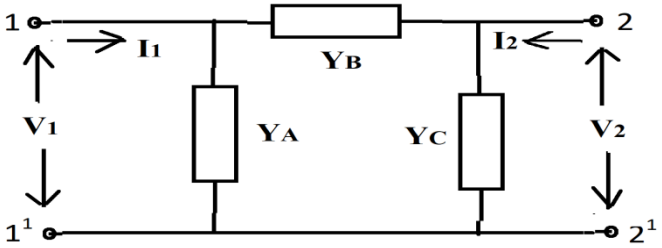
1. a) Explain about Impedance parameters. [L2][CO5][5M]
   b) Find the transmission parameters for the circuit shown in figure. [L4][CO5[5M]



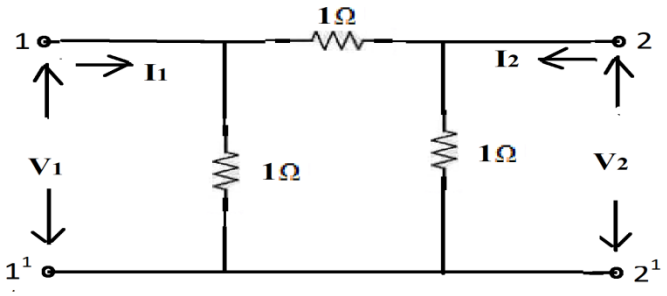
2. a) Explain about short-circuit parameters. [L2][CO5][5M]
   b) Find the h-parameters of the network shown in figure. [L4][CO5][5M]



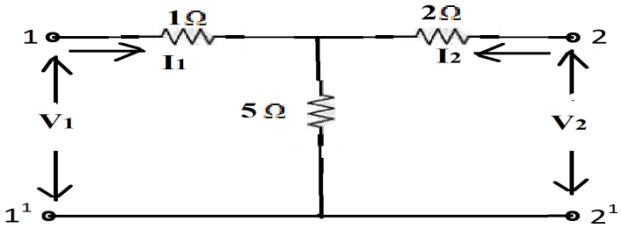
3. a) Explain about h-parameters in terms of y-parameters. [L2][CO5][5M]
   b) Find the Short-circuit parameters for the circuit shown in figure. [L4][CO5][5M]



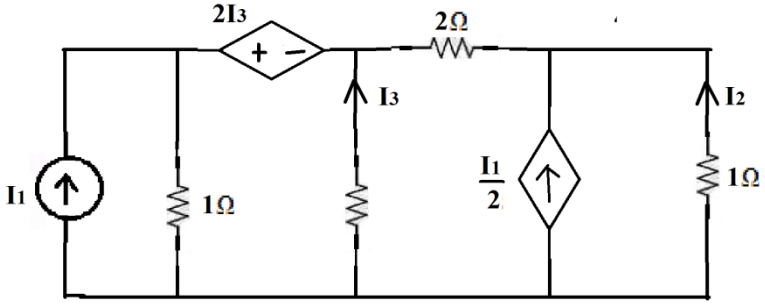
4. a) Explain about ABCD-parameters. [L2][CO5][5M]
   b) Find the Z-parameters of the network shown in below figure. [L4][CO5][5M]



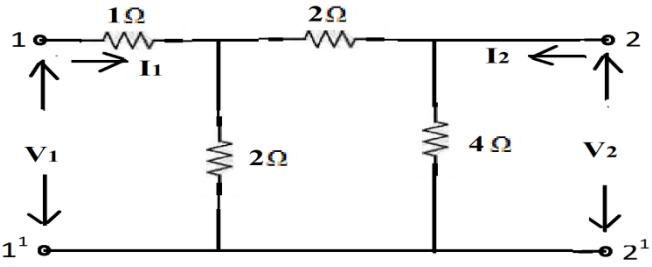
5. a) Derive the expressions for Chain parameters in terms of Z-parameters. [L2][CO5][4M]
   b) The Z-parameters of a two-port network are Z_{11}= 10Ω, Z_{22}= 15Ω Z_{12}= 5Ω and Z_{21}= 5Ω .Find the equivalent T-network and ABCD parameters. [L2][CO5][6M]
6. a) Find the transmission parameters for the circuit shown in figure. [L4][CO5][5M]



   b) The hybrid parameters of a two-port network is shown in figure are, h_{11}= 1K, h_{12}=0.003, h_{21}= 100 and h_{22}= 50μ℧.Find $V_2$and Z-parameters of the network. [L4][CO5][5M]
7. a) Derive the expressions for Z-parameters in terms of ABCD-parameters. [L2][CO5][5M]
   b) Find the current transfer ratio I_2/I_1 for the network shown on figure. [L2][CO5][5M]



8. a) Derive the expressions for Y-parameters in terms of ABCD parameters. [L2][CO5][5M]
   b) Determine the y-parameters of the following network. [L4][CO5][5M]



9. a) The given ABCD parameters are, A=2, B=0.9, C=1.2, D= 0.5. Find Y-parameters. [L4][CO5][5M]
   b) The given Y-parameters are, Y_{11}= 0.5, Y_{12}= Y_{21}= 0.6, Y_{22}= 0.9.Find Z- parameters. [L4][CO5][5M]
10. a) Define Two-port network. [L1][CO5][2M]
    b) Draw the equivalent circuit of Z-parameters. [L1][CO5][2M]
    c) What is the condition for Symmetry in Z and Y parameters? [L1][CO5][2M]

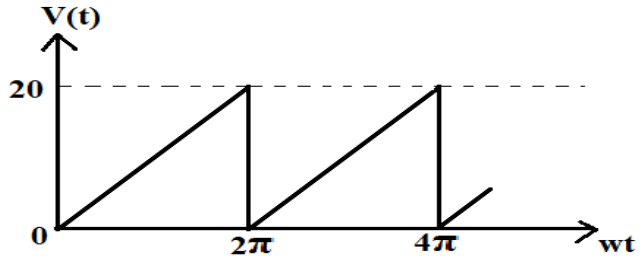
d) What is the condition for Reciprocity in Z and Y parameters? [L1][CO5][2M]

e) Write the equations for Z-parameters in terms of Y-parameters. [L1][CO5][2M]

UNIT-V
FOURIER TRANSFORMS

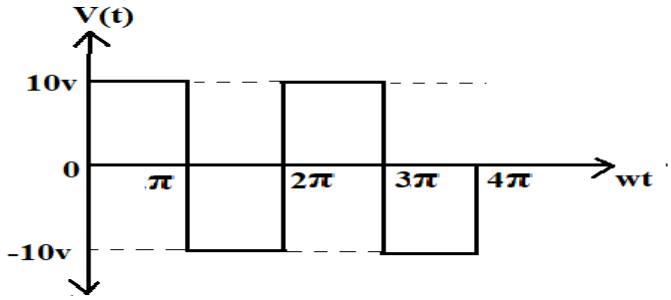
1. a) Derive the Trigonometric form of Fourier series. [L2][CO4][5M]

   b) Find the Fourier series for the following waveform. [L4][CO4][5M]

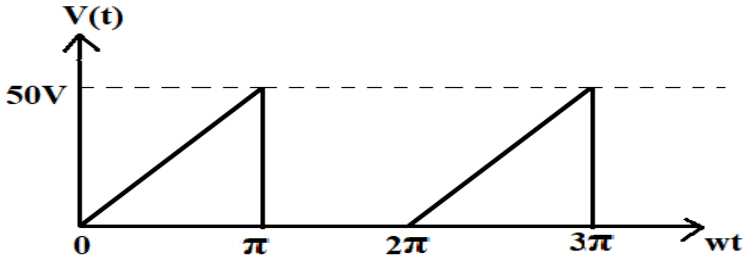


2. a) Derive the Exponential form of Fourier series. [L2][CO4][5M]

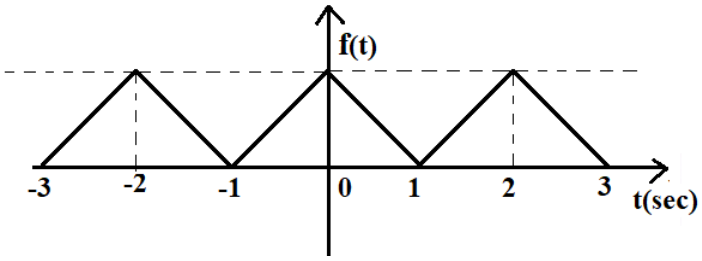
   b) Obtain the Fourier series for the following waveform shown in figure. [L4][CO4][5M]



3. a) Find the Trigonometric Fourier series for the following waveform shown in figure. [L4][CO4][5M]



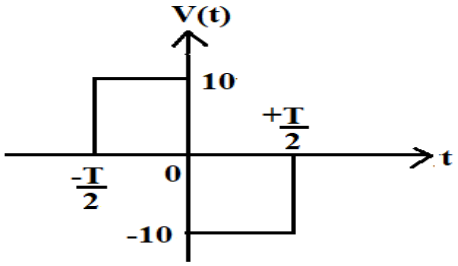
   b) Find the Exponential Fourier series for the following waveform shown in figure. [L4][CO4][5M]



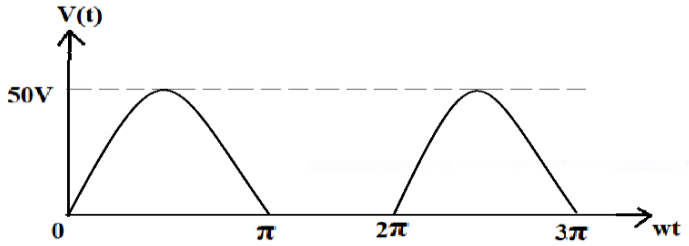
4. Write and prove the properties of Fourier transforms. [L2][CO4][10M]

5. a) Explain about Line spectrum and Phase spectrum. [L2][CO4][6M]

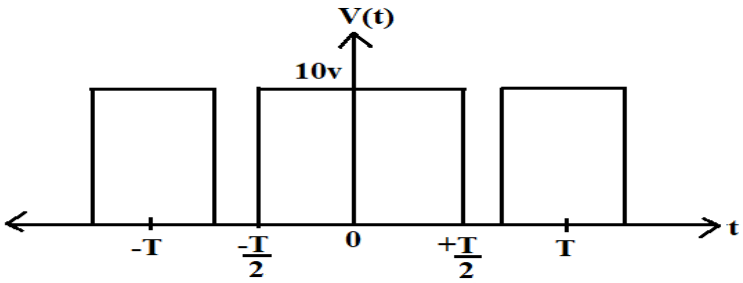
b) Obtain the magnitude and phase spectrum of the waveform shown in figure. [L2][CO4][4M]



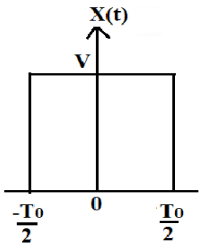
6. a) Find the Trigonometric Fourier series for the waveform shown in figure and sketch the spectrum. [L4][CO4][6M]



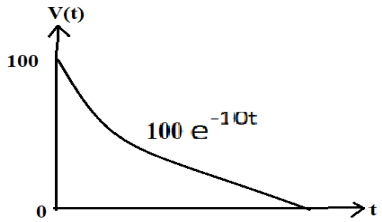
b) Find the Fourier transform of a periodic pulse train shown in figure. [L4][CO4][5M]



7. Determine the Fourier transforms of the following waveforms shown in figure(a) and figure(b). [L4][CO4][10M]

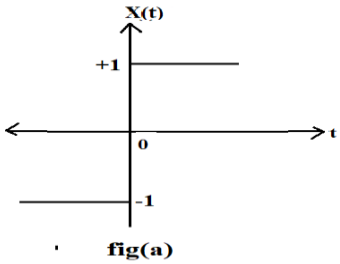


fig(a)

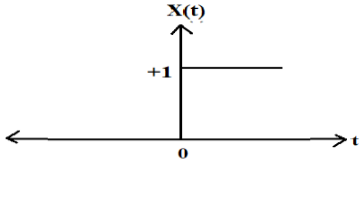


fig(b)

8. Determine the Fourier transforms of the following waveforms shown in figure (a) and figure (b). [L4][CO4][10M]

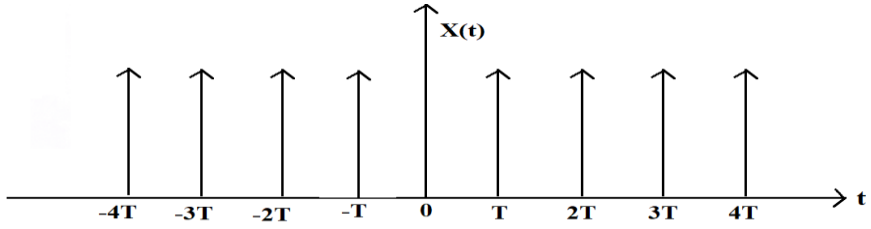


fig(a)



fig(b)

9. a) Find the Fourier Transform of a periodic unit impulse train shown in figure [L4][CO4][5M]



b) Explain about waveform symmetry for even and odd functions. [L2][CO4][5M]

10. a) Define Fourier series. [L1][CO4][2M]

b) Define Fourier transform. [L1][CO4][2M]

c) Write the expression for trigonometric form of Fourier series. [L1][CO4][2M]

d) Write the expression for exponential form of Fourier series. [L1][CO4][2M]

e) Write any two properties of Fourier transforms. [L1][CO4][2M]

Prepared By
V.MANASA REDDY