

## GANPAT UNIVERSITY

B. Tech. Semester: III Electronics and Communication Engineering

CBCS Regular Examination December 2013

## 2EC305 NETWORK ANALYSIS

Time: 3 Hours

Total Marks: 70

- Instruction:**
1. All questions are compulsory.
  2. Write answer of each section in separate answer books.
  3. Figures to the right indicate marks of questions.

## SECTION - I

- Que.1 (A) Determine Y-Parameter for the given network (figure 1.1). 6  
 (B) Prove the reciprocity and symmetry condition for H-Parameter. 6

OR

- Que.1 (A) For the given network (figure 1.2), determine the H-parameter 6  
 (B) Prove the relationship between Z-parameter to transmission parameter and transmission parameter to Y-parameter. 6
- Que.2 (A) To determine the  $I_1$  value using the superposition theorem (figure 1.3) 6  
 (B) To find thevenin's equivalent network across the terminal A and B (figure 1.4) 5

OR

- Que. 2 (A) Find the current through a load of  $8\Omega$  in the circuit of (figure 1.5) with the help of Norton's theorem. 6  
 (B) To find the Laplace transform of square wave type waveform (figure 1.6). 5
- Que. 3 (A) Proves the attenuation constant for low pass filter. 6  
 (B) Design a constant K high pass filter to work into impedance of  $500\Omega$  and to have a cutoff frequency of 1KHz. For the above filter compute.  
 1. Phase angle at frequency 1.5KHz.  
 2. Attenuation in neper at a frequency of 0.9KHz. 6

## SECTION-II

- Que.4 (A) What is the Source transformation and give the Network Simplification techniques with an example 6  
 (B) Determine the current through the  $4\Omega$  resistor branch of the given network of the fig 2.1 using mesh analysis. 6

OR

- Que.4 (A) What is the link current in graph? And explain tie set schedules with an example 6  
 (B) In the network of fig. 2.2, determine the voltage of nodes 1 and node 2 with respect to the selected reference. 6
- Que.5 (A) In the circuit of fig. 2.3, the steady state reached with the switch k is changed from position 1 to 2 at  $t=0$ . Find the  $i(0+)$ ,  $\frac{di}{dt}(0+)$  and  $\frac{d^2i}{dt^2}(0+)$ . 6  
 (B) Explain and draw equivalent circuit for Resistor, inductor and capacitor In term of the initial & final Condition. 5

OR

- Que.5 (A) Find the Solution of a non-homogeneous Equation Using Integrating factor and time Constant. 5  
 (B) An exponential voltage  $v(t)=2e^{-4t}$  is applied at time  $t=0$  to a series R-L Circuit comprising a resistor  $R=4\Omega$  and inductor  $L=1H$ . Obtain the particular solution for current  $i(t)$  through the circuit. Assume zero initial current in the inductor. (fig. 2.4) 6
- Que.6 (A) Explain the following term. 6  
 1. Passivity and Reciprocity network  
 2. Active & Passive element  
 3. Loop and Mesh  
 (B) Construct the exact dual of the network in fig.2.5 4  
 (C) Why needed supermesh or supernode in the electrical network or circuit? 2

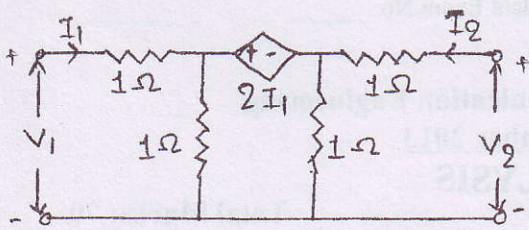


figure 1.1

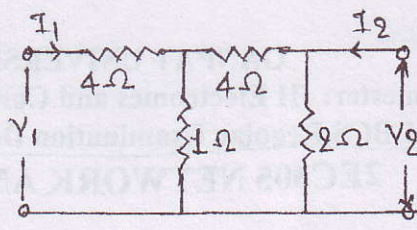


figure 1.2

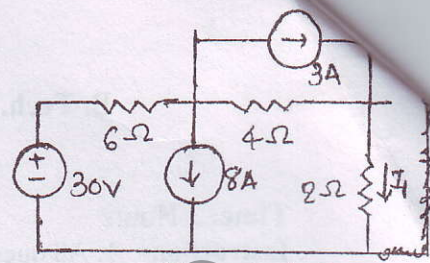


figure 1.3

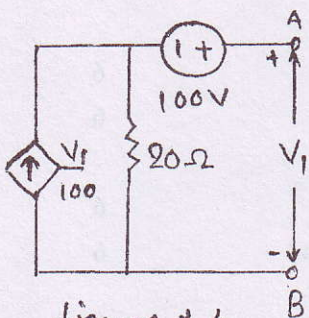


figure 1.4

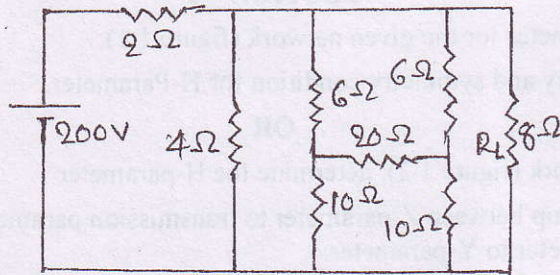


figure 1.5

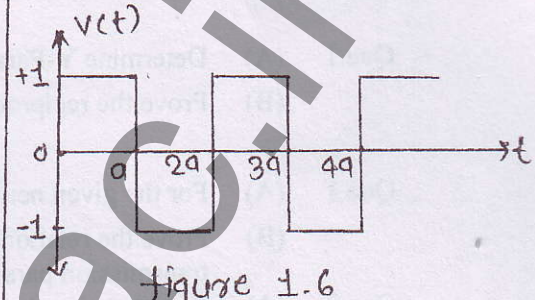


figure 1.6

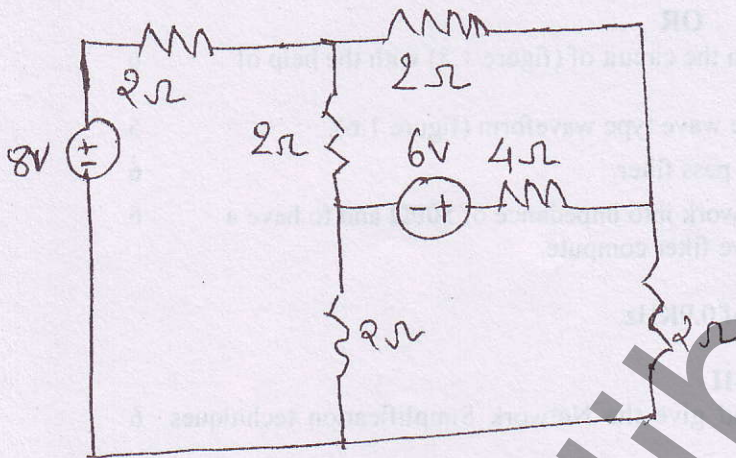


Figure 2.1

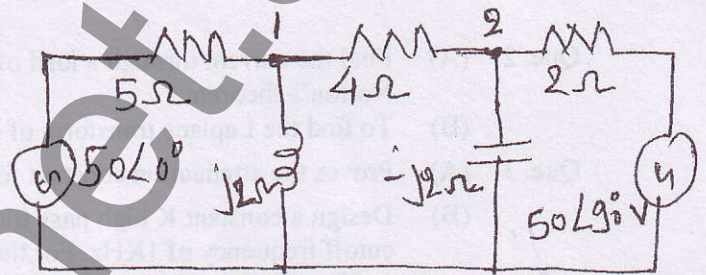


Figure 2.2

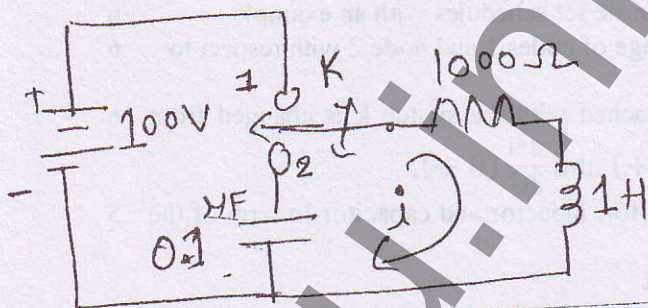


Figure 2.3

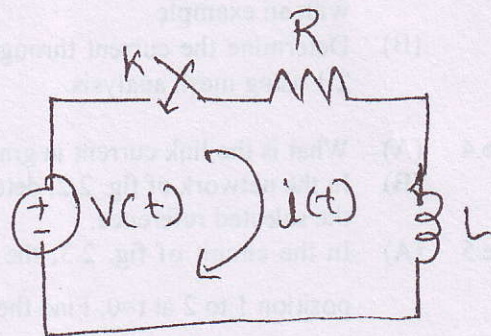


Figure 2.4

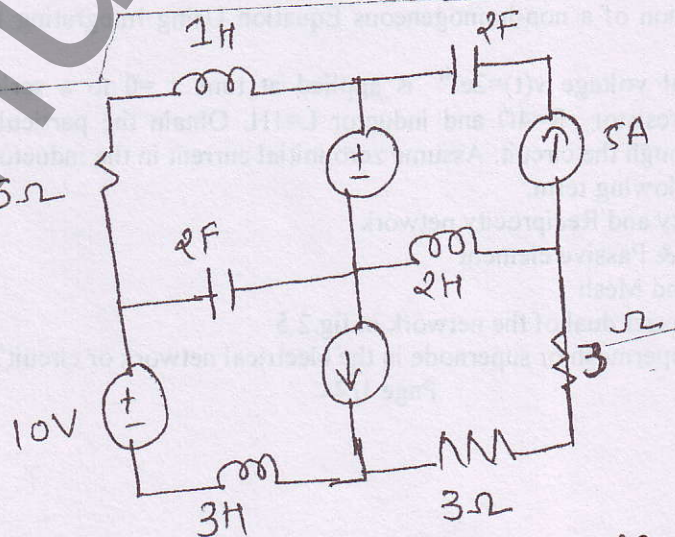


Figure 2.5