FACULTY OF ENGINEERING

Code No. E-5637/N/AICTE

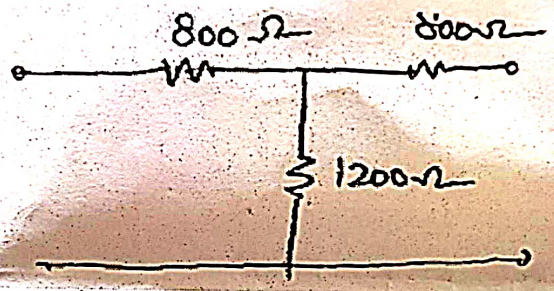
B.E. (ECE) III– Semester (AICTE) (Main & Backlog) (New) Examinations,
February / March-2023

Subject: Network Theory

Time: 3 Hours Max. Marks: 70

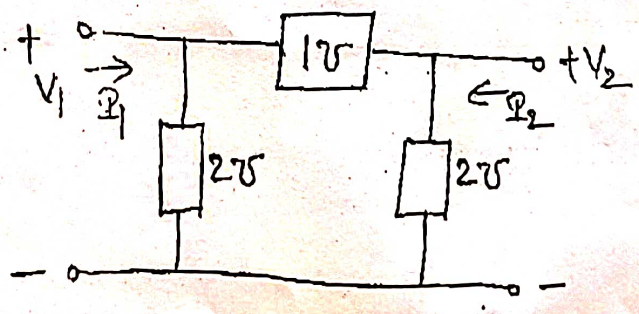
Note: (i) First question is compulsory and answer any four questions from the remaining six questions. Each questions carries 14 Marks.
(ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.
(iii) Missing data, if any, may be suitably assumed.

1. (a) Write the condition for reciprocity of a 2-port network interms of Z, Y, h and Transmission Parameters.
   (b) Calculate the characteristic impedance and propagation constant of the following network.



   (c) What is a notch filter? Explain.
   (d) Derive the relation between Neper and Decibel.
   (e) What do you mean by an inverse impedance? Explain with examples.
   (f) What are positive real functions? Explain.
   (g) The nominal characteristic impedance of a symmetrical T- attenuator is 600Ω. Design the attenuator to give an attenuation of 40 dB .

2. (a) Define transmission parameters for a 2-port network and show that they are useful in describing networks which are connected in cascade.
   (b) Find the open circuit impedance parameters and short circuit admittance parameters for the network given below.



3. (a) Show that the characteristic impedance of a symmetrical T network is equal to geometrical mean of its open circuit and short circuit impedances.
   (b) Define the following terms.
   (1) Image impedance
   (2) Iterative impedance
   (3) Image transfer constant
   (4) Iterative transfer constant

...2

4. (a) Design a composite high pass filter to operate into a load of 600 Ω and have a cut off frequency of 1.2 KHz. The filter is to have one constant K-Section, one m-derived section with f_∞ = 1.1 KHz and two terminating half sections with m = 0.6.
   (b) Explain the need for terminating half sections in a composite filter. Why m=0.6 is used for designing such sections?

5. (a) What is an equalizer? Explain full series equalizer.
   (b) Derive the necessary relations to design a symmetrical bridge T-attenuator.

6. (a) What do you mean by a Hurwitz polynomial? Explain. Test whether the polynomial $P(S) = 2S^4 + 5S^3 + 6S^2 + 2S + 1$ is Hurwitz?
   (b) Synthesize the following function using Cauer form-1
   $Z(S) = [S(S^2 + 3)(S^2 + 5)] / [(S^2 + 2)(S^2 + 4)]$

7. (a) Obtain an expression for image impedance Z_{i1} of asymmetrical L- network.
   (b) Describe the different types of filters classified on the basis of their frequency characteristics.

******