

# FACULTY OF ENGINEERING

B.E. (ECE) III-Semester (AICTE) (Main & Backlog) Examinations, July 2021

Subject : Network Theory

Time : 2 Hours

Max. Marks: 70

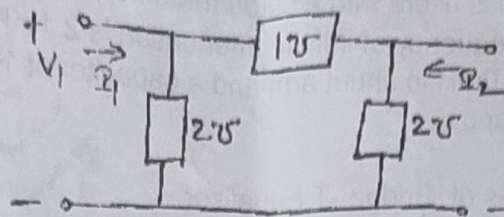
Missing data, if any, may be suitably assumed

Note: Answer any Five Questions.

## PART - A

(5x2= 10 Marks)

1. Prove that for any two port Bilateral network  $AD-BC=1$ .
2. Compute the short circuit admittance parameters for the network below.



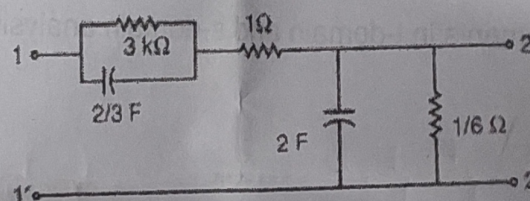
3. Define Image impedance and Iterative impedance of Asymmetrical network.
4. Determine the characteristic impedance for symmetrical T network having total series arm impedance of  $200 \Omega$  and shunt arm impedance of  $800 \Omega$ .
5. Explain how to decide the value of  $m$  in  $m$ -derived filters.
6. What is a notch filter? List its applications and characteristics.
7. List the applications of Equalizer.
8. Design a symmetrical 'T' attenuator with  $\alpha = 20 \text{ dB}$  and  $R_o = 600 \Omega$ .
9. Check if the polynomial  $P(S) = s^4 + 11s^3 + 39s^2 + 51s + 20$  is Hurwitz or not?
10. Check if the given function  $Z_2(s) = \frac{s^5 + 3s^3 + 4s}{2s^4 + 6s^2}$  is an LC Immitance or not.

## PART - B

Note: Answer any Four Questions

(4x15= 60Marks)

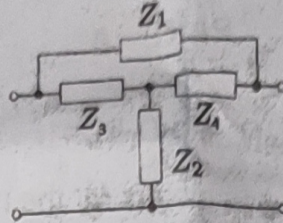
11. a) Calculate  $Y_{12}$  for the two-port network below.



- b) Verify whether the network above is reciprocal or not.



12. a) Determine image impedance, iterative impedance, image transfer constant & iterative transfer constant of L-network whose series arm is  $j200 \Omega$  & shunt arm is  $-j600 \Omega$ .  
 b) Calculate the image impedance of network below Where  $Z_1=20 \Omega$ ,  $Z_2=30 \Omega$ ,  $Z_3=35 \Omega$ ,  $Z_4=25 \Omega$ .



13. a) Design a composite low pass filters with a cutoff frequency 2KHZ and a nominal impedance of  $600 \Omega$  with frequency of infinite attenuation is 2.1 KHZ.  
 b) A filter has an inductor of 10mH in shunt arm and a capacitor of  $1 \mu F$  each in the series arm. Determine  $\beta$  and  $\alpha$ .

14. a) Derive the design equations of Bridge -T Equalizer.

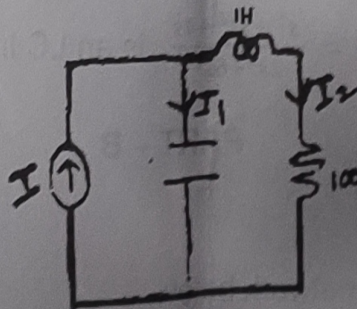
$$z(s) = \frac{(s^2 + 2)(s^2 + 4)}{s(s^2 + 3)}$$

- b) Synthesize the second foster forms of

15. a) Design the elements of asymmetrical T pad working between a source & load of  $600 \Omega$  &  $150 \Omega$  offering a loss of 2.4 nepers.  
 b) Write notes on Constant Resistance equalizer.

16. a) The unit response of a linear system is  $r(t) = (2e^{-2t} - 1) u(t)$ . Find the response of  $r(t)$  to the input  $f(t) = t u(t)$  with a neat sketch.

- b) Explain simple pole/zero, repeated pole/zero and complex pole/zero. Find the location of the  $I_2/I_1$  in the s-domain for the below circuit.



17. Write short notes on

- a) Represent R, L, C elements in t-domain and s-domain analysis of electric circuit with equations.  
 b) Amplitude equalizer.  
 c) Positive real functions.