CONSTANT K FILTERS
- Constant k filters, also k-type filters, are a type of electronic filter designed using the image method. They are the original and simplest filters produced by this methodology and consist of a ladder network of identical sections of passive components

FILTER PERFORMANCE
- The laboratory filters are assembled in accordance with the design of the circuit. The inductor used were toriods on compressed molybdenum permally

PART A

1. Define neper & bel

Neper :- It is defined as N nepers $= \ln \left|\frac{V_1}{V_2}\right| = \ln \left|\frac{I_1}{I_2}\right|$. Also It is defined as the natural algorithm of input voltage or current to the output voltage or current.

Bel :- The bel is defined as the logarithm of a power ratio. Number of bels $= \log \frac{P_1}{P_2}$

2. Define decibel.

Decibel: It is the 10 times of common logarithm of ratio of input power to output power.

$$D = 10 \log \left|\frac{P_1}{P_2}\right|$$

Where P1 = input Power   P2 = output power

1 NP = 20log10e dB= 8.685889638 dB   and   1 dB = 0.115129254 Np

3. What is filter?

Filter: - It is the electronics device which is designed to separate and pass or suppress a group of signal through a mixer of signals. And it also passes freely a desired band of frequency. While almost suppressed other band of frequency.

4. What are the types of filter?

Types of filter

a. Active filters: They contains transistor, inductors and op-amp.

b. Passive filters: They contains resistor, capacitor.

5. What is symmetrical networks?

When $Z_1 = Z_2$ or the two series arms of a T network are equal, or Za = Z0 and the shunt arms of a π network are equal the network works are said to be symmetrical.

6. Write the equivalent value of neper to decibel?

1 Neper = 8.686 db or N = 0.115D

7. What are the parameter of filter?

The Parameter of filter are

i. Characteristics impedance (Z_0).   ii. Passband.   iii. Stopband.

iv. Cut off Frequency.

v. Attenuation.

8. How will construct band pass filter by using LPF & HPF?

To construct band pass filter by connecting LPF and HPF in series, in which the cut off frequency of the LPF is above the cut off frequency of the HPF, the overlap thus allowing only a band of frequencies to pass.

9. How will construct band stop filter by using LPF & HPF?

To construct band stop filter by connecting LPF and HPF in parallel in which the cut-off frequency of the LPF is below that of the HPF.

10. What is cut off frequencies?

The frequency which separates pass band and stop band is known as cut off frequency. It is denoted by 'fC'.

11. Define characteristics impedance.

The characteristic impedance of symmetrical network is the impedance measured at the input terminal of the first channel in the chain of infinite network in cascade and it is represented by Zo

12. What is propagation constant?

Propagation constant is the complex sum of attenuation constant and phase shift constant. It is denoted by 'γ'. $\gamma = \alpha + j\beta$

Where, α = attenuation constant

β = phase shift constant

13. What is constant k low pass filter?

If Z_1 and Z_2 of a reactance network are unlike reactance arms, then $Z_1Z_2 = K^2$

Where K is a constant independent of frequency network or filter sections for which this relation hold are called constant k filters.

14. What are the types of constant k filter?

Types of constant k filter are :

i. The constant k low-pass filter.

ii. The constant k high-pass filter.

15. What is low pass filter?

The filter which allow to pass frequencies below the cutoff-frequency and attenuates all other frequencies is known as low pass filter.

**16. What are the disadvantage of constant k filter?**

There are two disadvantages of constant k filter

i. Very slow attenuation rate.

ii. Non-constant image impedance.

17. What is crystal filter?

A crystal filter is a special form of quartz crystal used in electronics systems, in particular communications devices. It provides a very precisely defined centre frequency and very steep band pass characteristics, that is a very high Q factor far higher than can be obtained with conventional lumped circuits.
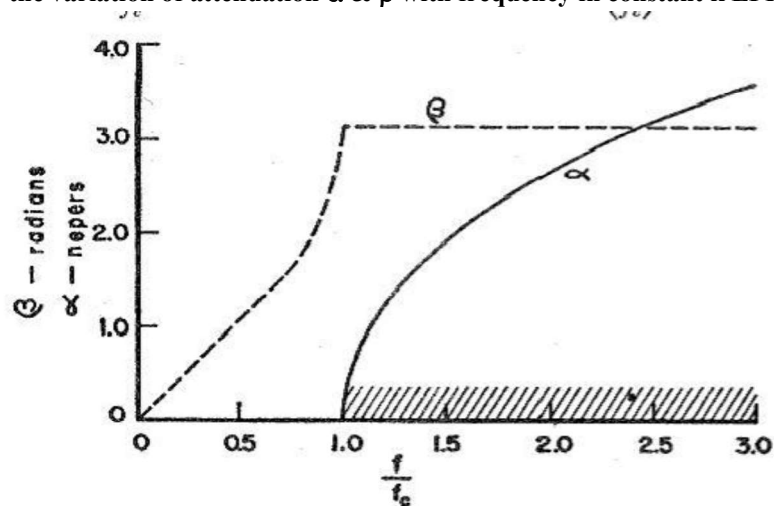
18. Design a ladder network formed by symmetrical T-network?
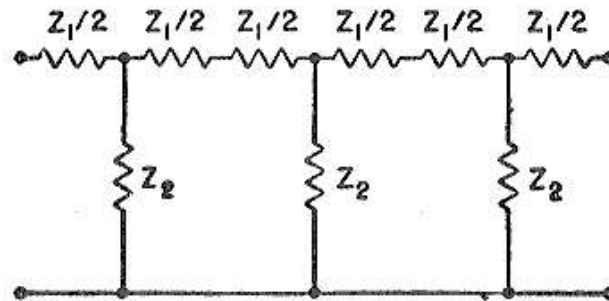
19. Define composite filter.

The m-derived section is designed following the design of the prototype T section. The use of a prototype and one or more m-derived section in series results in a composite filter.

20. Draw the variation of attenuation α & β with frequency in constant k LPF & HPF?

1.19. QUESTIONS BANK
PART – A

1. Define Filter.
2. What is neper and decibel?
3. Define Symmetrical network.
4. Define Iterative impedance.
5. Define Propagation Constant.
6. Give the input impedance of short circuit and open circuit network.
7. What do you mean by stop band and pass band of frequencies?
8. Define constant k filter.
9. Give the characteristic impedance for a low pass & high pass filter.
10. What are the disadvantages of constant k filter?
11. What is m-derived section?