

Roll No.

Total No. of Pages : 03

Total No. of Questions : 09

B.Tech.(ECE) (Sem.-3)

**NETWORK THEORY**

Subject Code : BTEC-304-18

M.Code : 76447

Date of Examianation : 29-05-2023

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**1. Write briefly :**

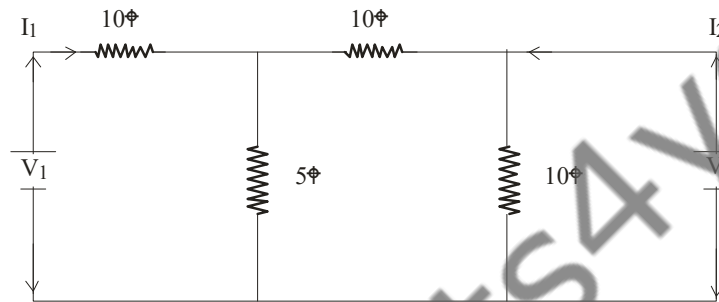
- a. Write an impedance function with zeroes at  $s=-1$  and  $-3$ , poles at  $s=0$  and  $s=(-2)$ . Comment on whether it will generate RC, RL or RC circuit?
- b. What are hybrid parameter? Where are they used?
- c. Represent and derive the series interconnection of 2-port network.
- d. What are the properties for a polynomial to be Hurwitz?
- e. What is the difference between network synthesis and network analysis?
- f. A series RL circuit has  $R=10\Omega$ ,  $L=10$  mH. Find  $i(t)$  when  $V=10V$ .
- g. Find  $f(t)$  if  $F(s)=\frac{s+8}{s^2+8}$
- h. Define reciprocity theorem and state its applicability.
- i. What do you-mean by active and reactive power?
- j. State any two properties of Fourier Transform.

### SECTION-B

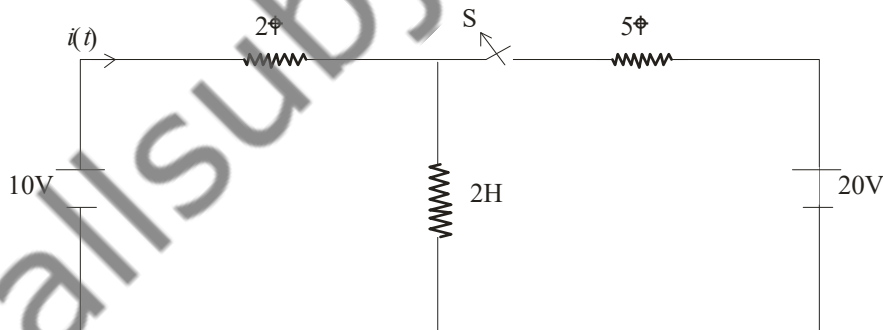
2. What are positive real functions? Discuss the necessary and sufficient conditions of PR functions. Check if the function is PR?

$$Z(s) = \frac{s^3 + 5s^2 + 9s + 3}{s^3 + 4s^2 + 7s + 9}$$

3. What are different types of filters? Explain any two in detail.
4. Obtain the transmission parameters of the following network:



5. What are the advantages of 3-phase supply? Explain Millman's method for solving unbalanced systems.
6. In the given Fig, Switch S is closed and steady state has been reached. S is opened at  $t=0$ . Find current through inductor,  $i(t)$ .



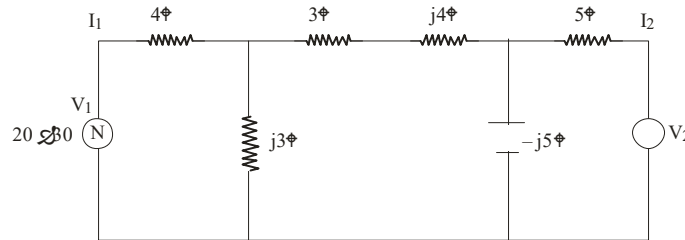
### SECTION-C

7. If a constant-K high pass filter has cut-off frequency of 10 KHz and nominal impedance  $R_o$  is  $7000\Omega$ , design the T-and  $\pi$ -sections of this filter. Determine its characteristic impedance, phase constant at 25 KHz, and attenuation at 8KHz.

8. Realize the following function using all four canonical forms:

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

9. Find  $V_2$  so that there is no current in  $(3+j4)\Omega$  branch.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**