

Paper ID:

3	0	2	4
---	---	---	---

Roll No.

--	--	--	--	--	--	--	--	--	--

B TECH
(SEM III) THEORY EXAMINATION 2017-18
FUNDAMENTALS OF NETWORK ANALYSIS AND SYNTHESIS

Time: 3Hours

Max. Marks: 100

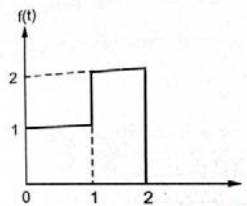
Note: Attempt all Sections.

SECTION A

1. Attempt all questions in brief.

2 x 10 = 20

a) Determine the function for the given waveform-



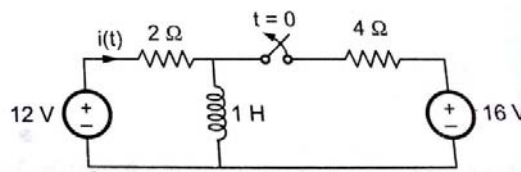
- b) Write the properties of RC driving point function?
- c) What are the different types of network function?
- d) What is the condition for Symmetry of y-parameter and t-parameter?
- e) What are the properties of Hurwitz polynomial?
- f) Draw the waveform represented by the following function-
- g) $f_1(t) = (t-1)u(t-1)$ (ii) $f_2(t) = tu(t+T)$
- h) Write down the statement for Norton theorem with example?
- i) Write the T-parameter in terms of Z-parameter?
- j) What is the difference between active and passive filters?

SECTION B

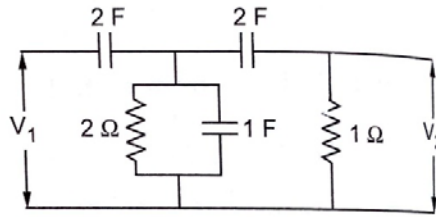
2. Attempt any three of the following:

10 x 3 = 30

a) What is initial and final condition of network elements? Find $i(t)$ for $t > 0$ when switch is opened at $t = 0$?

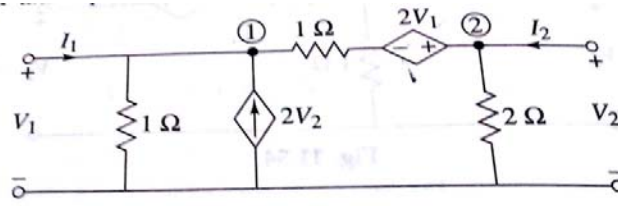


b) Obtain Voltage ratio transfer function for the given network-



c) For the given network function, draw pole-zero diagram and obtain the time domain response $i(t)$. $I(s) = \frac{s^2 + 4s + 3}{s^2 + 2s}$

d) Find the Y-parameter for the network-



e) Test given function $F(s)$ for positive realness?

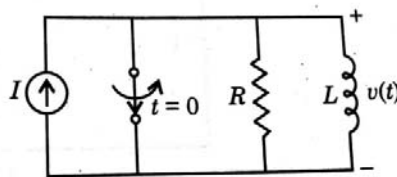
$$F(s) = \frac{2s^3 + 2s^2 + 3s + 2}{s^2 + 1}$$

SECTION C

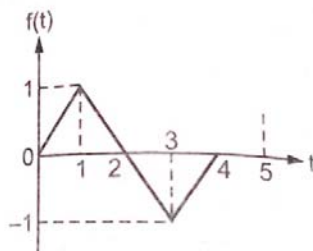
3. Attempt any *one* part of the following:

10 x 1 = 10

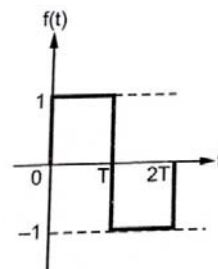
a) The circuit shown in figure has the switch S opened at $t=0$. Solve for v , dv/dt and d^2v/dt^2 at $t=0+$, if $I=1A$, $R=100\Omega$ and $L=1H$. Also find the expression for $v(t)$.



b) Write the expression for the waveform shown in the figure-



(i)

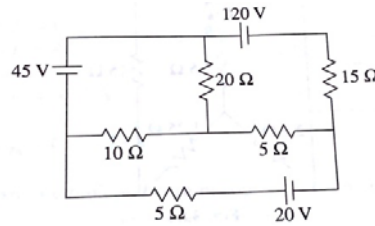


(ii)

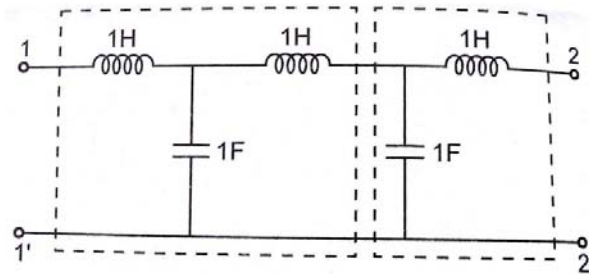
4. Attempt any one part of the following:

10 x 1 = 10

- a) Find the current through 20 Ω resistor using Thevenin theorem-



- b) Find the T-parameter using the concept of interconnection of two given network-



5. Attempt any one part of the following:

10 x 1 = 10

- a) What are the properties of Positive real function? Test whether the polynomial is Hurwitz or not? $F(s) = s^7 + 2s^6 + 2s^5 + s^4 + 4s^3 + 8s^2 + 8s + 4$

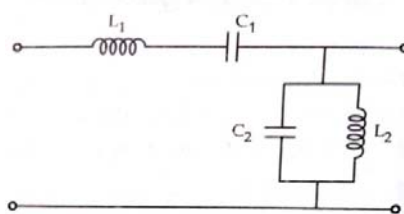
- b) Realize the Cauer forms of the following impedance function-

$$Z(s) = \frac{4(s^2 + 1)(s^2 + 9)}{s(s^2 + 4)}$$

6. Attempt any one part of the following:

10 x 1 = 10

- a) Define the zeros of transmission? Identify the zeros of transmission of the given network-



- b) Synthesize $Y_{21}(s) = \frac{s^2}{s^3 + 3s^2 + 3s + 2}$ with 1Ω termination?

7. Attempt any one part of the following:

10 x 1 = 10

- a) Design first order high pass active filter and draw its frequency response?

- b) Discuss the Non-inverting VCCS and CCVS circuit?