

Total No. of Questions : 8]

SEAT No. :

PD4059

[Total No. of Pages : 3

[6402]-18

S.E. (Electrical Engineering)

NETWORK ANALYSIS

(2019 Pattern) (Semester - IV) (203147)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, and Q.7 or Q.8.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Use of calculator is allowed.
- 5) Assume suitable data if necessary.

- Q1) a)** What is time constant? Explain time constant in case of series R-L and series R-C circuit. **[7]**
- b)** Explain the behaviour of R, L and C elements for transients. Mention the representation at the instant of switching. **[5]**
- c)** Obtain the expression for voltage across capacitor in series RL circuit connected to a d. c. voltage V for $t \geq 0$. Assume initial charge across capacitor is zero. **[5]**

OR

- Q2) a)** $R = 1 \Omega$, $L = 1 \text{ H}$, and $C = 0.5 \text{ F}$ are connected in series with a switch across C. 2 V supply is connected to the circuit. At $t = 0^-$ the switch is in closed position. At $t = 0$ the switch is opened. Find the voltage across the switch at $t = 0^+$. **[7]**

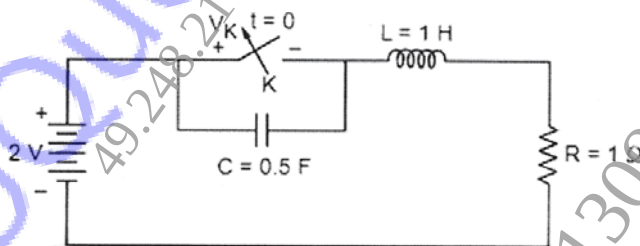


Fig. No. 1

- b)** Explain the behaviour of R, L and C elements at the time of switching, at $t = 0$, at $t = 0^+$ and at $t = \infty$. **[10]**
- Q3) a)** Find the Laplace Transform of a ramp function. **[6]**
- b)** State and explain the convolution theorem of Laplace Transform. **[6]**
- c)** State ant six properties of Laplace Transform. **[6]**

OR

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- Q4)** a) Derive the relation between unit step function and unit Impulse function. [6]
 b) Find the Laplace transform of $e^{-at} \sin \omega t$. [6]
 c) Obtain $F(s)$ for the signal shown in fig. no. 2. Also determine its Laplace transform. [6]

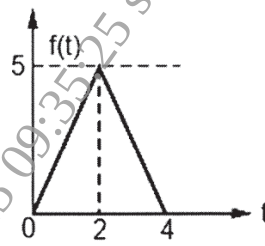


Fig. No. 2

- Q5)** a) Express impedance parameters in terms of transmission line parameters. [9]
 b) Find Z parameters of the network shown in figure no. 3. [8]

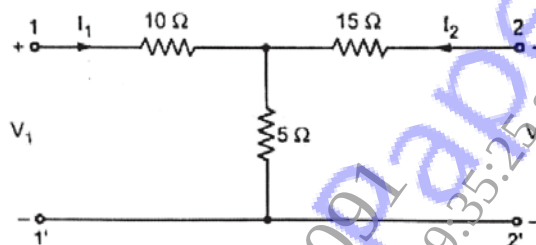


Fig. No. 3

OR

- Q6)** a) Define the following terms in relation with filter and give significance of each. [9]
 i) Pass band
 ii) Stop band
 iii) Cutoff frequency
 b) What is high pass filter? Derive the expression for the cutoff frequency of prototype low pass filter in terms of L and C. [8]
- Q7)** a) Explain the necessary conditions for transfer function. [9]
 b) Determine the driving point impedance voltage ratio transfer function for the network shown in fig. No. 4. [9]

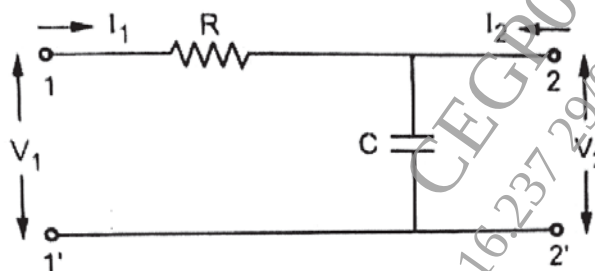


Fig. No. 4

OR

- Q8)** a) What is pole-zero plot? Explain with suitable example. [9]
b) Obtain the pole zero plot of transform impedance for the network shown in fig. no.5. [9]

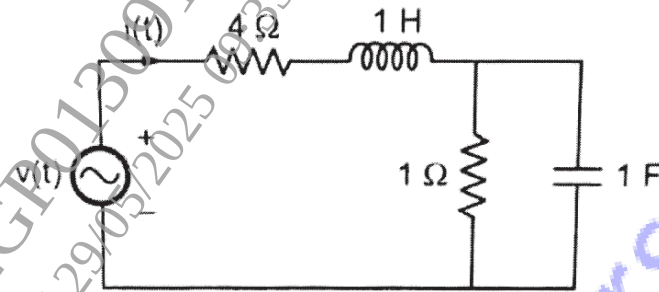


Fig. No. 5

