IMPORTANT QUESTIONS

Q1(a) What do you mean by a signal? Indicate the different properties of signal.
(b) Define Laplace Transform. Find Laplace Transform of $e^{-at}\sin wt$.
(c) Define open circuit and short circuit impedance.
(d) What are the basic element of Graph Theory
(e) Define the following functions: Unit Step, Unit Ramp, Unit Impulse, Doublet.
(f) What is network? Explain the classification of network.
(g) What do u mean by Network Analysis and Synthesis?
(h) Comment on the linearity and causality.

Q2 Explain the concept of complex frequency.

Q3 Derive initial and final value theorem

Q4 For the given figure Fig 1, plot the following signals:

i. $X\left(-\frac{2}{3}t-0.5\right)$

ii. $X\left(-0.5-\frac{1}{3}t\right)$

iii. Find the response to excitation For the given figure Fig 2, when the network is an Ideal Integrator

iv. Find the laplace transform of the given waveform in figure 1 & 2

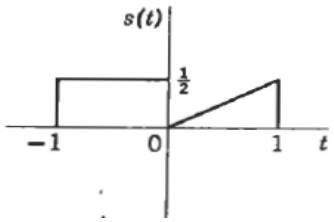


Fig 1

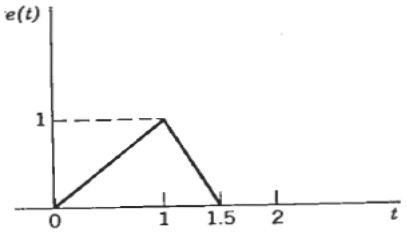


Fig 2

Q5 In the N/W shown in the Fig 3 the switch is moved from position 1 to 2. Find the $i_1(t)$ & $i_2(t)$ after the switch position changes. The element values are given as V1=2v, V2=3v, L=1H, C=1/3 F, R1=0.5 Ω, R2=2Ω

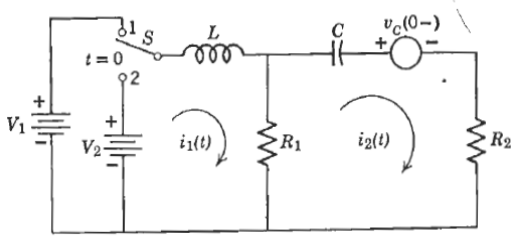


Fig 3

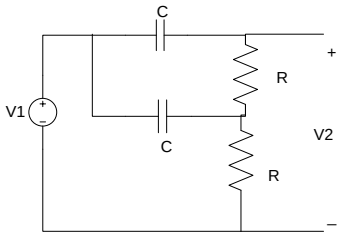


Fig 4

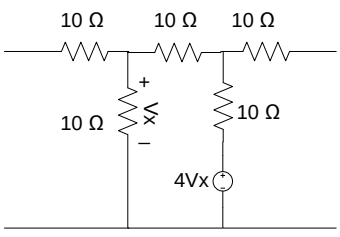


Fig 5

Q6 Find the transient response of a series RLC circuit having DC excitation.

Q7 Find the transfer function G(s) = $\frac{V2(s)}{V1(s)}$ for the circuit shown in Fig 4

Q8 Find z-parameters of the network shown in Fig 5

Q9 i) Find y-parameters in terms of z-parameters.
ii) Find the condition of reciprocity and symmetry for h-parameters.

Q10 Impulse response of a linear circuit is $e^{-t}\sin t\,u(t)$. Using pole-zero plot of output transform, determine the output, when the input is $e^{-2t}u(t)$. [Hint: output = Impluse response * input]

Q11 What is Hurwitz polynomial (Routh Criterion)? Explain the properties of Hurwitz polynomial. Find the Range of K so that P(S) is Hurwitz.

$$P(S) = S^4 + 3S^3 + 12S^2 + KS - 16S + K$$

Q12 What is Positive Real Function? Explain the properties of Positive Real Function. Test the following function is Positive Real Function or not?

$$F(s) = \frac{s^3 + s^2 + 3s + 5}{s^2 + 6s + 8}$$

Q13 Explain the synthesis of L-C Immittance Function, R-C impedance function, R-L impedance function.

Q14 Synthesize the given function in

A. Foster-I and II forms.
B. Cauer-I and I forms

$$Z(S) = \frac{2\left(S^2+1\right)\left(S^2+9\right)}{S\left(S^2+4\right)}$$

Q15 Define the following terms(define any 5)

i) Branch ii) Graph iii) Node iv) Twig
v) Link vi) Directed Graph vii) Non-planar Graph
viii) Co-tree ix) Path

Q16 The fundamental Cut-set matrix is given as:

	Twigs			**Links**		
	a	c	e	b	d	e
2	1	0	0	1	0	1
4	0	1	0	0	1	1
5	0	0	1	1	1	1

Draw the graph from this Cut-set Matrix.

Q17 Synthesize the given admittance function with 1-Ω termination

$$Y'_{21}(S) = \frac{S^2}{S^3 + 3S^2 + 3S + 2}$$

Q18 What is Transfer Function? Explain its properties. Write the necessary condition for driving point immitance Function.

Q19 In the given circuit Fig 6 as shown below, switch S is changed from 'b' to 'a' at t=0. Find the values of $i(0^+)$, $\frac{di(0^+)}{dt}$, $\frac{d^2i(0^+)}{dt^2}$

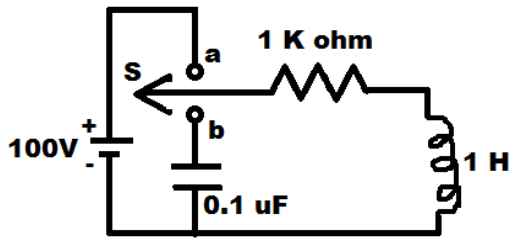


Fig 6

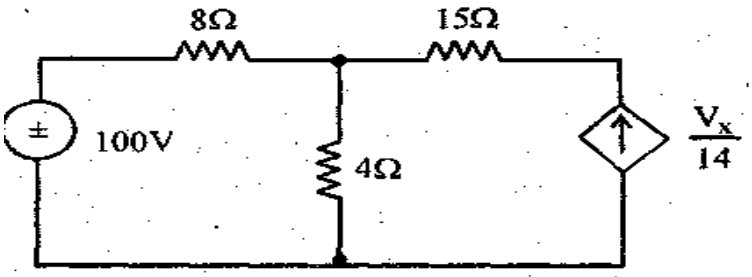
Q20 Classify the signals on the basis of

i. Continuous time signals and Discrete time signals
ii. Even and Odd Signals
iii. Periodic and Non-periodic Signals
iv. Time Shifting
v. Amplitude Scaling

Q21Resolve the waveforms in fig. 1 into odd and even terms. Find the response to excitation for figure Fig 2, when the network is an Ideal differentiator. Explain the following connections of two port Networks.

i. Series Connection
ii. Parallel Connection
iii. Series-Parallel Connection
iv. Cascade Connection

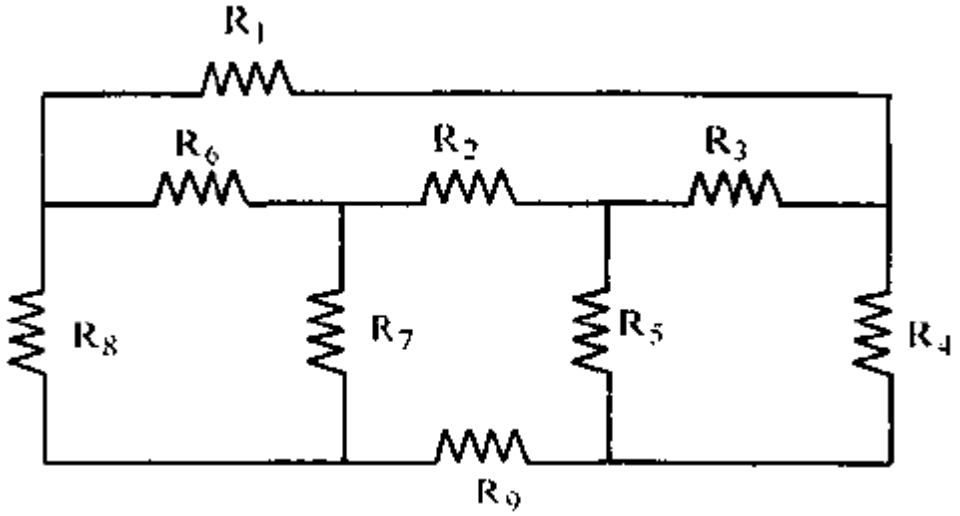
Q22 What is a transfer function? Explain its properties. For the given network, find the tie-set matrix



Q23 Enlist the restrictions on locations of pole and zeros in driving point functions. A series circuit has R=25 ohms and L=5H. A d.c. voltage of 100V is applied at t=0. Find:

a) The equations for charging current, voltage across R and L and
b) The current in the circuit 0.5 second later and
c) The time at which the drop across R and L are same

Q24 Figure below represents a resistive network. Draw its graph. Select a suitable tree and obtain the tie-set matrix and cut-set matrix.



Q25. In a pi network, the series arm impedance is $0.05X\ 10^{-3}\ angle\ 60^{o}$ mho and shunt arm impedance are $0.1X\ 10^{-3}\ angle\ 0^{o}$ and $0.2X\ 10^{-3}\ angle\ 90^{o}$ mho. Find y-parameters.