



JAF-003-1273001

Seat No. _____

M. Sc. (ECI) (Sem. III) (CBCS) (W.E.F.-2016) Examination

November - 2019

**Paper - 9 - Advanced Circuit & Network Concepts
(New Syllabus)**

Faculty Code : 003

Subject Code : 1273001

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

Instructions : (1) All questions carry equal marks.

(2) Figures on right hand side indicate marks.

1 Answer the following : (any seven) 14

1. Write the definition of Laplace Transform.
2. What is functional transforms ?
3. Write about inverse transform in brief.
4. Find the Laplace transform of the function : e^{5t+6}
5. Write about resistor in the s-domain.
6. What is transfer function ?
7. Define convolution integral in circuit analysis.
8. Define impulse source.
9. Write the formula for series and parallel combinations of resistors.
10. What is transfer impedance of two-port network ?

2 Answer the following : (any two)

1. Explain functional transforms of unit step function, 7
exponential function, sine function and cosine function.
- 2 Explain inverse transforms and partial fraction 7
expansion: proper rational functions.
- 3 Determine the partial fraction expansion for 7

$$F(s) = \frac{s^2 + s + 1}{s(s+5)(s+3)}$$

- 3 Answer the following : 14
1. Discuss about inductor in s-domain and capacitor in s-domain. 7
 2. Explain the natural response of an RC circuit. 7

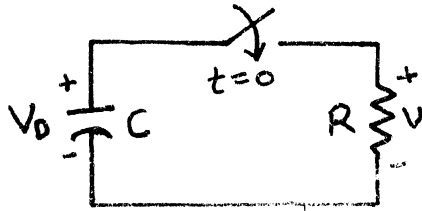


Fig-1



Fig-2

OR

- 3 Answer the following : 14
1. Explain the transfer function and the steady state sinusoidal response. 7
Assume $x(t) = A \cos(\omega t + \phi)$ and use the equation $Y(S) = H(S) X(S)$.
 2. Explain the concept of complex frequency in detail. 7
- 4 Answer the following : 14
1. Determine the transform impedance and admittance representations for resistance and inductance. 7
 2. Explain voltage transfer ratio, current transfer ratio, transfer impedance and transfer admittance for one-port and two-port network. 7
- 5 Answer the following : (any two) 14
1. Write a note on properties of transfer functions. 7
 2. Explain necessary conditions for driving point function. 7
 3. Discuss stability criterion for given active network. 7

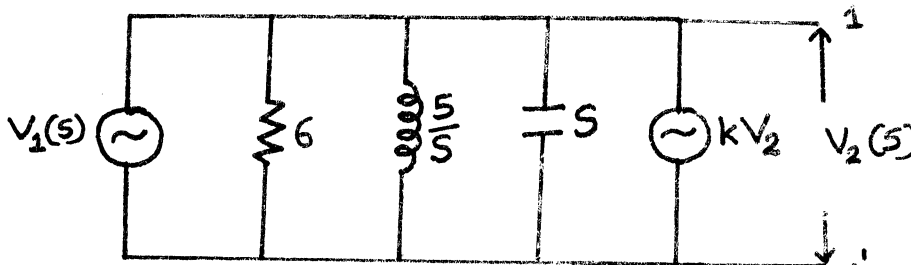


Fig-3

4. Write a note on short circuit admittance (Y) parameters for given two-port network.

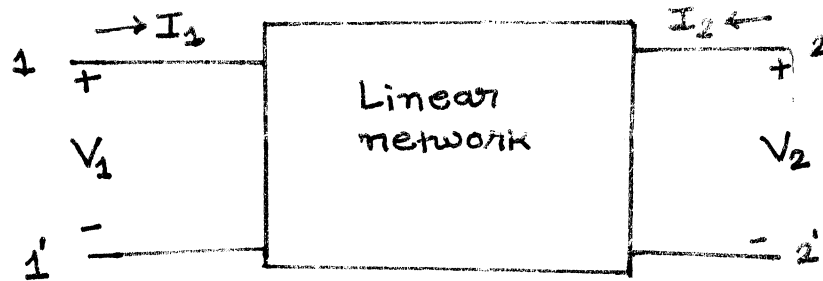


Fig-4