

(3 Hours)

Total Marks - 80

N.B.

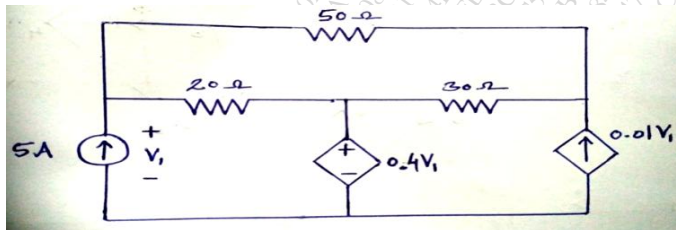
- i) Question No. 1 is compulsory.
- ii) Attempt any three questions from remaining.
- iii) Assume suitable data if necessary.
- iv) Figures to the right indicate full marks.

Q.1 Attempt any **Four**

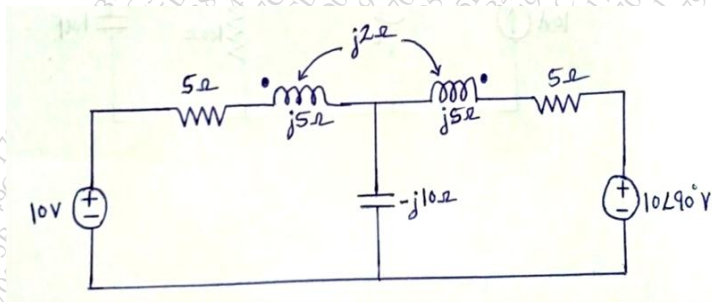
- A) Express Z - parameters in terms of Y- parameters. [05]
- B) Explain the principle of duality. [05]
- C) State reciprocity theorem. [05]
- D) Find Laplace transform of unit step & unit ramp function. [05]
- E) State restrictions on pole & zero location for driving point function. [05]

Q.2

- A) Use Nodal analysis to determine voltage V_1 for the electrical circuit shown below, [10]

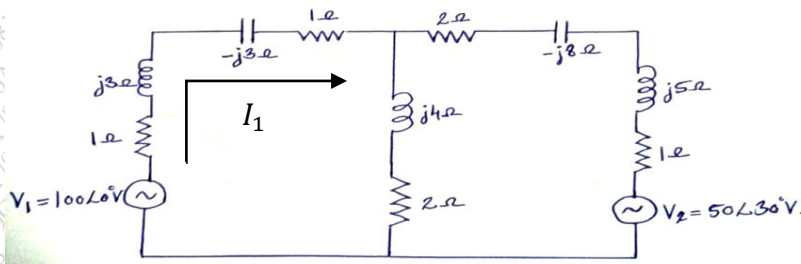


- B) Find the current through 10Ω capacitive reactance by using mesh analysis, [10]



Q.3

- A) Use Superposition theorem to find current I_1 for the electrical circuit shown below, [10]



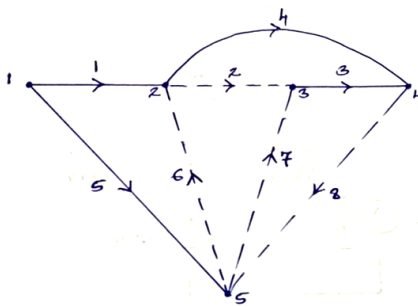
- B) Define the following terms, [05]

- i) Non-oriented & Oriented graph.
- ii) Tree & Co-tree.

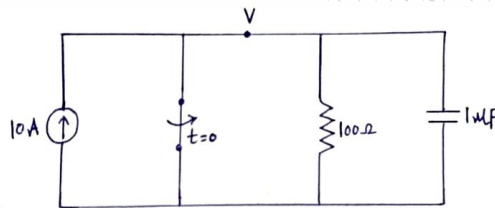
- C) Define pole & zero of network function & draw p-z plot for $V(s) = \frac{5(s+5)}{s(s+10)(s+15)}$. [05]

Q.4

A) For a given tree of the linear graph, obtain incidence matrix, fundamental cut-set matrix & fundamental tie-set matrix, [10]

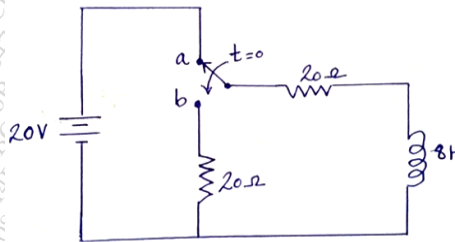


B) In the given circuit switch is opened at $t = 0$, find the value of v , $\frac{dv}{dt}$ & $\frac{d^2v}{dt^2}$ at time $t = 0+$. [10]

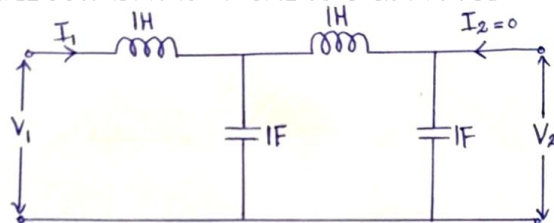


Q.5

A) The switch changes its position from "a" to "b" at time $t = 0$. Determine current $i(t)$ for $t > 0$ using Laplace transform. [10]

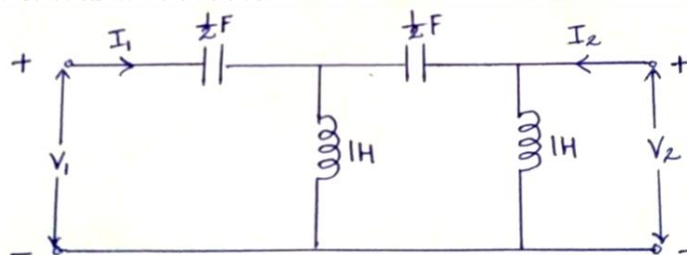


B) Find the network functions $\frac{V_1}{I_1}$, $\frac{V_2}{I_1}$ & $\frac{V_2}{I_2}$ for the network shown below, [10]



Q.6

A) Determine the Y- parameters for the two port network shown below, [10]



B) Define the Z - parameters of two port network. Derive the expression for reciprocity & symmetry condition. [10]
