

(3 Hours)

Total Marks - 80

N.B.

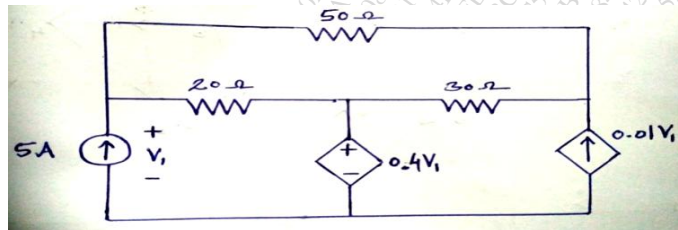
- i) Question No. 1 is compulsory.
- ii) Attempt any three questions from remaining.
- iii) Assume suitable data if necessary.
- iv) Figures to the right indicate full marks.

Q.1 Attempt any **Four**

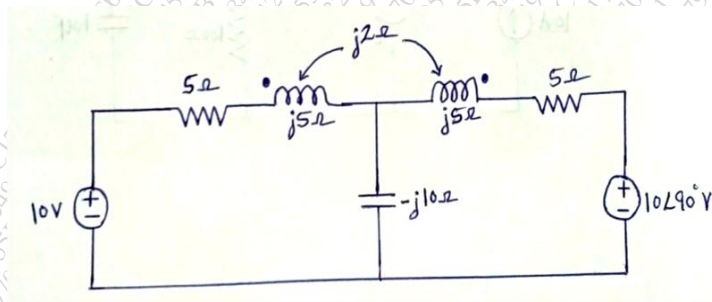
- A) Express Z - parameters in terms of Y- parameters. [05]
- B) Explain the principle of duality. [05]
- C) State reciprocity theorem. [05]
- D) Find Laplace transform of unit step & unit ramp function. [05]
- E) State restrictions on pole & zero location for driving point function. [05]

Q.2

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

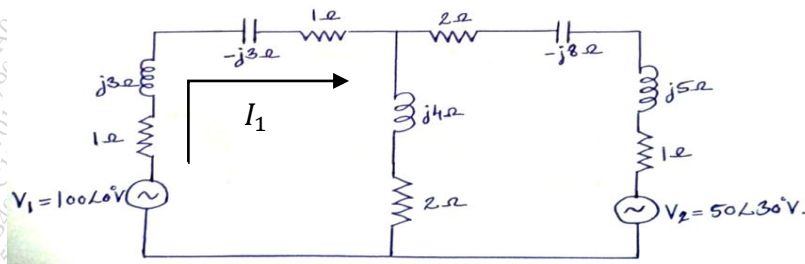


- B) Find the current through  $10\Omega$  capacitive reactance by using mesh analysis, [10]



Q.3

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



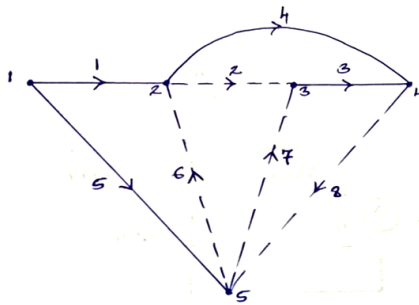
- B) Define the following terms, [05]

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

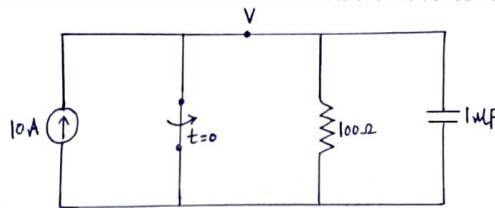
- C) Define pole & zero of network function & draw p-z plot for  $V(s) = \frac{5(s+5)}{s(s+10)(s+15)}$ . [05]

Q.4

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

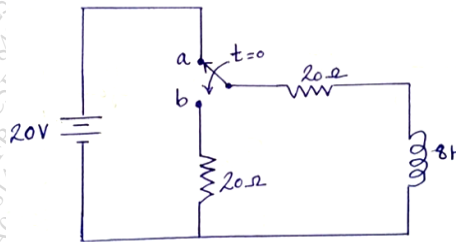


B) In the given circuit switch is opened at  $t = 0$ , find the value of  $v$ ,  $\frac{dv}{dt}$  &  $\frac{d^2v}{dt^2}$  at time  $t = 0^+$ . [10]

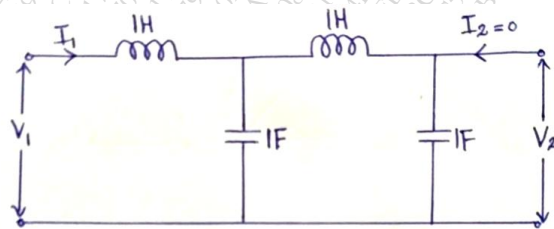


Q.5

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]

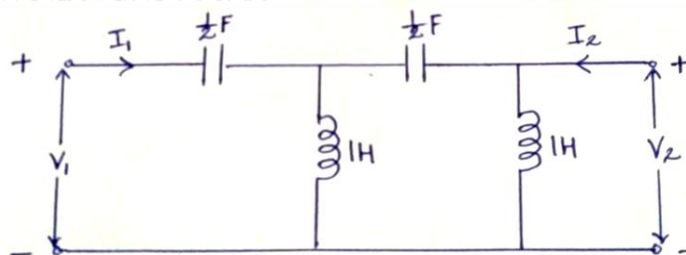


B) Find the network functions  $\frac{V_1}{I_1}$ ,  $\frac{V_2}{I_1}$  &  $\frac{V_2}{I_2}$  for the network shown below, [10]



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]

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