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BT-3 / D-17

NETWORK ANALYSIS & SYNTHESIS

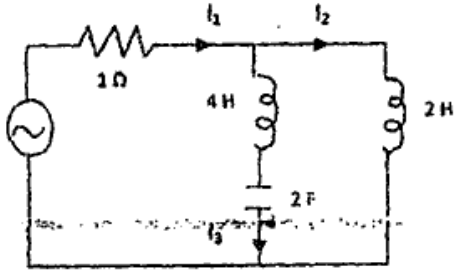
Paper–EE-203 E

Time allowed : 3 hours] *[Maximum marks : 100*

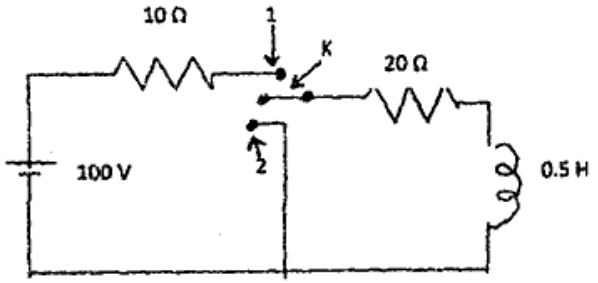
Note : *Assume suitable data if missing any. Attempt five questions selecting at least one question from each unit.*

Unit–I

1. For the Network shown in below, draw the oriented graph. Write the Tie-set schedule by selecting a Tree and hence obtain the equilibrium equation on loop basis. Calculate the values of branch currents and branch voltages. 20



2. In the given figure, the switch 'K' is kept first at position 1 and steady state condition is reached. AT t = 0, the switch is moved to position 2. Find the current in both the cases. 20



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Unit–II

3. (a) The transform current I(s) in a network is given by: 10

$$I(s) = \frac{s}{(s+2)\left(s^2+2s+2\right)}$$

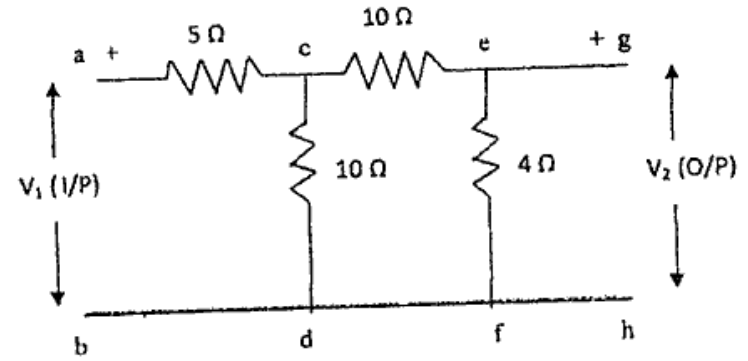
Obtain the pole-zero plot and hence the time domain response.

(b) Explain driving point and transfer point impedance and admittance of a one-port network.

4. In a linear 2 port network, $V_1(t)$ and $V_2(t)$ be the input voltage and its response at the output $V_2(t) = t.e^{-2t}.u(t)$. If the response to an impulse voltage be given by $V(t) = (e^{-t} + e^{-2t})\,u(t)$, find $V_1(t)$ as well as the transfer function of the network. 20

Unit–III

5. Find the Z parameters for the circuit shown: 20



6. The currents I_1 and I_2 at Input and Output ports respectively of a 2 port network can be expressed as:

$I_1 = 5V_1 - V_2$

$I_2 = -V + V_2$

(a) Find the equivalent π network.

(b) Find the input impedance when a load of $(3 + 5j)\ \Omega$ is connected across output port. 20

Unit–IV

7. (a) The driving point admittance of one port LC network is given by: $Y(s) = \dfrac{s(s^2+9)}{10(s^2+4)\ (s^2+25)}$ 10

Obtain the first and second foster form of equivalent networks.

(b) The driving point impedance of a network is: 10

$$Z(s) = \frac{s^2+5s^3+3s}{s^4+3s^2+1}$$

Find the first form of Cauer network.

8. Design a T and section constant K-high pass filter having cut-off frequency of 12 kHz and nominal Impedance R_o=500Ω. Also find

(a) Attenuation at 4 kHz.

(b) Its characteristic impedance and phase constant at 24 kHz. 20