

BACHELOR OF TECHNOLOGY (C.B.C.S.) (2020 COURSE)

B.Tech.Sem - III E & TC :: SUMMER - 2022

SUBJECT : NETWORK ANALYSIS & SYNTHESIS

Day : Thursday
Date : 2/6/2022

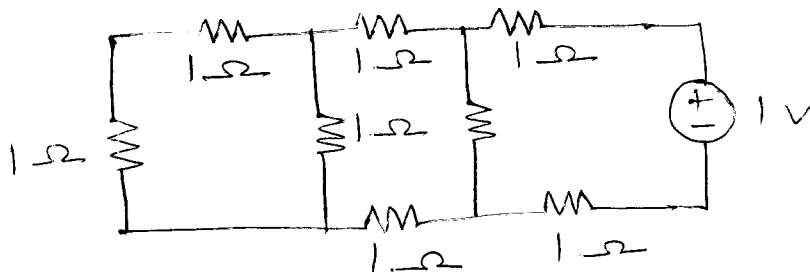
S-24654-2022

Time : 02:30 PM-05:30 PM
Max. Marks : 60

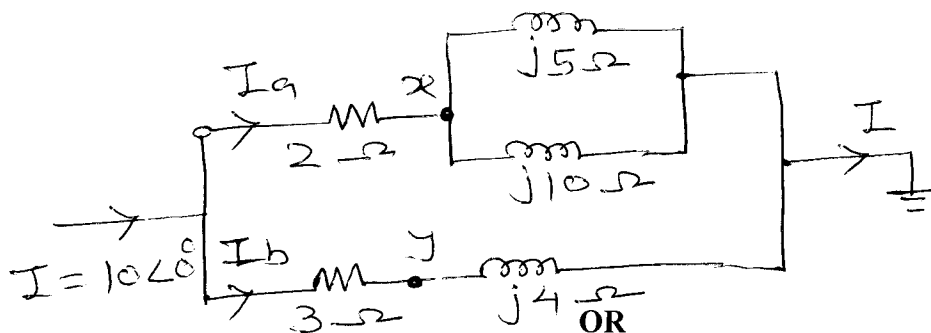
N. B.

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Use of non-programmable calculator is allowed.
- 4) Assume suitable data. If necessary.

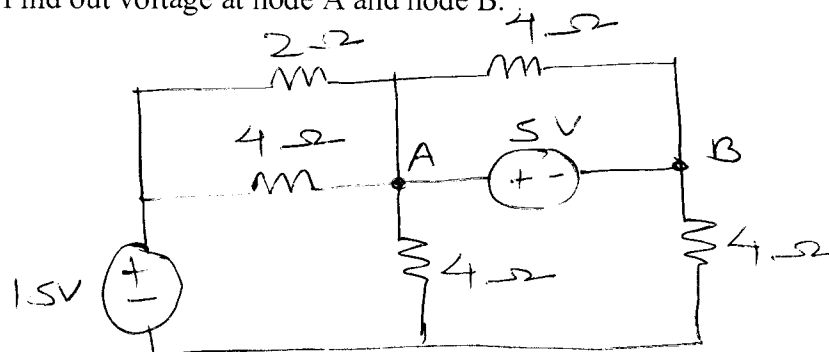
Q.1 a) For the given network find the power dissipated in the resistor R. (05)



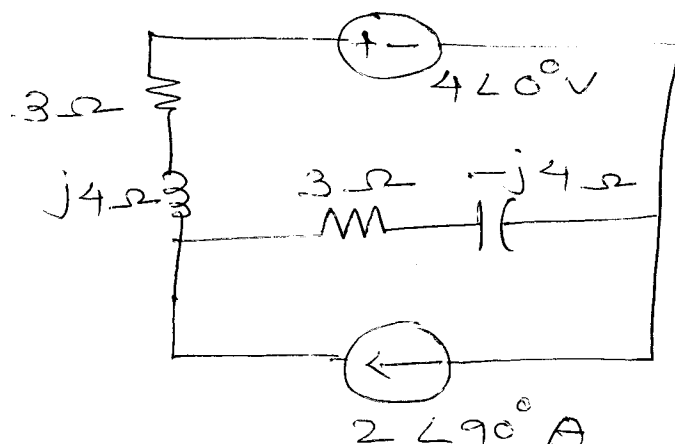
b) Determine the voltage V_{xy} in the circuit in the shown figure. (05)



a) Find out voltage at node A and node B. (05)

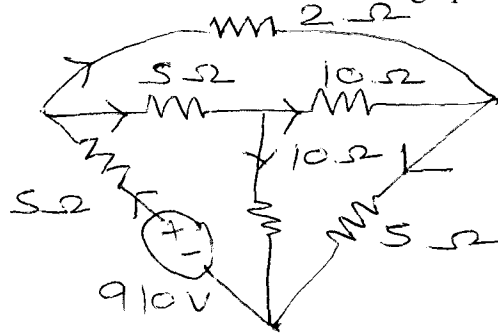


b) Determine the current in the capacitor branch by the superposition theorem in the circuit. (05)



P.T.O

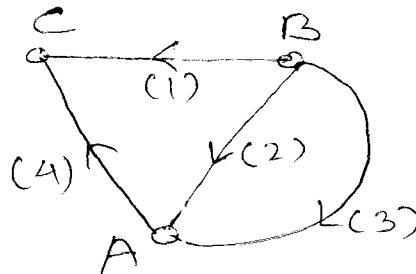
- Q.2 a) From the given circuit draw the oriented graph and find total number of trees. (05)



- b) Define following terms with the examples (05)
 i) Tieset matrix
 ii) F-cutset matrix

OR

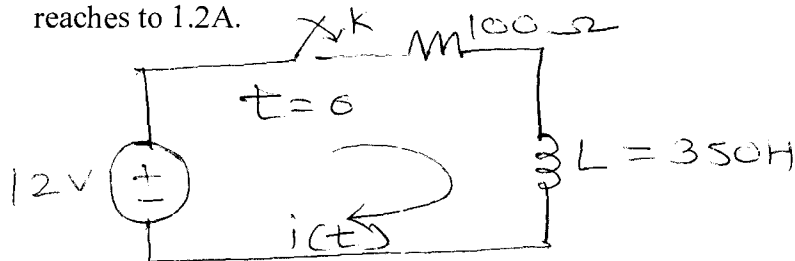
- a) What are the properties of tree and how can we identify total number of trees (05)
 in the given graphs.
 b) Find total tieset and f cut set for below graph (05)



- Q.3 a) What is transient response? Why it is important? (03)
 b) Derive expression for voltage across capacitor in source free series RC circuit (07)
 assuming initial voltage across capacitor to be V_0 volts.

OR

- a) What are the initial conditions of passive elements? (05)
 b) In the circuit initially switch is kept open for long time. At $t=0$, switch K is (05)
 closed. Obtain expression for current in the circuit for $t > 0$. Find value of
 current at $t=0.25$ sec. what will be the current in circuit in one time constant
 period? Determine the instant of time at which the current in the circuit
 reaches to 1.2A.



- Q.4 a) Derive the quality factor in inductor. (05)
 b) A coil of inductance 10H and 10Ω resistance is connected in parallel with (05)
 100 pF capacitor. The combination is applied with a voltage of 100V. Find
 resonant frequency and current at resonance.

OR

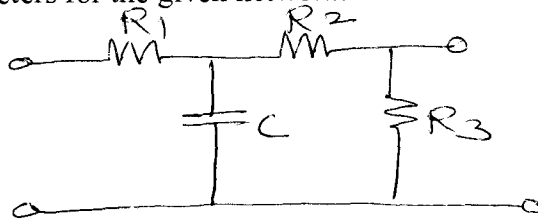
- a) Derive the anti resonance frequency. (05)
 b) A resistor and a capacitor are in series with a variable inductor. When this (05)
 circuit is connected to 230V, 50Hz supply, the maximum current obtained by
 varying the inductor is 0.366A. The voltage across the capacitor at that
 instant is 300V. Find the circuit components.

P.T.O.

Q.5 a) Find Z parameters whose ABCD. (05)

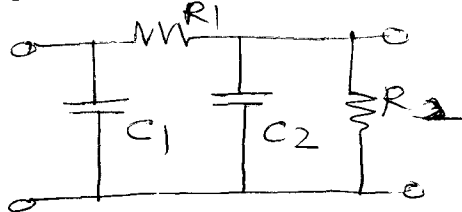
$$[A = 4 \quad B = 8 \quad C = 2 \quad D = 3]$$

b) Find h parameters for the given network. (05)



OR

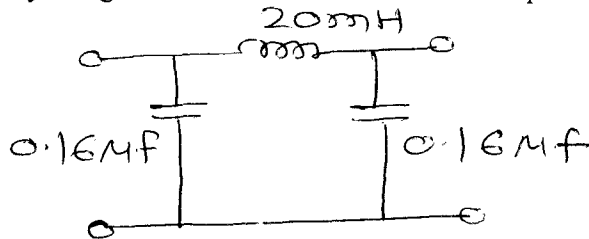
a) Find ABCD parameters of the given network. (05)



b) Find the reciprocity condition of y parameters. (05)

Q.6 a) A line is composed of T section of resistances. Calculate characteristic impedance and propagation constant if each series arm is 50Ω and shunt arm is 5000Ω . (05)

b) Identify the given filter and find its cutoff frequency and design impedance. (05)



OR

a) Prove that the resonant frequency (f_0) in band pass filter is the geometric mean of lower (f_1) and higher (f_2) cut off frequencies. (05)

b) Explain m HPF (m high pass filter) in detail with design equation and reactance curve. (05)

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