

1059
B.E. (Electronics and Communication Engineering)
Second Semester
EC-204: Electrical Science

Time allowed: 3 Hours

Max. Marks: 50

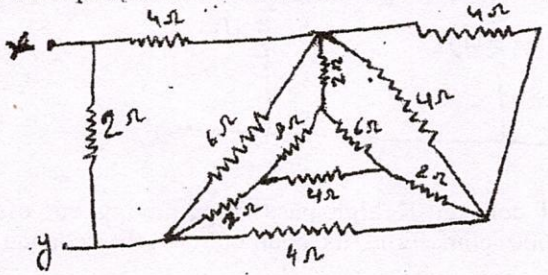
NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Part.

x-x-x

- I. a) State with appropriate example current division and voltage division in network analysis?
- b) What do you understand by duality Principle?
- c) Define the concept of stability?
- d) State maximum power transfer theorem?
- e) Define tree and twig?
- f) What is ladder network?
- g) Can band pass and band stop filters be realized using low pass and high pass filters?
- h) What is the significance of 'm' in m-derived filter?
- i) Distinguish between cut-off frequency and attenuation frequency?
- j) What do you understand by term slip in an induction motor? (1*10=10)

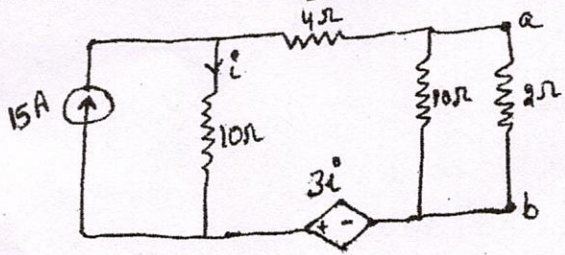
PART -A

- II. a) Find the equivalent resistance between terminal 'xy' in the network shown.



- b) State ohm's law?
- c) State and prove superposition theorem with suitable example? (3,2,5)

- III. a) Determine the Thevenin's equivalent circuit across terminal 'ab' for the given circuit. Also calculate the value of load voltage and load current across the load resistance.



- b) State and prove reciprocity theorem with suitable example? (5,5)

P.T.O.

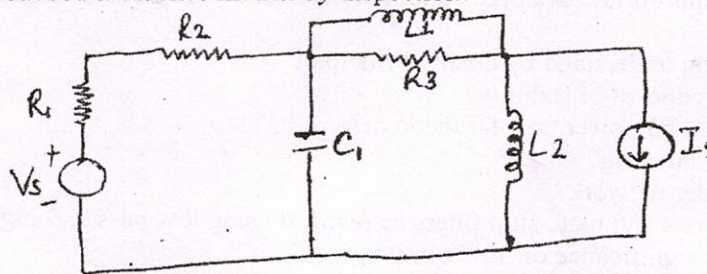
(2)

- IV. a) Explain the concept of complex frequency. Also discuss its physical significance?
 b) For the given network function draw the pole zero plot and hence obtain time domain response.

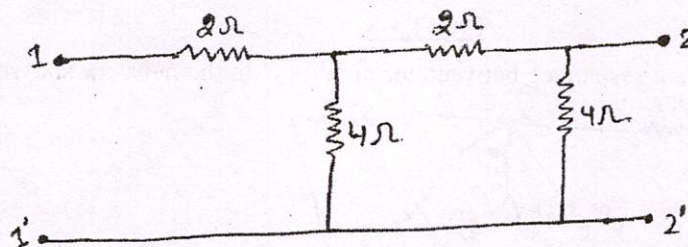
$$G(s) = 15s(s+3) / (s+4)(s^2 + 3s+11) \quad (5,5)$$

PART-B

- V. a) Draw the oriented graph of the network shown below. Also write down the incidence matrix and reduced incidence matrix by inspection?



- b) Determine the transmission parameters for the network shown below.



- VI. a) Design T and Pie section of constant-K high pass filter having cut off frequency 15kHz and design impedance 600 ohm. Find its characteristic impedance and phase constant at 25 kHz.
 b) Design an m-derived low pass filter in both T and Pie configuration having a design impedance of 600 ohm, cut off frequency of 5 kHz and $m=0.35$? (5,5)
- VII. a) Draw and explain the basic construction of DC motor? Also derive the torque and emf equations for the same?
 b) Write short note on:
 (i) Torque-Slip characteristics
 (ii) Composite Filters (6,4)