R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, October/November - 2016
NETWORK THEORY
(Electrical and Electronics Engineering)

Time: 3 Hours　　　　　　　　　　　　　　　　　　　　　**Max. Marks: 75**

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART – A　　　　　　　　　　　　　　　　　　　　　　　(25 Marks)

1.a)　What are the advantages of three phase system?　　　　　　　　　　[2]
  b)　Three coils, each having resistance of 25Ω and inductive reactance of 10Ω are connected in Star to a 400V, 3-phase, 50Hz AC supply. Calculate the power supplied.
　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　[3]
  c)　Define the term Time Constant.　　　　　　　　　　　　　　　　[2]
  d)　Sketch the DC response of RC circuit and response curve.　　　　　　[3]
  e)　Mention the properties of Transfer Function　　　　　　　　　　　[2]
  f)　Write the necessary conditions for Driving Point Functions.　　　　　[3]
  g)　Define Port and Two-port network.　　　　　　　　　　　　　　　[2]
  h)　The admittance parameter Y_{12} in the 2-port network in figure 1 is　　[3]
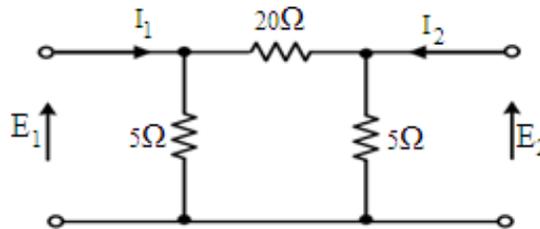
Figure 1

  i)　Classify Constant K-Filters.　　　　　　　　　　　　　　　　　　[2]
  j)　A π– section filter comprises a series arm inductance of 25 mH & two shunt capacitors each of 0.12 microfarad. Calculate the attenuation at 15 KHz.　　[3]

PART – B　　　　　　　　　　　　　　　　　　　　　　　(50 Marks)

2.a)　Three impedances each of (10+j3) ohms are connected in star to a 220 V, 3-phase, 50 Hz supply. Calculate the line currents and power delivered to the load.
  b)　Derive the relation between phase and line values of a 3-phase balanced delta connected system.　　　　　　　　　　　　　　　　　　　　　[5+5]

OR

3.a)　Explain the measurement of power in a balanced 3-phase system using a single watt meter.
  b)　Three coils each having a resistance of 50 Ω and an inductive reactance of 45 Ω are connected in star and fed by a 3-phase, 400 V, 50 Hz system. Find
　　(i) Line current
　　(ii) Power
　　(iii) Power factor　www.ManaResults.co.in [5+5]

4.a) Deduce the transient response of RL series circuit excited by DC source.
  b) In the network shown in the figure 2 below, the switch is closed at t = 0. Find the values of i1(t) and i2(t) assuming zero initial currents through inductors.   [5+5]
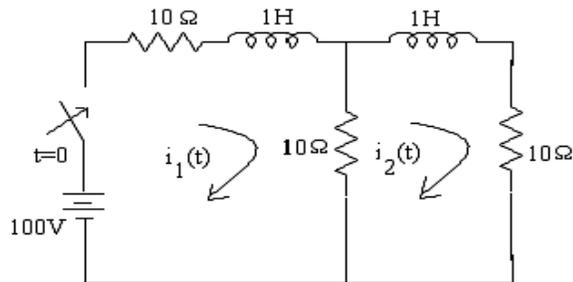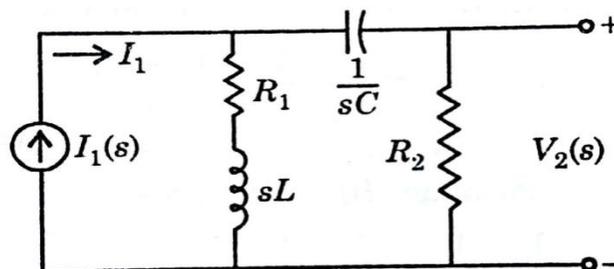

Figure 2

OR

5.a) In a series RLC circuit, R = 5 Ω, L = 1 H and C = 1 F. A dc voltage of 20 V is applied at t = 0. Obtain i (t).
  b) Find initial conditions for voltage across capacitor, the currents i_1, i_2 and the derivatives for the circuit shown in figure 3. below. Take R_1=10 Ω.   [5+5]
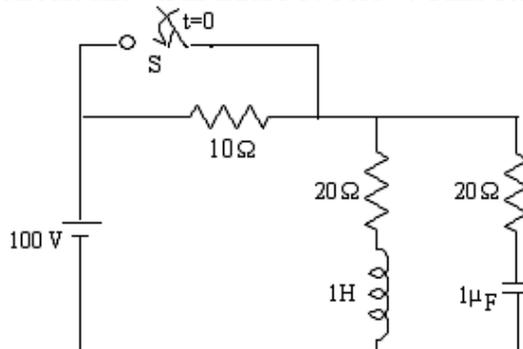
Figure 3

6.a) Explain the concept of Complex Frequency.
  b) Find the Transfer Impedance function for the network given below (Figure 4).   [5+5]

Figure 4

OR

7. Find the Driving Point Impedance, Transfer Impedance and Voltage Transfer function for the circuit given below (Figure 5). [10]
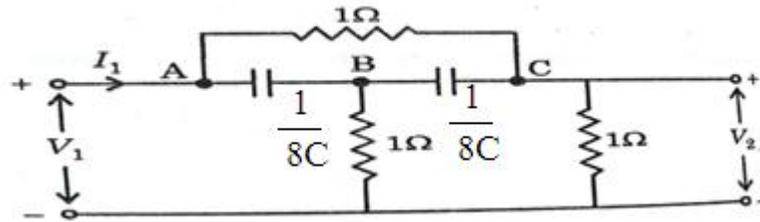

Figure 5

8.a) Derive the relation between ABCD and 'Z'-parameters.
 b) A two port network has the following parameters: $Z_{11} = 4\ \Omega$, $Z_{12} = 1\ \Omega$, $Z_{21} = 3\ \Omega$ and $Z_{22} = 3\ \Omega$. Calculate short circuit parameters. [5+5]

OR

9.a) Obtain the transmission line parameters when the two transmission networks having the transmission parameters A_1, B_1, C_1, D_1 and A_2, B_2, C_2, D_2 are connected in cascade.
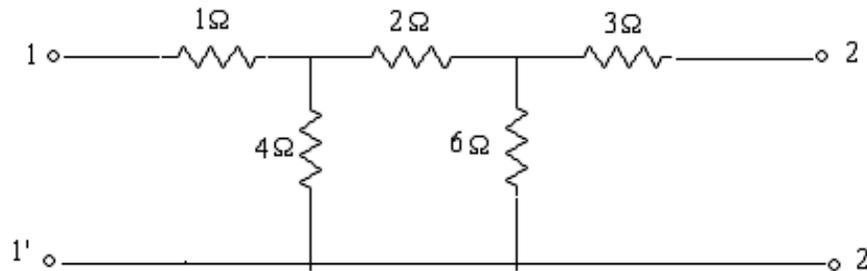 b) Obtain 'Z' – parameters for the given network shown below. (Figure 6) [5+5]

Figure 6

10.a) Design a high pass filter with a cut-off frequency of 2.5 KHz with a terminated design impedance of 1000 Ω.
  b) Design an m-derived T section low pass filter having a design impedance of 800 Ω, cut-off frequency of 4400 Hz and infinite attenuation at 2500 Hz. [5+5]

OR

11.a) Design a constant K-low pass filter to match with a line having characteristic impedance of 650 Ω and to pass frequency up to 5 kHz.
  b) Design and m-derived π-section high pass filter having a cutoff frequency of a 2 kHz. Take Rk=600Ω and f=2.1 kHz. Find the attenuation at f = 2.05 KHz and 25k Hz. [5+5]

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