Code No: 114DH **R13**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, October/ November- 2016
PRINCIPLES OF ELECTRICAL ENGINEERING
(Electronics and Communication Engineering)

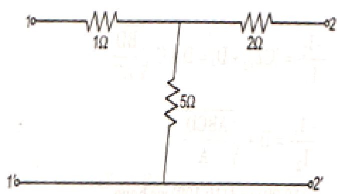
Time: 3 Hours **Max. Marks: 75**

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) Define transient response of an electrical circuit. [2]
b) Differentiate the time constants of R-L and R-C series circuit. [3]
c) Express h-parameters in terms of Y-parameters. [2]
d) Find the image parameters of the network shown in figure below. [3]



e) Differentiate stop band and pass band filters. [2]
f) Explain the significance of attenuation in electronic circuits. [3]
g) What are the two functions of a commutator in D.C. Machines? [2]
h) Mentions the reasons for compounding D.C. Generator. [3]
i) Write short notes on transformer cooling. [2]
j) What is a transformer? Differentiate between step- up and step -down transformer.[3]

PART-B

(50 Marks)

2.a) Obtain the transient response of R-L series circuit excited by d.c source. Also, draw the graphs for voltage drops across R and L.
b) Determine whether RLC series circuit shown in figure 1 is under damped, over damped or critically damped. Also, find v_L (0+) and I (∞). [5+5]

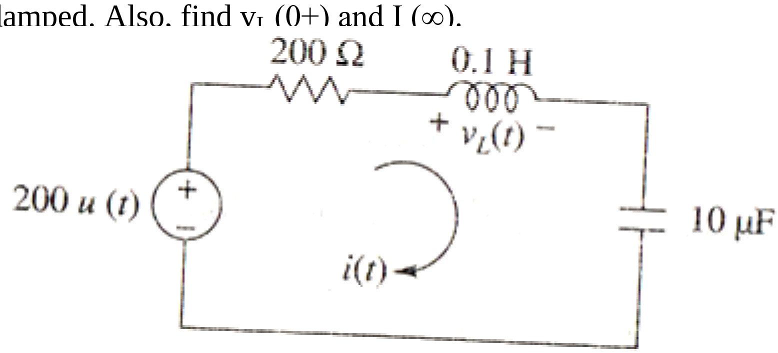


Figure: 1

OR

3.a) Obtain the transient response of R-L-C series circuit excited by d.c source. Also, draw the graphs for voltage drops across R, L and c.

b) A series R-L circuit has a constant voltage V = 10 volts is applied at t = 0. At what time does $V_R = V_L$.(Figure 2) [6+4]

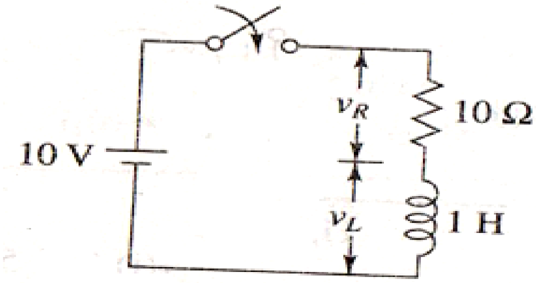


Figure: 2

4.a) Obtain the ABCD parameters for the network of figure 3.

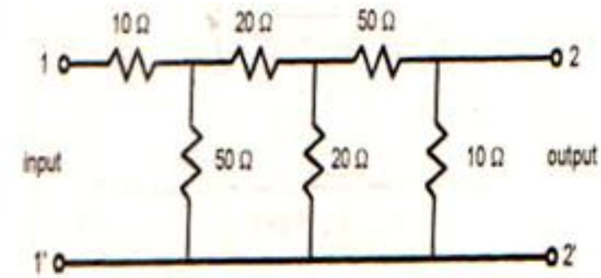


Figure: 3

b) Determine Y- parameters using interconnection of two port networks for the network shown in figure 4. [5+5]

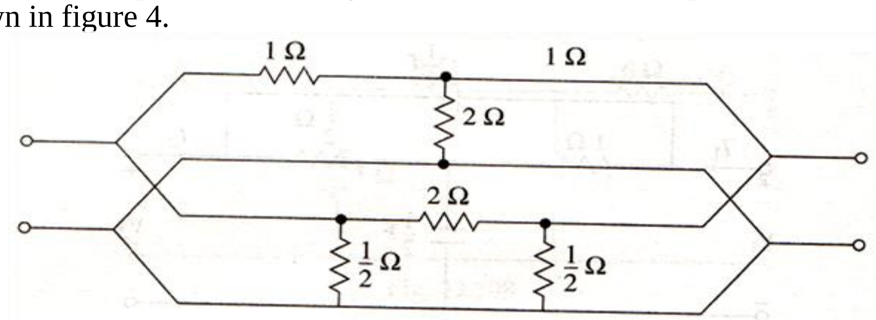


Figure: 4

OR

5.a) Obtain the short circuit admittance parameters of the network of figure 5 and there by obtain the A, B, C, D parameters.

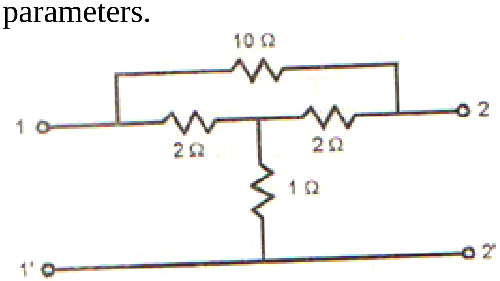
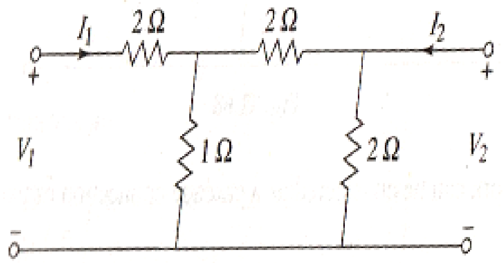


Figure: 5

b) Two identical sections of the network shown in figure 6 are connected in cascade. Obtain the transmission parameters of the overall connection. [5+5]



6.a) Design an m-derived π-section high pass filter having a cut off frequency of 10 KHz R_K=600Ω and f∞=9.5 KHz. Find the attenuation at f=9.8 KHz and 5KHZ.

b) Design a symmetrical bridged T-type attenuator with attenuation of 20 dB and design impedance of 600Ω. [6+4]

OR

7.a) Design a constant K prototype high pass filter with a cut-off frequency of 5KHZ working into an impedance of 600Ω. Calculate the phase shift, attenuation and the characteristic impedance at (i) 2.5KHz (ii) 8KHz.

b) Design a symmetrical lattice attenuator to have attenuation of 20 dB and characteristic impedance of 600Ω. [6+4]

8.a) A 220 D.C shunt motor has an armature resistance of 0.8 Ω and takes a current of 25 A on full load. By how much must the main flux be reduced to raise the speed by 30% if the developed torque is constant?

b) Explain the procedure of conducting a Swinburne's test to be conducted on a d.c shunt machine. [4+6]

OR

9.a) A 20KW, 4 pole d.c shunt generator has a terminal voltage of 250V when running at 400 rpm. The armature has a resistance of 0.16Ω and consists of 652 conductors which are lap wound. The diameter of pole shoe circle is 0.38m. The poles are 0.2m long and subtend an angle of 60^0. Calculate the flux density in the air gap. Neglect shunt field current.

b) Describe different methods of speed control of d.c motors. Also, state their advantages and disadvantages. [4+6]

10.a) Draw the equivalent circuit of transformer . Explain how it can be simplified. Explain the advantages of simplification.

b) The constants of a single phase 50Hz, 2200/220 V transformer is as follows:
H.V. side: $r_1 = 0.21\Omega$, $x_1 = 3.84\Omega$, $Rc_1 = 4800\Omega$, $Xm_1 = 3500\Omega$
L.V. side: $r_2 = 0.006\Omega$, $x_2 = 0.022\Omega$.
Find the equivalent circuit parameters referred to (i) h.v. side and (ii) l.v. side. [6+4]

OR

11.a) Explain the effect of variations of frequency and supply voltage on Iron losses of a transformer.

b) A 75KVA, 11000/440V single phase transformer has a primary winding having a resistance of 7.8Ω and a reactance of 9.4Ω. The resistance and reactance of the secondary winding are 0.0085Ω and 0.0123Ω respectively. Calculate the equivalent impedance (i) referred to the primary side and (ii) referred to the secondary side. Also calculate the total copper loss in the transformer. [6+4]

---ooOoo---