Code No: 133BK **R16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2018
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 is cut set matrix? [2]
b) Define: i) Flux ii) Reluctance iii) M.M.F. [3]
c) What is balanced supply and balanced load? [2]
d) What is the significance of phase sequence? [3]
e) Sketch the DC response of RL circuit and response curve. [2]
f) Define time constant of R-C circuit excited d.c source. [3]
g) Define Port and Two-port network. [2]
h) Two two-port networks with transmission parameters A_1, B_1, C_1, D_1 and A_2, B_2, C_2, D_2 respectively are cascaded. What is the transmission parameter matrix of the cascaded network? [3]
i) What is the function of a band elimination filter? [2]
j) What is a high pass filter? In what respects it is different from a low pass filter? [3]

PART-B

(50 Marks)

2.a) Explain self inductance and mutual inductance.
b) Find the value of XL in the coupled network shown in figure 1 for making it series resonant. [5+5]

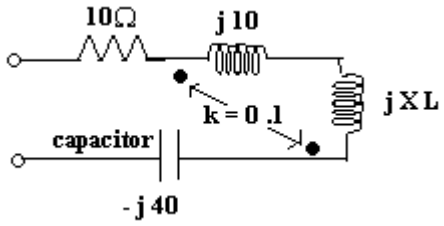

Figure: 1

OR

3.a) Obtain tie-set schedule for the network shown in figure 2.

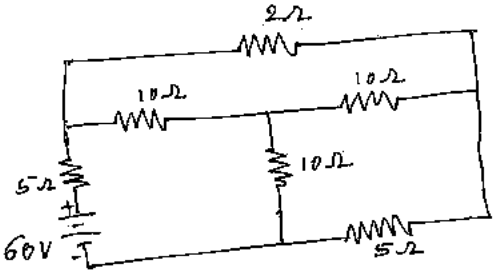

Figure: 2

b) Explain Faradays law of electromagnetic Induction. [5+5]

4.a) An unbalanced Δ connected load is connected across a balanced 3 phase RYB 440V supply. Find the wattmeter reading connected in the circuit shown in figure 3.

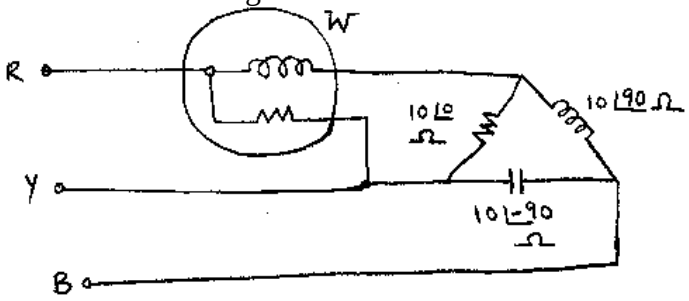

Figure: 3

b) Three impedances $Z_a = 6\angle 90^0$, $Z_b = 6\angle 0^0$ and $Z_c = 6\angle -90^0$ ohms are connected in star. Calculate the values of Z_x, Z_y and Z_z of the equivalent delta. Derive the formula used. [5+5]

OR

5. A balanced three phase three wire system has a Y-connected load. Each phase contains three loads in parallel: -j 100 Ω, 100 Ω and 50 + j50 Ω. Assume positive phase sequence with $V_{ab} = 400\angle 0^o$ volts. Find (i) V_{an} (ii) I_{aA} (iii) The power factor of the load (iv) The total power drawn by the load. [10]

6.a) The switch in Figure 4 has been in position A for a long time. At t = 0, the switch moves to B. Determine v(t) for t > 0 and calculate its value at t = 1 s and 4 s.

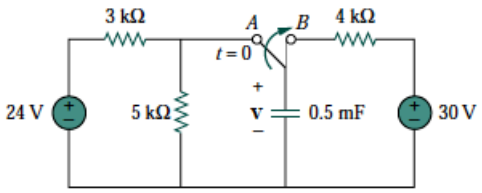

Figure: 4

b) Find the Capacitor voltage for t<0 and t>0 for each circuit shown figure 5. [5+5]

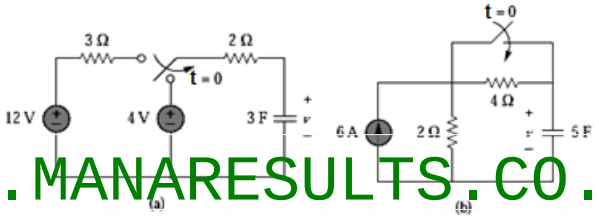

Figure: 5

OR

7.a) At t = 0, switch 1 in Figure 6 is closed, and switch 2 is closed 4 s later. Find i(t) for t > 0. Calculate i for t = 2 s and t = 5 s.

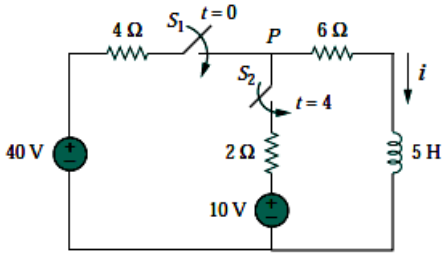

Figure: 6

b) The switch has been in position **a** for a long time as shown in figure 7, At t=0 it moves to position **b**. Calculate i(t) for all t > 0. [5+5]

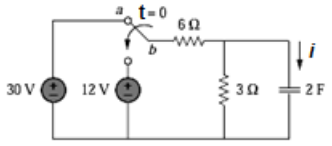

Figure: 7

8.a) Explain different types network functions as applied to single port and two port network. Obtain Y_{12} of the given network shown in figure 8.

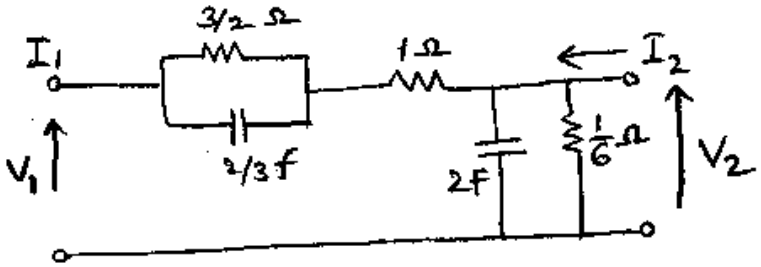

Figure: 8

b) Obtain the relation between Y and Z parameters. [5+5]

OR

9.a) Find driving point impedances Z_{11} and Z_{22} transfer impedances Z_{21} and Z_{12} for the network shown in figure 9.

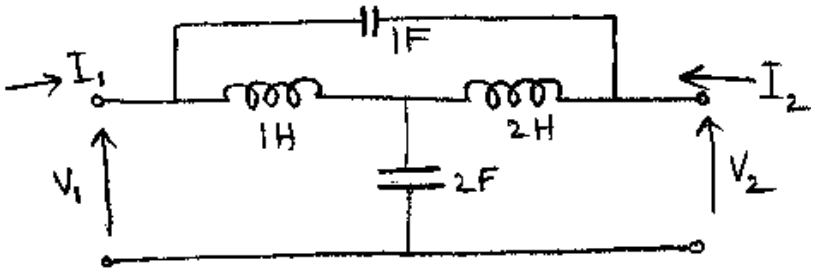

Figure: 9

b) Obtain the relationship between Z and h parameters. [5+5]

10. Derive the equations to find the inductances and capacitances of a constant K high passfilter. [10]

OR

11. Explain low pass filters. Discuss the design considerations of K type-low pass filters. [10]

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