

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

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|------|--|------------|
| 1.a) | What is cut set matrix? | (25 Marks) |
| b) | Define: i) Flux ii) Reluctance iii) M.M.F. | [2] |
| c) | What is balanced supply and balanced load? | [3] |
| d) | What is the significance of phase sequence? | [2] |
| e) | Sketch the DC response of RL circuit and response curve. | [3] |
| f) | Define time constant of R-C circuit excited d.c source. | [2] |
| g) | Define Port and Two-port network. | [3] |
| 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? | [2] |
| i) | What is the function of a band elimination filter? | [3] |
| j) | What is a high pass filter? In what respects it is different from a low pass filter? | [2] |
| | | [3] |

PART-B

- | | | |
|------|--|------------|
| 2.a) | Explain self inductance and mutual inductance. | (50 Marks) |
| b) | Find the value of XL in the coupled network shown in figure 1 for making it series resonant. | [5+5] |

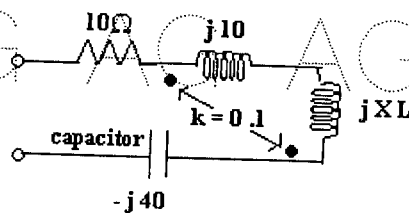


Figure: 1
OR

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

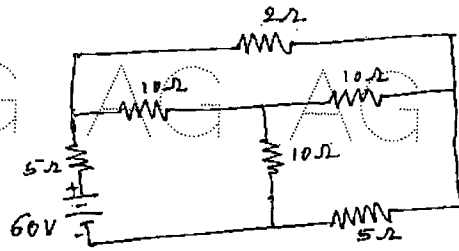


Figure: 2

- 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.

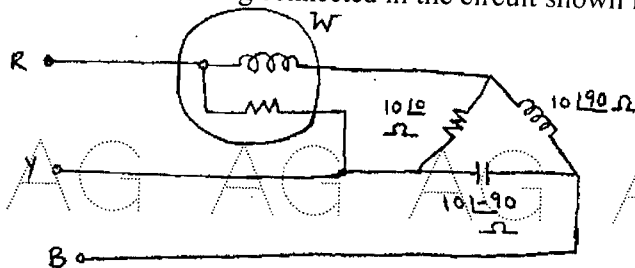


Figure: 3

- b) Three impedances $Z_a = 6\angle 90^\circ$, $Z_b = 6\angle 0^\circ$ and $Z_c = 6\angle -90^\circ$ 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: $-j 100 \Omega$, 100Ω and $50 + j50 \Omega$. Assume positive phase sequence with $V_{ab} = 400\angle 0^\circ$ 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.

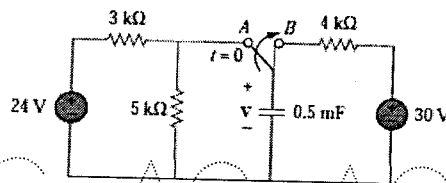


Figure: 4

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

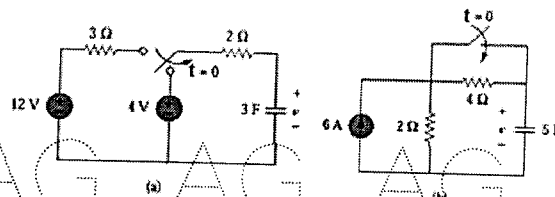


Figure: 5

- 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.

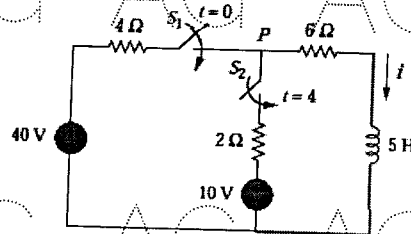


Figure: 6

- 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]

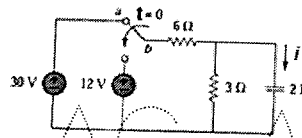


Figure: 7

- 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.

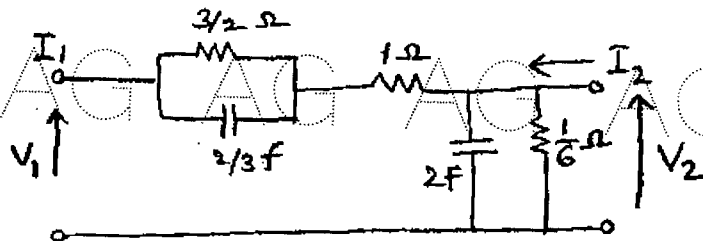


Figure: 8

- 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.

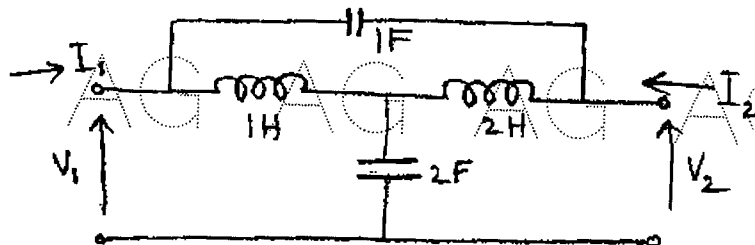


Figure: 9

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

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

OR

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

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