



B.E. DEGREE EXAMINATIONS: APRIL / MAY 2023

(Regulation 2018)

Fourth Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

U18EET4004: Network and System

COURSE OUTCOMES

- CO1:** Understand the basic concepts of graph theory and apply it to electrical networks.
CO2: Analyze the transient behavior of DC and AC circuits.
CO3: Model the networks in S-domain and determine their equivalent two port network parameters
CO4: Design various types of filters, attenuators and observe their frequency response.
CO5: Categorize the different types of signals and systems.

Time: Three Hours

Maximum Marks: 100

**Answer all the Questions: -
 PART A (10 x 2 = 20 Marks)
 (Answer not more than 40 words)**

- | | |
|---|-----------------------|
| 1. Define the rank of a graph. | CO1 [K ₁] |
| 2. Summarize the properties of a tree. | CO1 [K ₂] |
| 3. Recall the initial conditions for the inductor. | CO2 [K ₁] |
| 4. Classify the voltage current relationship of circuit elements in 's' domain. | CO2 [K ₂] |
| 5. Find the time constant of the series RL circuit. | CO2 [K ₁] |
| 6. Compare the driving point impedance and admittance of a one port network. | CO3 [K ₂] |
| 7. List the different types of filters. | CO4 [K ₁] |
| 8. Show that the signal $x(t) = \sin 23t$ is periodic. | CO5 [K ₁] |
| 9. Rephrase the power of the signal: $x(t) = A u(t)$. | CO5 [K ₂] |
| 10. Illustrate the discrete unit step sequence. | CO5 [K ₂] |

**Answer any FIVE Questions: -
PART B (5 x 4 = 20 Marks)
(Answer not more than 80 words)**

11. Extend the subgraph of the graph shown in Figure 11 to find twigs.

CO1 [K₂]

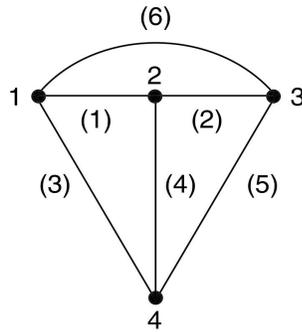


Figure 11: Twigs of a Graph

12. Apply the KVL to identify the DC voltage and current response of a series RC circuit.

CO2 [K₃]

13. Build the voltage transfer function of the two-port network shown in Figure 13.

CO3 [K₃]

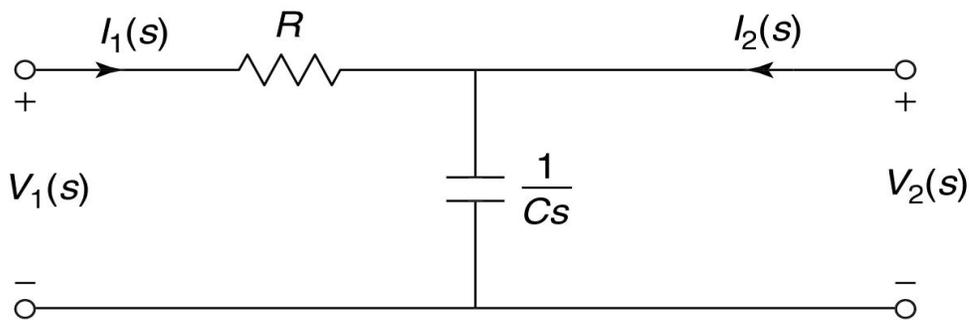


Figure 13: Voltage transfer function of the two-port network

14. Organize the different parameters of the constant 'k' low-pass filter.

CO4 [K₃]

15. Demonstrate that the system $y(t) = x(t^2)$ is linear.

CO5 [K₂]

16. Infer the complete incidence matrix for the graph shown in Figure 16.

CO1 [K₂]

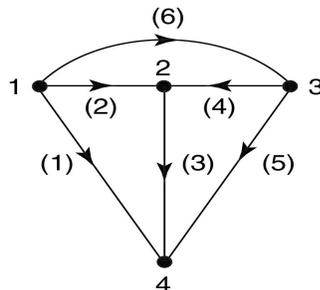


Figure 16: Different matrices of a Graph

Answer any FIVE Questions: -
PART C (5 x 12 = 60 Marks)
(Answer not more than 300 words)

17. a) Interpret the tie set matrix for the graph shown in Figure 16. 6 CO1 [K₂]
 b) Outline the fundamental cut set matrix for the graph shown in Figure 16. 6 CO1 [K₂]
18. a) Examine the current response of the series RL circuit shown in Figure 18a. 6 CO2 [K₄]

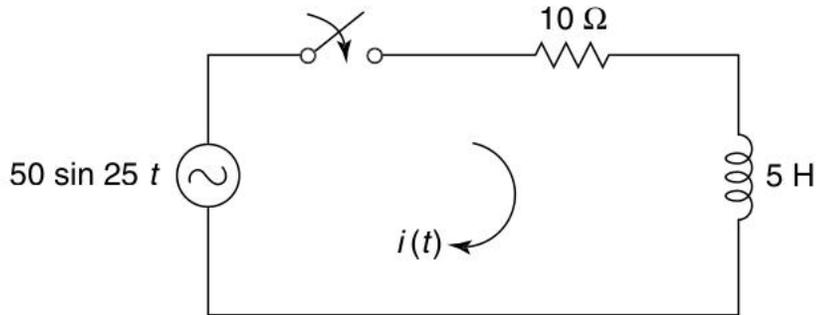


Figure 18a: Current response of series RL circuit

- b) Inspect the current response of the series RL circuit shown in Figure 18b. 6 CO2 [K₄]

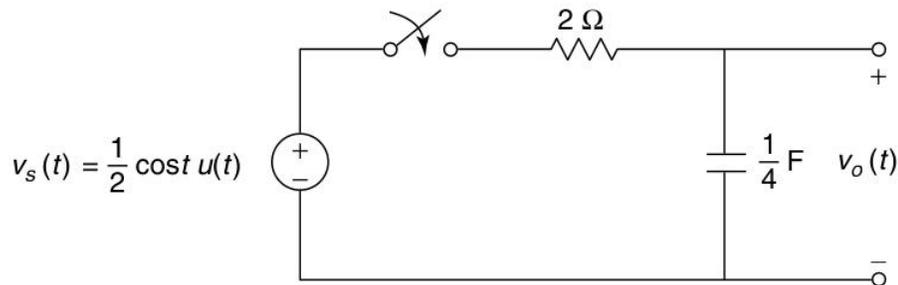


Figure 18b: Current response of series RC circuit

19. a) Construct the pole-zero plot for the function: 6 CO3 [K₃]

$$F(s) = \frac{s^2 + 4}{(s + 2)(s^2 + 9)}$$

b) Develop the 'Y' parameters for the network shown in Figure 19b.

6 CO3 [K3]

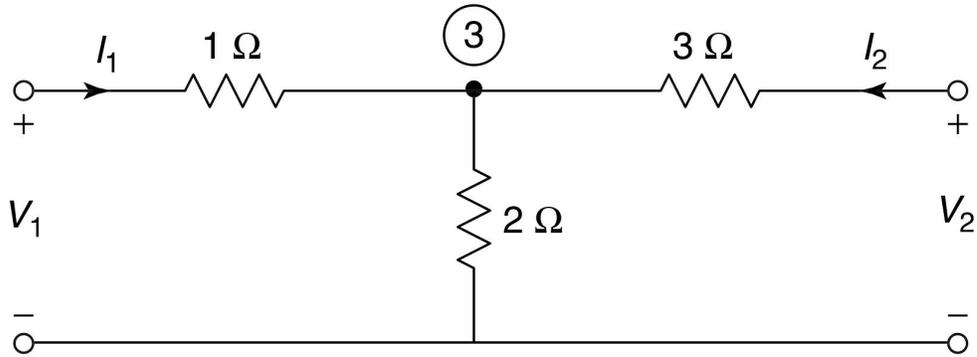


Figure 19b: 'Y' parameters for the network

20. a) Solve the different parameters of the 'm' derived high pass filter. 6 CO4 [K3]
b) Identify the attenuation of a symmetrical T network if the ratio of R1 and R2 is 0.25. 6 CO4 [K3]
21. a) Translate that the systems $y(n) = \sin x(n)$ and $h(n) = n u(n)$ are stable or not. 6 CO5 [K2]
b) Explain that the systems $y(n) = x(3n)$ and $y(n) = \sin(x(n))$ are static or dynamic. 6 CO5 [K2]
22. a) Model the 'Z' parameters of a 'T' network. 6 CO3 [K3]
b) Make use of symmetry to design the lattice attenuator. 6 CO4 [K3]
