

Code No: **R231211**

R23

SET - 1

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY GURAJADA VIZIANAGARAM
I B. Tech II Semester Supplementary Examinations Dec-2025/Jan 2026
NETWORK ANALYSIS
(Only ECE)

Time: 3 hours

Max. Marks: 70

Question paper consists of Part A & Part B.
Part A is compulsory, Answer all questions.
In Part B, Answer any one question from each unit.

PART-A

(20 Marks)

- 1 a) What is the difference between independent and dependent sources? [2]
- b) What conditions must be met for substitution theorem to apply? [2]
- c) How does a capacitor behave at $t = 0$ and $t \rightarrow \infty$? [2]
- d) What is the purpose of partial fraction expansion in Laplace analysis? [2]
- e) What does the phase angle between voltage and current indicate? [2]
- f) Express Ohm's law using phasor notation. [2]
- g) Define half-power frequencies in the context of series resonance. [2]
- h) What is meant by natural current in a coupled inductor circuit? [2]
- i) What are the types of attenuators commonly used? [2]
- j) Define iterative impedance. [2]

PART-B

(50 Marks)

Unit-1

- 2 Find Norton equivalent resistance R_N and current I_N at terminals a-b of [10]
the circuit shown below Figure.1.

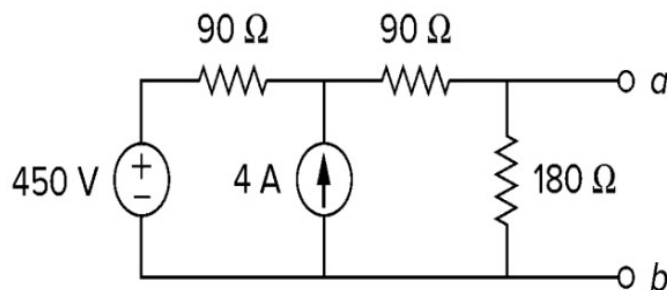


Figure:1

(OR)

- 3 Find the voltage across 30Ω resistor using Mesh analysis shown in Figure.2. [10]

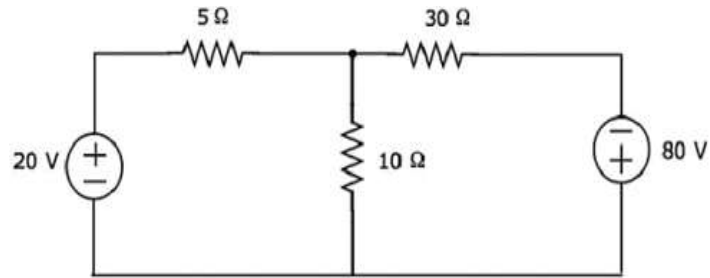


Figure:2

Unit-2

- 4 a) Show that the condition for critically damped response is $R = 63.2\Omega$. [10]
b) For $R = 20\Omega$, derive expressions for $i(t)$ and $V_L(t)$ for $t > 0$ (Assume that $V_C(0^-) = 0\text{V}$ and $i_L(0^-) = 0\text{A}$). Plot them versus time.

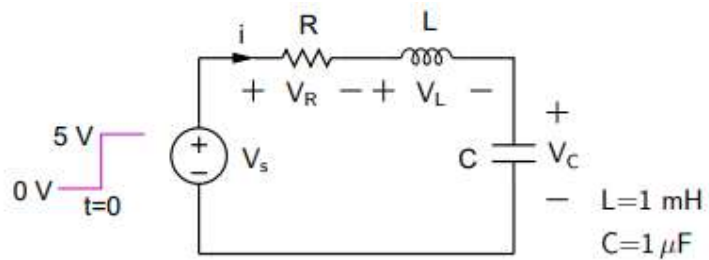


Figure:5

(OR)

- 5 Find the inverse Laplace transform of $\left[\frac{s^2+1}{s(s+1)^2}\right]$ [10]

Unit-3

- 6 In the circuit shown below Figure.6, find an expression for the current $i(t)$ when the switch is changed from position 1 to 2 at time $t = 0$. [10]

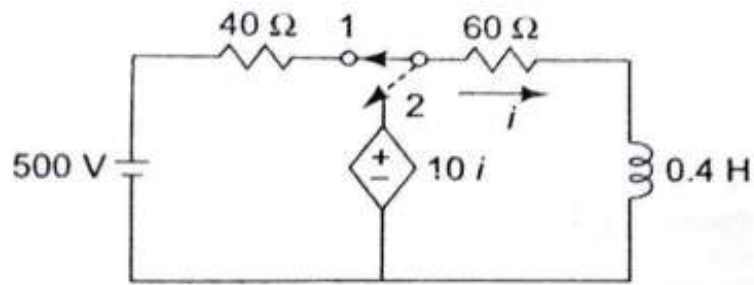


Figure:6

(OR)

- 7 Given a network of 9 resistors shown in Figure.7, find the equivalent resistance between point E and F. [10]

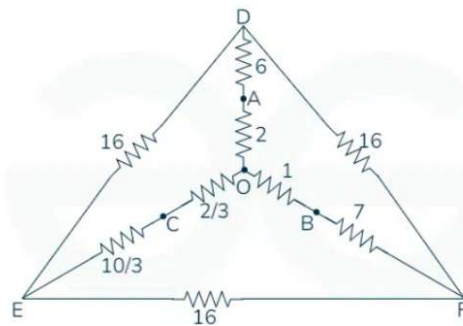


Figure:7

Unit-4

- 8 What is parallel resonance (anti-resonance)? Explain its behavior and conditions. [10]

(OR)

- 9 Explain conductively coupled equivalent circuits with an example. [10]

Unit-5

- 10 Find Y-parameters for the network shown below Figure.8. [10]

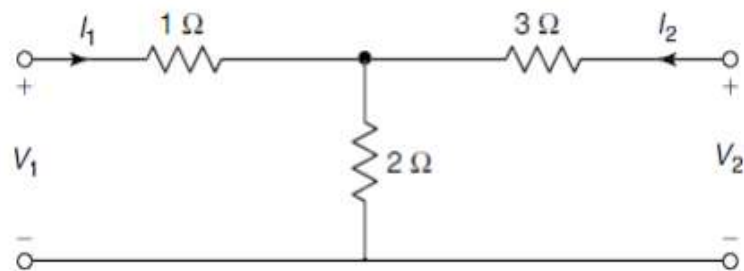


Figure:8

(OR)

- 11 Explain the concept of impedance matching and describe various [10]
impedance matching networks.
