

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY GURAJADA VIZIANAGARAM
I B. Tech II Semester Supplementary Examinations Dec 2025/Jan 2026
Electrical Circuit Analysis - I
(Only EEE)

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 an independent source? [2]
- b) What is the difference between a loop and mesh? [2]
- c) Define reluctance. [2]
- d) What is mutual inductance? [2]
- e) Define average value of periodic waveform. [2]
- f) What is the phasor relationship between voltage and current in an inductor? [2]
- g) Define quality factor. [2]
- h) Define bandwidth. [2]
- i) Define thevenin's resistance. [2]
- j) What is linearity? [2]

PART-B**(50 Marks)****Unit-1**

- 2 In the circuit below Figure.1, determine the voltage across current source [10]
using both mesh and nodal analysis. Compare the results in both methods.

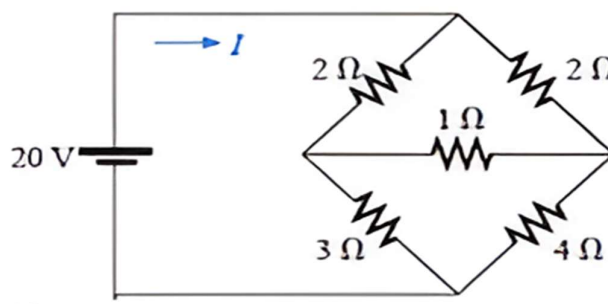


Figure:1

(OR)

- 3 Using network reduction techniques, determine the power in all the circuit elements of the circuit below Figure.2. [10]

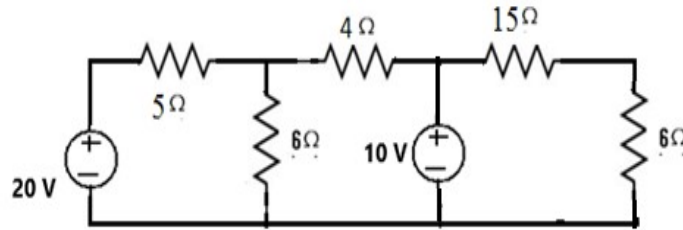


Figure:2

Unit-2

- 4 Two identical coupled coils have an equivalent inductance of 160 mH when connected series aiding and 100 mH in series opposing. Find L_1 , L_2 , M and K . Derive the expressions used in solving this problem. [10]

(OR)

- 5 Draw a composite magnetic circuit. Determine the relationship between fluxes and MMFs in different parts of the magnetic circuit. Explain with the help of its analogous electrical circuit. [10]

Unit-3

- 6 In the circuit below Figure.3, determine V_1 and V_2 using nodal analysis. [10]
Also determine the currents in inductor and capacitor.

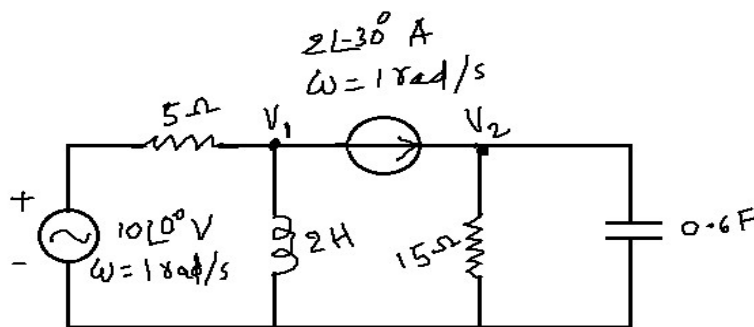


Figure:3

(OR)

- 7 Determine the power in all the circuit elements of the circuit below Figure.4. [10]

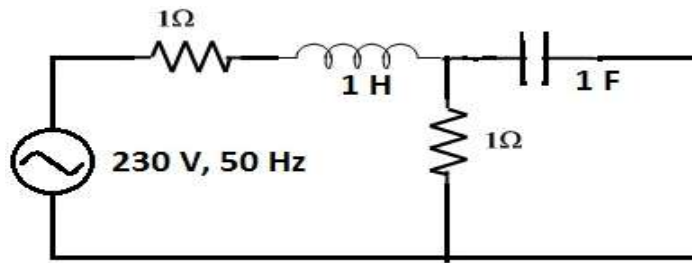


Figure:4

Unit-4

- 8 Derive the expressions for resonant frequency, quality factor, bandwidth and half power frequencies in a series RLC resonant circuit [10]

(OR)

- 9 Draw the impedance and admittance locus diagrams of series RL circuit. [10]
Derive the necessary expressions required for drawing the diagrams

Unit-5

- 10 Determine the thevenin's voltage and thevenin's resistance across terminals a and b in the circuit below Figure.5. Using these values, determine norton's equivalent circuit across the terminals. [10]

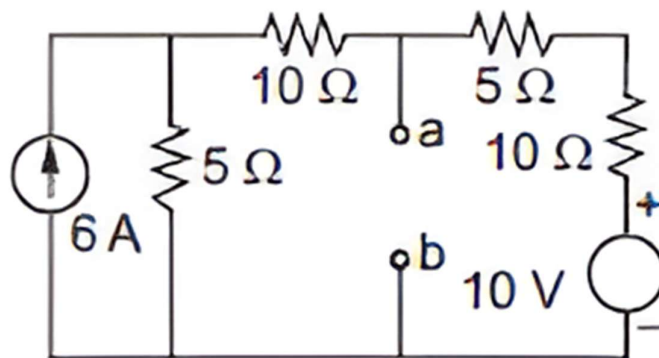


Figure:5

(OR)

- 11 Find the power dissipated in the resistors R_1 , R_2 and R_3 for the circuit shown below Figure.6, by applying superposition theorem [10]

Figure:1

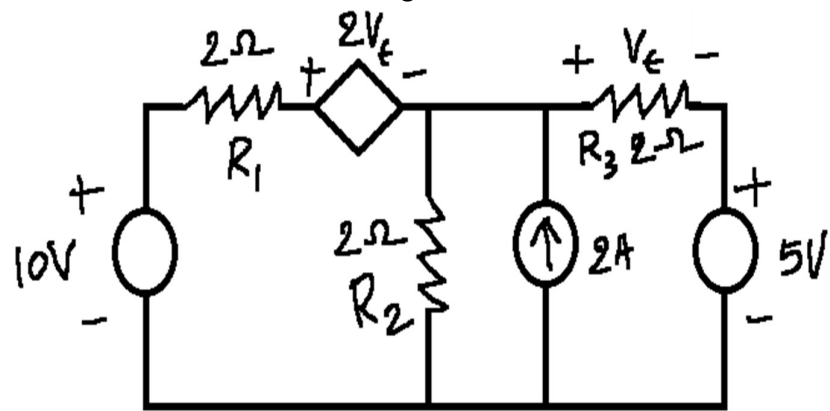


Figure:6
