



VIT[®]

Vellore Institute of Technology

Final Assessment Test – May 2024

Course: IEEE102L - Basic Electrical and Electronics Engineering

Class NBR(s): 4495 / 4499 / 4502 / 4504 / 4506

Slot: D1+TD1

Time: Three Hours

Max. Marks: 100

- KEEPING MOBILE PHONE/ELECTRONIC DEVICES EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE
- DON'T WRITE ANYTHING ON THE QUESTION PAPER

Answer any TEN Questions

(10 X 10 = 100 Marks)

1. Solve for the currents I_1 , I_2 , I_3 for the network shown in Figure 1.

[10]

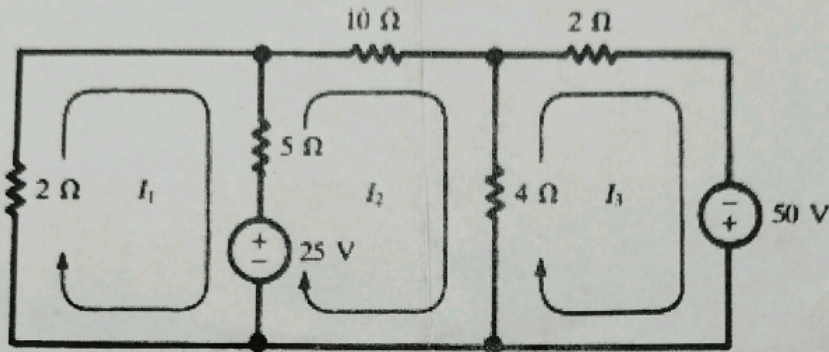


Figure.1

2. Find the value of the adjustable resistance R which results in maximum power transfer across the terminals ab of the circuit shown in Figure 2.

[10]

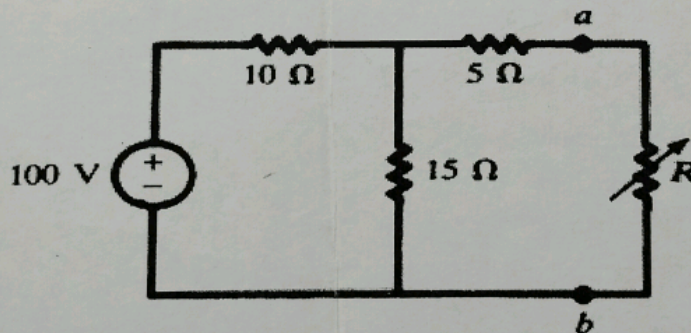


Figure.2

3. A coil of inductance 318.3 mH and negligible resistance is connected in series with a 200 ohm resistor to a 240 V, 50 Hz supply. Calculate (a) the inductive reactance of the coil, (b) the impedance of the circuit, (c) the current in the circuit, (d) the voltage across each component and (e) the circuit phase angle.

[10]

4. A balanced Δ -connected load having an impedance of $20 - j15 \Omega$ is connected to a Δ -connected, generator having the voltage of $330 \angle 0^\circ$ V. Calculate the phase voltages, phase currents of the load and the line currents. [10]
5. Two similar coils have a coupling coefficient of 0.25. When they are connected in series cumulatively, the total inductance is 80 mH. Calculate the self-inductance of each coil. Also calculate the total inductance when the coils are connected in series differentially. [10]
6. A coil of 200 turns is wound uniformly over a wooden ring having a mean circumference of 600 mm and a uniform cross-sectional area of 500 mm^2 . If the current through the coil is 4 A, calculate (a) the magnetic field strength, (b) the flux density and (c) the total flux [10]
7. List the types of transformers and explain its operating principle. Deduce the expression for the emf induced in the transformer. [10]
8. Describe BLDC motor working principle with neat circuit diagram and list its applications. [10]
9. a) Construct the Karnaugh map for the following function and hence obtain the reduced expression for [10]

$$F = \overline{X}YZ + \overline{X}Y\overline{Z}T + \overline{X}YZ\overline{T} + XYZT + X\overline{Y}\overline{Z}\overline{T} + X\overline{Y}Z\overline{T} + X\overline{Y}ZT + XY\overline{Z}T + XYZ$$
 b) Write the Boolean expression for FULL -ADDER circuit and draw the same using two half adders.
10. With neat circuit diagram and necessary truth table, realize the 8:1 Multiplexer and give its application. [10]
11. Explain the characteristics of a PN junction diode and full wave rectifier circuit with relevant diagrams. [10]
12. With a neat circuit diagram, explain the operation of BJT under CE configuration and draw its output characteristic curve. [10]