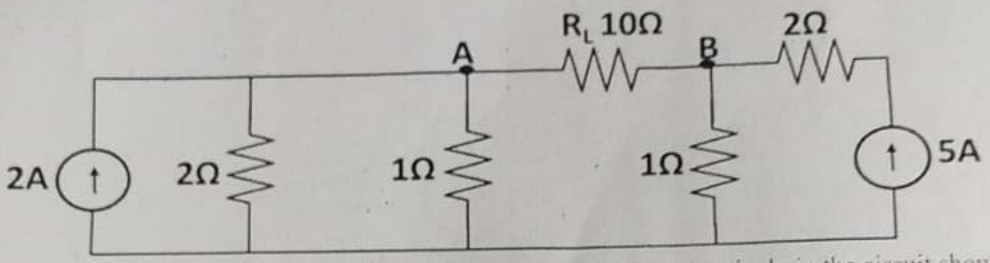
Final Assessment Test (FAT) – January/February 2023

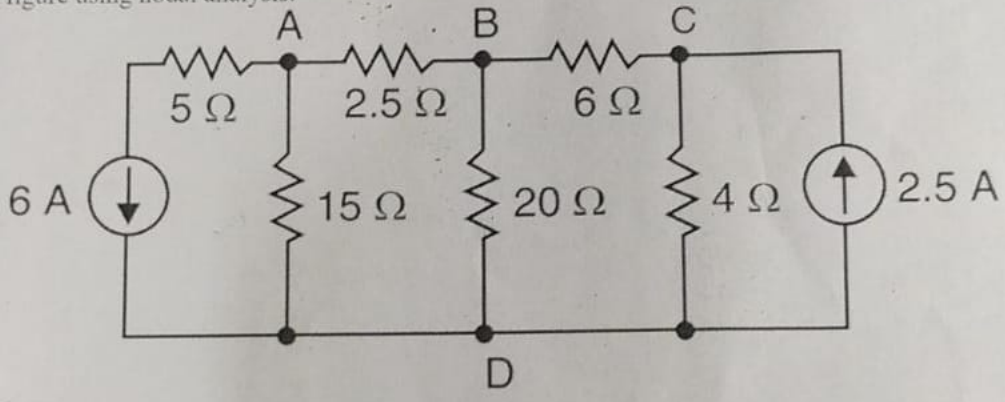
Programme	B.Tech.	Semester	Fall Semester 2022-23
Course Title	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	Course Code	BEEE102L
Faculty Name	Prof. Anantha Krishnan V	Slot	B1+TB1
		Class Nbr	CH2022231700084
Time	3 Hours	Max. Marks	100

Part A (10 X 10 Marks)
Answer All questions

1. For the circuit shown in figure, obtain the Thevenin's equivalent circuit and find the load current. [10]



2. Solve for nodal voltages Va, Vb and Vc at the nodes A, B and C respectively in the circuit shown in figure using nodal analysis. [10]



3. A 400 V, 3-phase supply is connected across a balanced load of three impedances each consisting of a 32-Ω resistance and 24 Ω inductive reactance in series. Determine the current drawn from the supply, if the three impedances are [10]
(a) Y-connected (b) Δ-connected

4. A steel ring of cross sectional area 50 mm^2 has an air gap of 2 mm and has the same cross sectional area as the steel ring. A coil of 2000 turns is wound uniformly around the steel ring. If the current in the coil is 10 A, the mean radius of the steel ring is 5 cm and relative permeability μ_r is 800, find [10]
a) total reluctance of the circuit
b) the flux in the ring

5. With suitable diagrams, elucidate the construction and working principle of an electrical machine that converts dc electrical energy to mechanical energy. [10]

6. i. Explain in detail about the formation, different biasing conditions and characteristics of PN junction diode. [10]

ii. Write the applications of Zener diode.

7. Plot the logical expression on a four-variable Karnaugh map. Obtain the simplified expression. [10]

$$F(A,B,C,D)=ABCD+A\overline{B}\,\overline{C}\,\overline{D}+A\overline{B}C+AB$$

8. What is a multiplexer? Construct an 8 X 1 multiplexer with necessary truth table and logic diagram. [10]

9. With neat diagram, explain the construction and operation of a single phase transformer. Deduce the expression for induced emf in the transformer. [10]

10. In the diagram shown below, the circuit is connected to a 230V, 50 Hz supply. Determine the following. [10]

a. Current drawn

b. Voltage V_1 and V_2

c. Power factor

d. Draw the phasor diagram with voltage, current and phase angle