

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV /DEC 2024

Third Semester

Bio Medical Engineering

BM3352- Electric Circuit Analysis

Regulations - 2021

Duration : 3 Hrs

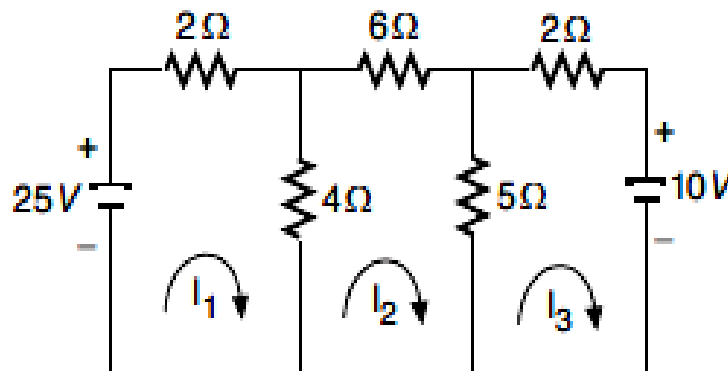
Maximum: 100 Marks

PART - A (ANSWER ALL QUESTIONS) (Marks 10*2=20)

Q.No	Questions	BLT	CO	Marks
1.	Define ohm's law.	RE	1	2
2.	A bulb is rated as 230V, 230W. Find the rated current and resistance of the filament.	AP	1	2
3.	State the limitations of Thevenin's theorem.	RE	2	2
4.	Define duality.	RE	2	2
5.	What are the types of power used in AC circuit?	RE	3	2
6.	Define instantaneous power.	RE	3	2
7.	In series RLC circuit, $L=2H$ and $C=5\mu F$. Determine the value of R to give critical damping.	AP	4	2
8.	Compare natural response and forced response.	UN	4	2
9.	Distinguish linear and ideal transformer.	UN	5	2
10.	Derive the formula for mutual inductance in terms of coupling coefficient K and self inductance.	UN	5	2

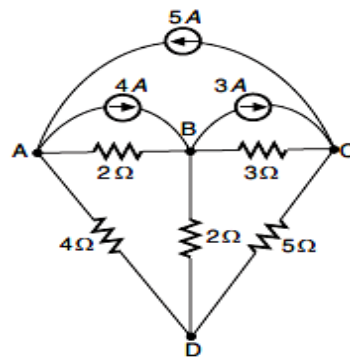
PART - B (ANSWER ALL QUESTIONS) (Marks 5*13 = 65)

Q.No	Questions	BLT	CO	Marks
11. a	Solve the mesh currents shown in figure using mesh analysis.	RE	1	13



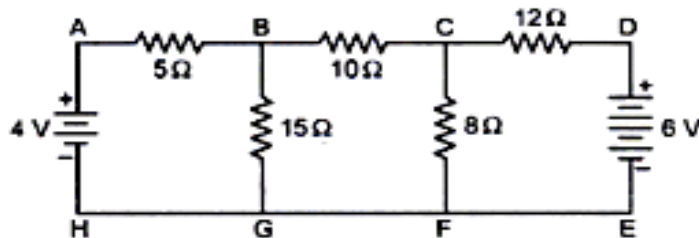
Or

- b i In the circuit shown in Figure, find the potential difference between A and D. RE 1 8



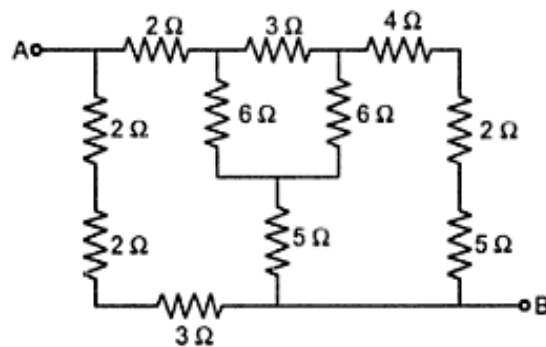
- ii State Kirchhoff's laws. RE 1 5

12. a Interpret the network shown in figure and to determine the current through 10 ohm resistor by using thevenin's theorem. UN 2 13

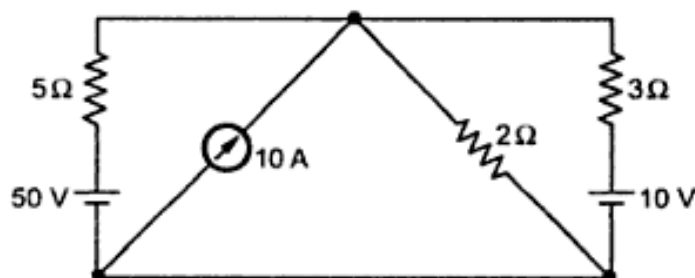


Or

- b i Calculate the effective resistance between the terminals A and B in the circuit shown below. UN 2 8



- ii Using source transformation, replace the current source in the circuit given into voltage source and find the current delivered by the 50V source. UN 2 5



13. a Draw the phasor diagram for a series R-L-C circuit energized by a sinusoidal voltage showing the relative positions of the current, component voltage and applied the voltage for the following cases:(a) When $X_L > X_C$; (b) When $X_L < X_C$; and (c) when $X_L = X_C$

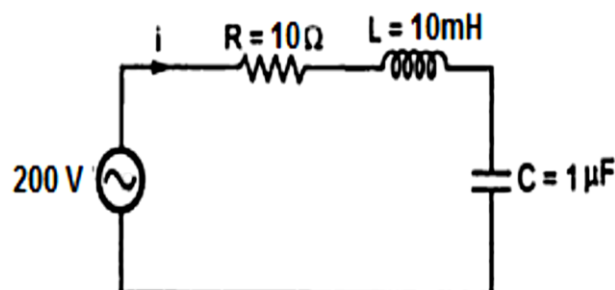
Or

- b A resistance of 120 ohms and a capacitor reactance of 250 ohms are connected in series across a AC voltage source. If a current of 0.9A is flowing in the circuit find out:
- (i) Power factor
 - (ii) Supply voltage
 - (iii) Voltage resistance and capacitance,
 - (iv) Active power and reactive power

14. a Derive the expression for the transient current flowing through a RLC series circuit to step input voltage for all possible damping with necessary waveform.

Or

- b A series RLC circuit with $R=10\Omega$, $L=10\text{ mH}$ and $C=1\mu\text{F}$ has an applied voltage of 200V at resonance frequency. Calculate the resonant frequency, the current in the circuit and the voltage across the elements at resonance. Find also the quality factor and bandwidth for the circuit.



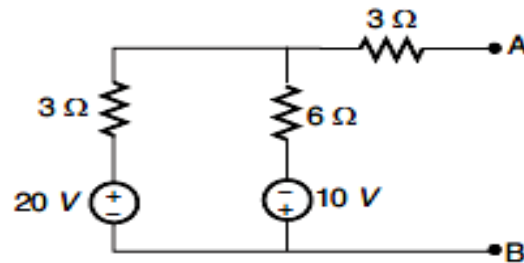
15. a Explain in detail about ideal transformer.

Or

- b Explain the following terms node, branch, tree, co-tree link and twigs with simple examples.

PART - C (Marks 1*15 = 15)

Q.No	Questions	BLT	CO	Marks
16.	a Obtain the Thevenin's and Norton's equivalent circuits for the active network shown in Fig.	AN	2	15



Or

- b Find C which results in resonance in the circuit shown in figure when $\omega = 5000 \text{ rad/sec}$.

