R22 Regulation *Subject code: 4E1AE*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech I Semester Regular Examinations, March/April 2023

Electrical Circuits

(EEE)

Maximum Marks: 60 Date:06.04.2023 Duration: 3 hours

Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

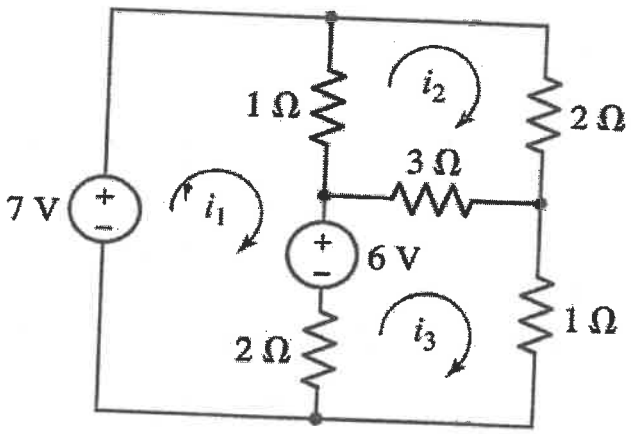
All the following questions carry equal marks (10x1M=10 Marks)

1. a Define Ohm's law.
   b Define Kirchoff laws.
   c Define RMS value.
   d Define quality factor.
   e State the Superposition theorem.
   f State Tellegan's theorem
   g Write the relationship between phase voltage and line voltage in a balanced star connected system?
   h List out the merits of 3-phase system over 1-phase system.
   i Define self-inductance.
   j Define tree and link.

Part-B

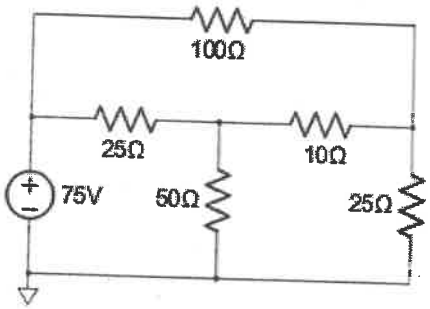
Answer All the following questions. (10M X 5=50Marks)

2 A. Write the voltage current relationship for R,L,C elements. [5]
B. Determine the current flowing through 3Ω resistance using mesh analysis in the circuit shown below: [5]



OR

3 Determine the current through 50 Ω resistor using nodal analysis: [10]

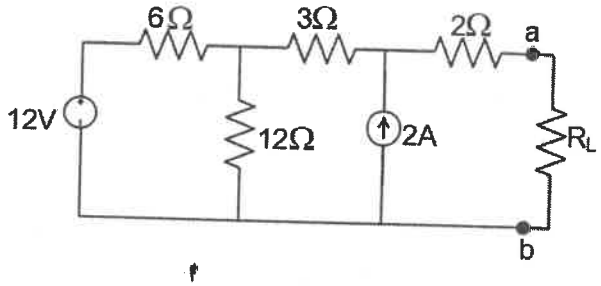


4 A. Define form factor. Derive an expression for formfactor of a sinusoidal voltage waveform. [5]
B. A series RLC circuit with R = 100Ω and L=100mH is excited by single phase 230V,50Hz sinusoidal ac supply. Determine the total impedance, current, active power and power factor of the circuit. [5]

OR

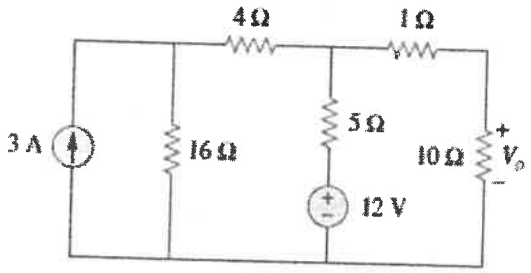
5 A. Define Resonance and explain about parallel resonance. [5]
B. Derive an expression for bandwidth of a series RLC circuit. [5]

6 A. State and explain Norton's Theorem. [5]
B. Determine the maximum power that can be transferred to the load resistance RL for the circuit shown below: [5]



OR

7 A. State and explain Millman's theorem. [5]
B. Determine the current though 10Ω resistance using Thevenin's theorem: [5]



8 A three phase balanced delta connected load of (10+j8) ohm is connected across a 400V,3-ϕ balanced supply. Determine the phase currents and line currents. Assume phase sequence to be RYB. Also calculate the power drawn by the load. [10]

OR

9 Derive the relation between the line and phase quantities in star and delta connection system for a balanced star and delta connected load. [10]

10 Two coupled coils with L1=0.02H and L2=0.01H and k=0.5 are connected in series aiding, series opposing, parallel adding and parallel opposing. What are the four equivalent inductances. [10]

OR

11 Define coefficient of coupling. Derive an expression for it in terms of self and mutual inductances. [10]