VIT
Vellore Institute of Technology

Final Assessment Test – June 2022

Course: **BEEE101L - Basic Electrical Engineering**

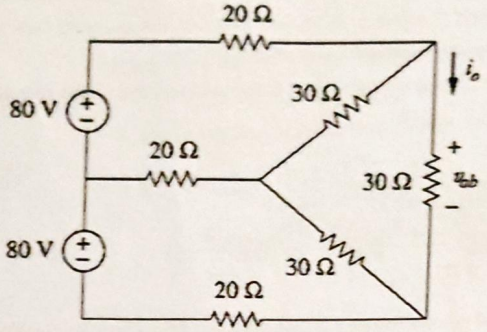
Time: **Three Hours** Max. Marks: **100**

KEEPING MOBILE PHONE/SMART WATCH, EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE

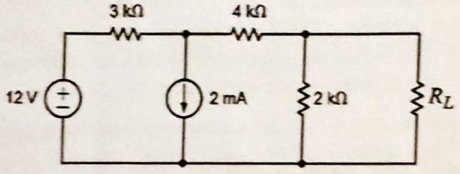
Answer any TEN Questions

(10 X 10 = 100 Marks)

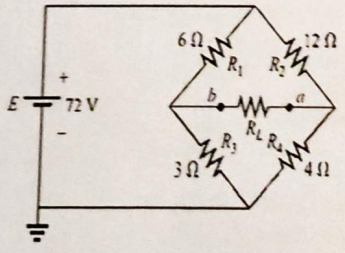
1. Using mesh analysis find v_{ab} and i_o in the below circuit.



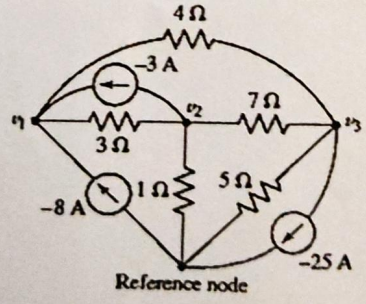
2. For the below circuit find R_L for maximum power transfer and the maximum power transferred to R_L.



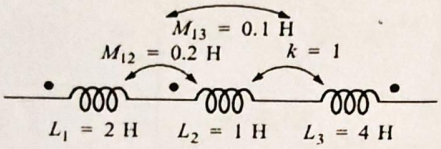
3. Find the Thevenin's equivalent circuit across R_L for the circuit shown below.



4. Find the node voltages using nodal analysis for the circuit shown below.



5. Two circuit elements are connected in series across a supply of frequency 60 Hz. One of the circuit elements is resistor with a value 40 Ω. A current of 3 A flows with leading power factor and the circuit impedance is 50 Ω. Calculate: (a) What is the value of the other circuit element in the series circuit, (b) the supply voltage, (c) the phase angle between the supply voltage and current, (d) the voltage drop across the resistor, and (e) the voltage drop across the other element. Also draw the phasor diagram.
6. Three similar coils each of resistance of 20 Ω and inductance of 0.17 H are connected across a 3 phase, 440 V, 50 Hz supply. Find the line and phase values of the current, real power and apparent power when they are connected in (a) Star and (b) Delta.
7. Define self and mutual inductance. Determine the total inductance of the series coils shown in the below figure.



8. Derive the expression for the emf generated in a DC generator. Also give the classification of DC generators with relevant circuits and equations.
9. Describe the working principle of transformer with necessary diagrams. Also deduce the expression for emf induced in the transformer coil.
10. Explain in detail the two-wattmeter method of power measurement in a three-phase system. Also comment on the power factor values based on the wattmeter readings.
11. Write short notes on safety and earthing aspects with relevant diagram.
12. Sketch the staircase wiring circuit with necessary fuse calculation and describe it's working.

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