Code No: R19ES1217 **R19** SET - 1

I B. Tech II Semester Supplementary Examinations, July/August - 2021
ELECTRICAL CIRCUIT ANALYSIS-I
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 75

Answer any five Questions one Question from Each Unit
All Questions Carry Equal Marks

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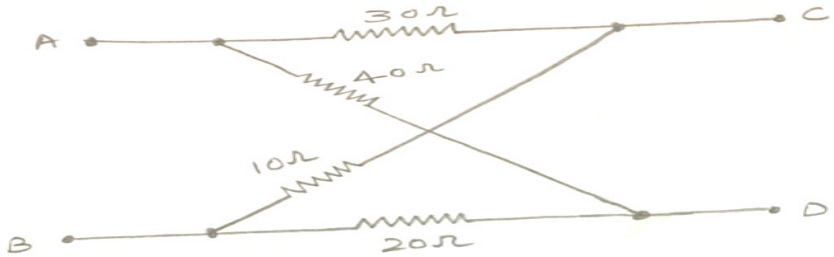
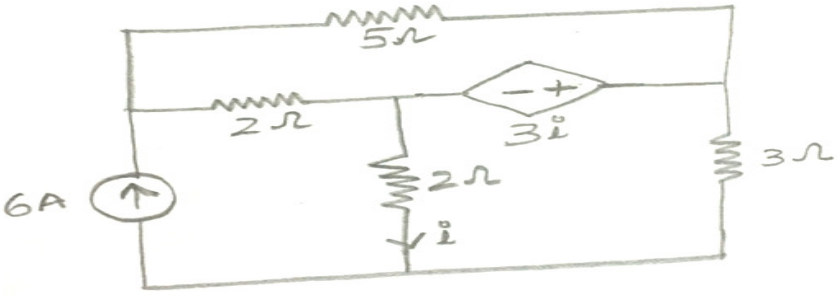
1. a) Prove that the energy stored by the capacitor is ½ CV^2 (7M)

   b) Find the resistance at AB for the network shown below: when terminals CD are (i) Open Circuited; and (ii) short circuited. (8M)



Or

2. a) Find the current through the 5Ω resistor using mesh analysis method. (10M)



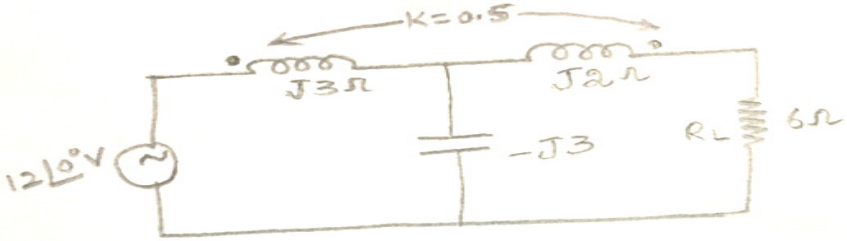
   b) Explain the concept of node analysis in Electrical Circuits. (5M)

3. a) Explain how an emf is induced (i) Statically, and (ii) Dynamically (8M)

   b) When two identical coupled coils are connected in series, the inductance of the combination is found to be 80 mH. When the connections to one of the coils are reversed, a similar measurement indicates 20 mH. Find the coupling coefficient between the coils. (7M)

Or

4. a) Find the drop across R_L for the following circuit: (8M)



   b) Prove that the net inductance for a two series aiding coils is equal to $L_1 + L_2 + 2M$ and also for two series opposing coils is equal to L1 + L2 - 2M, if the mutual inductance between the two coils is M. (7M)

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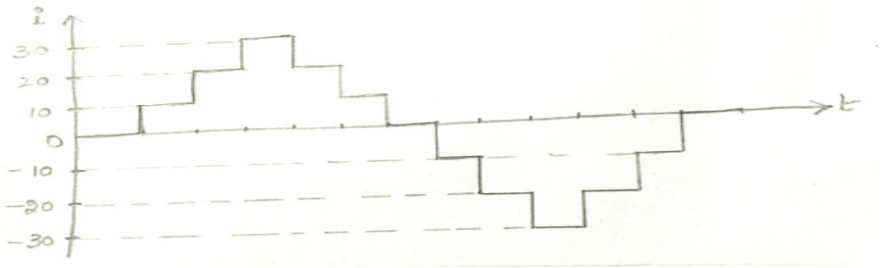
5. a) Distinguish between (8M)
(i) Lagging and Leading Waveforms and (ii) Lagging and leading Phaasors

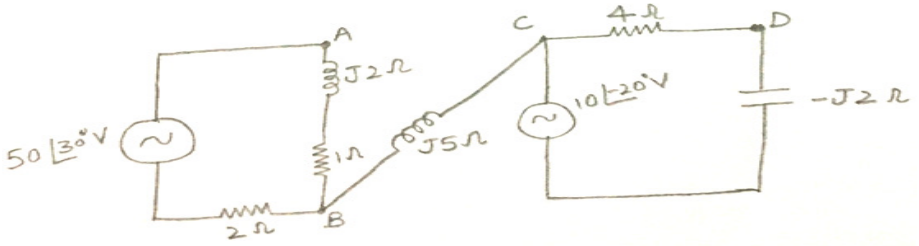
b) Find the average value, rms value, form factor and peak factor for the following circuit. (7M)



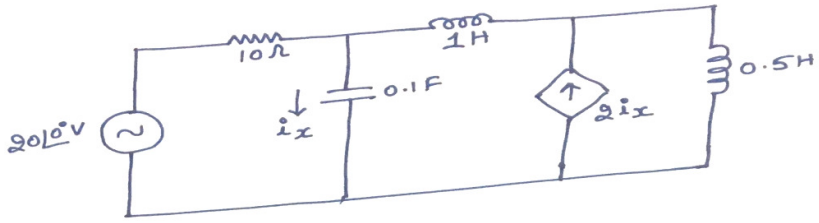
Or

6. a) A circuit consists of two coils connected to a 220 V a.c. supply. The first coil has a resistance of 5Ω and inductive reactance of 10Ω. The second coil has a resistance of 6Ω and inductive reactance of 8Ω. Calculate: (i) the total impedance of the circuit; (ii) the current, (iii) the circuit phase angle; and (iv) the voltage drop in each coil. (8M)

b) For the following network find the drop in ABCD branch. (7M)



7. Find i_x in the circuit shown below using nodal analysis. (15M)



Or

8. a) Derive the Q – factor for the Parallel RLC Resonating circuit. (7M)

b) A 50 μF capacitor, when connected in series with a coil having 40 Ω resistance, resonates at 1000 Hz. Find the inductance of the coil. Also obtain the circuit current if the applied voltage is 100 V. Also calculate the voltage across the capacitor and the coil at resonance. (8M)

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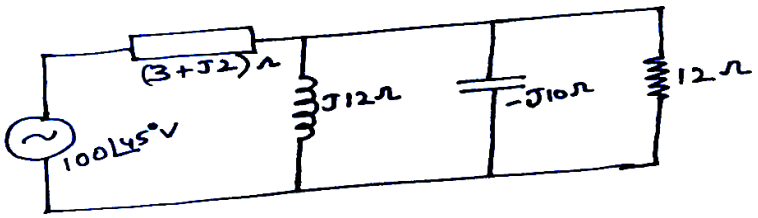
9. Find current through 12Ω resistor using Thevenin's theorem. (15M)



Or

10. Find the current through 1Ω resistor across terminals A – B for the following circuit using Norton's theorem. (15M)