

I B. Tech II Semester Supplementary Examinations, March- 2022
ELECTRICAL CIRCUIT ANALYSIS –I
 (Only for EEE)

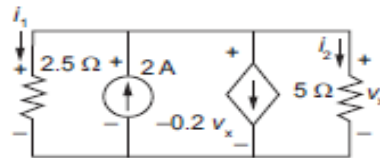
Time: 3 hours

Max. Marks: 70

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

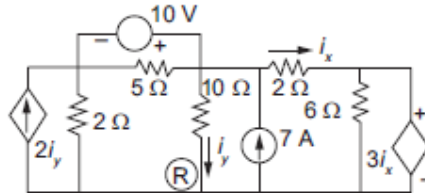
Unit I

1. a) Explain the following w.r.t necessary examples: (7M)
 i) Independent Current Source ii) Dependent Current source
 iii) Lumped and Distributed Elements
 b) Find the power absorbed and power delivered by the following circuit: (7M)



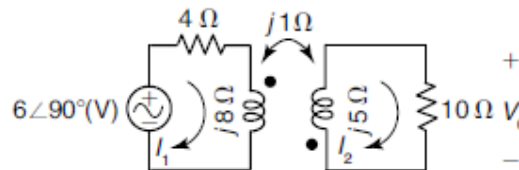
Or

2. Find the node voltages and the current through all the elements for the following circuit using Nodal analysis. (14M)



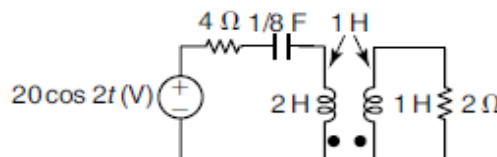
Unit II

3. a) Prove that the coefficient of mutual inductance M between two coils of self-inductances L_1 and L_2 is given by $\frac{M}{\sqrt{L_1 L_2}}$ (7M)
 b) Determine the voltage V_0 for the following circuit. (7M)



Or

4. a) Prove that when two coils of self-inductances L_1 and L_2 are connected in series opposing connection with a mutual inductance M then the total inductance is equal to $L_{eqv} = (L_1 + L_2 - 2M)$. (7M)
 b) Determine the coupling coefficient and the energy stored in the following coupled circuit at $t = 2$ seconds (7M)



Unit III

5. a) What is a Power triangle and explain the significance of it. (7M)
- b) When a resistor and coil in series are connected to a 240 V supply, a current of 5 A is flowing lagging 60° behind the supply voltage, and the voltage across the coil is 220 V. Find the resistance of the resistor and the resistance and reactance of coil. (7M)

Or

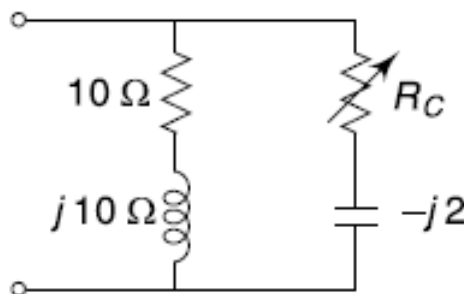
6. a) Explain the following terms relating to Alternating quantity: (7M)
i) Average value ii) Peak factor iii) Form factor
- b) If the form factor of a current wave form is 2 and the amplitude factor is 2.5, find the average value of the current if the maximum value of the current is 500A. (7M)

Unit IV

7. a) Explain the effect of variation of current and voltage across Inductor and capacitor w.r.t frequency in a series resonance circuit (7M)
- b) An inductive coil is connected in series with a $8 \mu\text{F}$ capacitor. With a constant supply voltage of 400 V the circuit takes minimum current of 80 A when the supply frequency is 50 Hz. Calculate the (i) resistance and inductance of the coil and (ii) voltage across the capacitor. (7M)

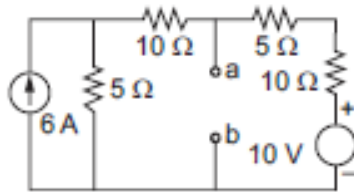
Or

8. a) Draw and explain the locus diagram for a series R – C circuit when R is fixed and variable capacitive reactance. (7M)
- b) Calculate the value of R_C in the circuit shown below which yields resonance. (7M)



Unit V

9. a) State and explain Substitution theorem. (7M)
- b) Find the Thevenin's equivalent and Norton's equivalent for the following circuit w.r.t terminals a and b. (7M)



Or

10. Find V_x in the circuit shown below using super position theorem (14M)

