

Code: 9A02305

R09/SS

B.Tech II Year I Semester (R09/R13) Supplementary Examinations June 2016

ELECTRICAL CIRCUITS

(Common to EEE, EIE, E.Con.E, ECE & ECC)

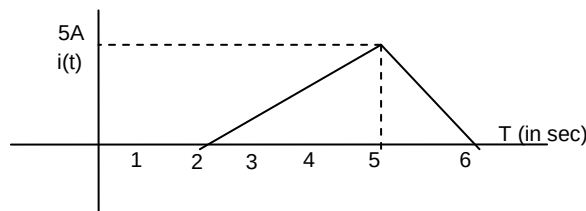
Time: 3 hours

Max. Marks: 70

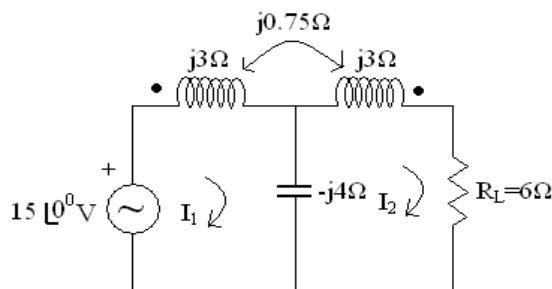
Answer any FIVE questions

All questions carry equal marks

- 1 (a) Write a note on inductor and V-I relationship associated with it.
 (b) A current $i(t)$ is applied to an inductance (L) of 2H as shown in figure below. Find $V_L(t)$.



- 2 (a) The expressions for n resistances connected in parallel.
 (b) A 20 V battery with an internal resistance of 5 ohms is connected to a resistor of x ohms. If an additional resistance of 6 ohms is connected across the battery, find the value of x so that the external power supplied by the battery remains the same.
- 3 (a) What is the concept of effective value of an alternating quantity? What is its practical significance?
 (b) A series RL circuit has $R = 25$ ohm and $X_L = 32$ ohm. It is connected in parallel to a capacitor of 100 micro farads and the combination is connected across a 200 V, 50 Hz supply. Find the current in each branch. Draw the vector diagram showing the total current.
- 4 (a) Give the expression of frequency at which the voltage across the capacitor is maximum.
 (b) A RC series circuit with $R = 50$ ohms and $C = 20$ micro farads is connected parallel to an inductance. The parallel combination is excited by a source of 10 V, 1 kHz. Determine the value of inductance if no reactance current is taken from the supply.
- 5 (a) Derive the expression for equivalent inductance of two coils connecting in series aiding.
 (b) For the network shown in figure below, find the drop across load resistance R_L .

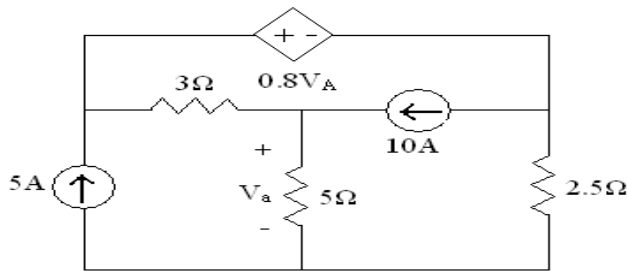


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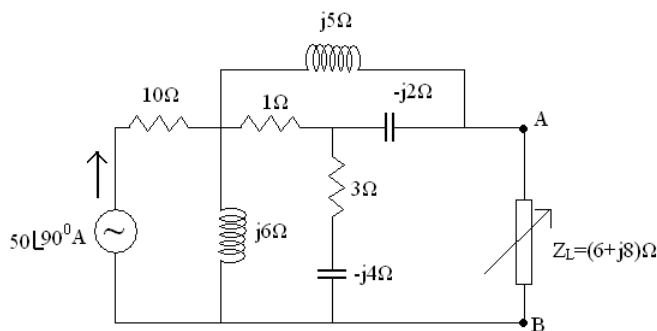
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- 6 (a) Explain the concept of duality.
 (b) With the help of nodal analysis, find power dissipated by all the resistors in the circuit shown below.



- 7 (a) Write limitations of maximum power transfer theorem.
 (b) Using suitable theorem, calculate voltage across Z_L for the circuit shown.



- 8 Find the current through $(4+j6) \Omega$ impedance using superposition theorem and verify it using mesh analysis.

