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

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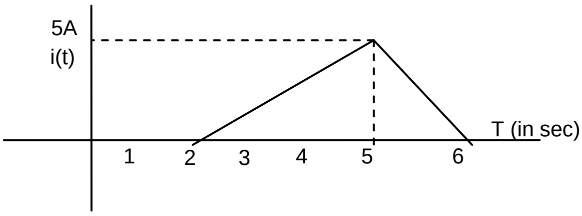
1 (a) Write a note on inductor and V-I relationship associated with it.

(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?

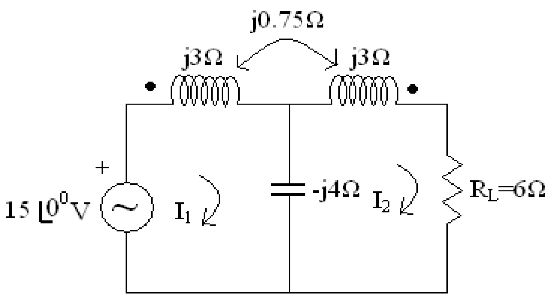
(b) A series RL circuit has R = 25 ohm and X_L= 32 ohm. It is connected in parallel to a capacitor of 100 micro farads and the combination is connected across a 200 V, 50 Hz supply. Find the current in each branch. Draw the vector diagram showing the total current.

4 (a) Give the expression of frequency at which the voltage across the capacitor is maximum.

(b) A RC series circuit with R = 50ohms 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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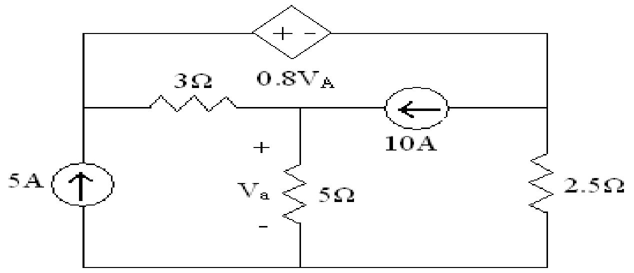
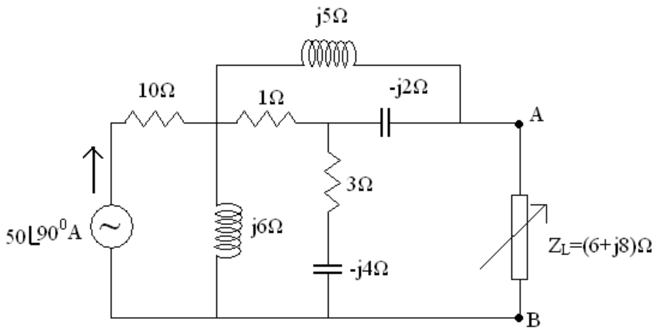
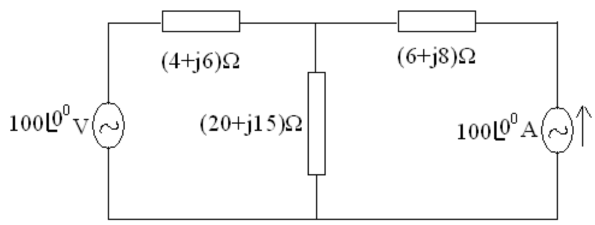
6 (a) Explain the concept of duality.
(b) With the help of nodal analysis, find power dissipated by all the resistors in the circuit shown below.



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) Ω impedance using superposition theorem and verify it using mesh analysis.



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