UNIT 2
STUDY GUIDE*

To pass the unit exam, you must be able to do the following (using books and notes):

CONCEPTUAL TOOLS	Learning Objective	Reading
CIRCUITS MAX POWER XFER Example (pdf)	2.1 Apply the maximum power transfer theorem.	Chap 4: Sec 4.12
SUPERPOSITION CIRCUITS $V_{DC} + V_{DC}$ EXAMPLE 1 (PDF) EXAMPLE 2 (PDF)	2.2 Apply the principle of superposition.	Chap 4: Sec 4.13
RLC CIRCUITS C (CAPACITOR) EQUATIONS i = C dv/dt Series capacitors Parallel capacitors Initial conditions C = OPEN CIRCUIT CHARGE SHARING V SRC MODEL Final conditions open circuit Energy stored Example 1 (pdf) Example 2 (pdf) L (INDUCTOR) EQUATIONS v = L di/dt Series inductors Parallel inductors Initial conditions L = WIRE CURRENT DIVISION I SRC MODEL Final conditions wire Energy stored Example 1 (pdf) Example 2 (pdf)	2.3 For a specified current through an inductance, find the voltage across it, and vice versa. For a specified voltage across a capacitance, find the current through it, and vice versa. From the voltages and currents, find energy stored in inductances and capacitances. Find the equivalence of inductances in series and parallel and of capacitances in series and parallel.	Chap 6: Sec 6.1-6.3
RLC CIRCUITS GENERAL RC/RL SOLUTION General solution Time const Thev equiv Solution procedure Example 1 (pdf) Example 2 (pdf)	2.4 Find the natural response of any circuit containing just one inductance or one capacitance (or one equivalent inductance or one equivalent capacitance).	Chap 7: Sec 7.1-7.2
RLC CIRCUITS GENERAL RC/RL SOLUTION General solution Time const Thev equiv Solution procedure Example 3 (pdf) Example 4 (pdf)	2.5 Find the step-function response of any circuit containing just one inductance or one capacitance (or one equivalent inductance or one equivalent capacitance).	Chap 7: Sec 7.3

* The material in this handout is based extensively on concepts developed by C. H. Durney, Professor Emeritus of the University of Utah.

RLC CIRCUITS GENERAL RC/RL SOLUTION General solution Time const Thev equiv Solution procedure Example 5 (pdf) Example 6 (pdf) Example 7 (pdf)	2.6	For given RC and RL circuits (containing only one equivalent storage element) give qualitative explanations based on the interpretations that: (1) uncharged capacitance looks initially like a short circuit and finally like an open circuit, and (2) inductance with no initial current looks initially like an open circuit and finally like a short circuit.	Chap 7: Sec 7.4-7.5
RLC CIRCUITS RLC CHAR ROOTS/DAMPING Series Parallel Overdamped roots Underdamped roots Critically damped roots Example (pdf)	2.7	Find the roots of the characteristic equation that describes any voltage or current in any series or parallel RLC circuit. Determine whether the response of a series or parallel RLC circuit is underdamped, critically damped, or overdamped.	Chap 8 Sec 8.1-8.2
RLC CIRCUITS RLC GENERAL SOLUTION Initial conditions	2.8	Evaluate the initial conditions of series and parallel RLC circuits.	Chap 8: Sec 8.3-8.4
RLC CIRCUITS GENERAL RLC SOLUTION Initial conditions Damping: over, under, critical sol'n forms Example 1 (pdf) Example 2 (pdf) Example 3 (pdf) Example 4 (pdf) Example 5 (pdf) **SUPERPOSITION** CIRCUITS Step + Natural response EXAMPLE (PDF)	2.9	Evaluate the arbitrary constants in the solution for any voltage or current in an RLC circuit.	Chap 8: Sec 8.3-8.4