ECE1050/60  Exam 1  given: Spring 03  (The space between problems has been removed.)

Remember, to get the most possible partial credit, always show all the intermediate values that you can calculate. If further calculations depend on a value that you can't figure out, just use a letter (like \( I_{R_1} \)) or a guessed value and proceed.

1. (20 pts) In the circuit shown find the power input by the source (\( P_S \)), the resistor value; \( R_1 \), and the voltage across \( R_2 \) (\( V_{R_2} \)).

![Circuit Diagram]

Note: feel free to show answers & work right on the schematic

2. (16 pts) a) Use the method of superposition to find the voltage across \( R_1 \). Be sure to clearly show and circle your intermediate results.

![Circuit Diagram]

3. (21 pts)  
   a) Find and draw the Thévenin equivalent of the circuit shown. The load resistor is \( R_L \).

![Circuit Diagram]

b) Find and draw the Norton equivalent of the same circuit.

c) Find the power dissipated by the load.

4. (16 pts) Use nodal analysis to find \( V_a \).

![Circuit Diagram]
5. (18 pts) For the waveform shown, find:
   a) peak-to-peak voltage or current, Vpp
   b) amplitude, A
   c) period, T
   d) frequency f in cycles/sec or Hz
   e) frequency ω in radians/sec
   f) the phase angle in degrees
   g) a complete expression for v(t), include numbers and units

6. (8 pts) The questions below are similar to what you might see on the FE exam. They expect you to average about 2 minutes per question.
   a) If a 12-ohm resistor is connected across terminals xy in the circuit shown, the current through it would be most near:
      (A) 0.5 A
      (B) 1.25 A
      (C) 2.0 A
      (D) 2.25 A
      (E) 5.75 A
   
   b) Find I₂ in amps.
      (A) 9
      (B) 12
      (C) 18
      (D) 24
      (E) 27

Answers
1. V_r2 := 3 · V   P_S := 0.35 · W   R_1 := 100 · Ω
2. -9 · V + 6 · V = -3 · V
3. a) 24 · Ω
    b) 0.3 · A
4. 4.8 · V
5. a) 10 · V   b) 5 · V   c) 12 · ms   d) 83.3 · Hz   e) 524 · rad/sec
    f) 120 · deg   g) 5 · V · cos \left( \frac{524 \ rad}{sec} \cdot t + 120 \ · deg \right) - 1 · V
6. a) A   b) D