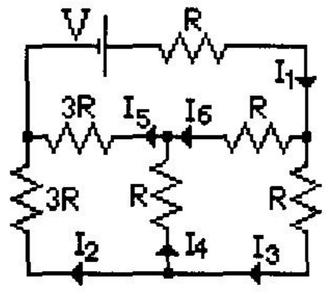
H.U. Fall 2008 Dr. H. Barsoumian

PHY 218
Quiz I

1. For the circuit shown in the figure



   a. Write down the KCL equations. *(4 pts)*
   b. Write down the KVL equations. *(9 pts)*
   c. Argue (without algebra) that $I_4 = 0$ *(4 pts)*
   d. Show that $I_1 = 40mA$ for $R=100\Omega$ & $V = 12v$ *(3 pts)*

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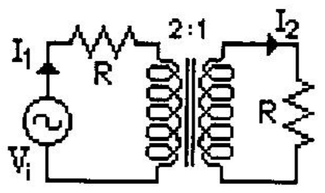
2. Take $R = 1.5K$ and $V_i = 15v$



   a. Calculate the current I_1. *(12 pts)*
   b. Is impedance matching satisfied? Explain briefly. *(3 pts)*

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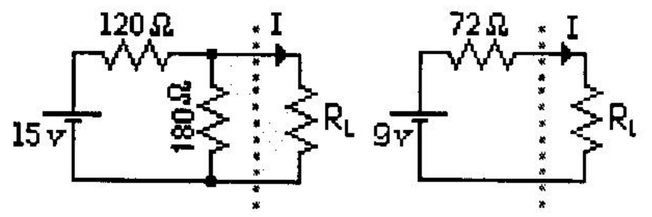
3. Use the Thevenin's Theorem to show that circuit (b) is equivalent to circuit (a). Note: NO points for other methods. *(15 points)*



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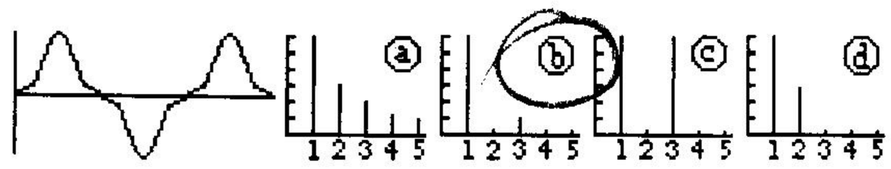
4. Which of the four spectra belongs to the waveform? Explain your answer clearly.
(No explanation, no points) *(8 points)* b



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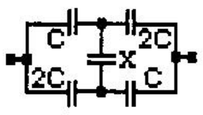
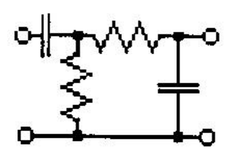
5. Answer 7 of the following 11 questions. *The 8th answer will be ignored.* *(7x6 = 42 points)*

   a. Why do transmission lines have capacitance and inductance?
   b. What is the value of a resistor marked as 3K3? 3.3KΩ
   c. Why does the size of capacitors increase with their value, whereas that of resistors does not?
   d. Why the value of an electrolytic capacitor is depends a little on voltage?



   e. Argue that $C_e \sim 1.4C$ is an "educated guess" for the connection shown, irrespective of X.
   f. How is a data "written" on a CD?



   g. Mention three uses of transformers.
   h. What is the shape of the Bode diagram for the filter shown?
   i. Define "termination" in transmission lines
   j. What is the approximate value of a current that causes painful shock? 9 mA
   k. Complete the following: Quality factor Q = (energy stored)/(energy dissipated)

Good Luck! *20 + 2x15 + 8 + 42 = 100*