**ECE 2201 – Circuit Analysis**

**Homework #3**

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| **1**    Figure 0.1 | For each circuit there is a set of equations. Mark each equation as true or false.  Figure 0.1  \_\_\_\_\_\_ a) *v*SA = *v*1  \_\_\_\_\_\_ b) *v*SA = *v*2  \_\_\_\_\_\_ c) *v*SA = *v*1 + *v*3 |
| Figure 0.2 | Figure 0.2  \_\_\_\_\_\_ d) *v*SA = *v*1  \_\_\_\_\_\_ e) *v*1 = *v*2  \_\_\_\_\_\_ f) *v*SA = *v*CSB  \_\_\_\_\_\_ g) *v*1 = -*v*2 |
| Figure 0.3 | Figure 0.3  \_\_\_\_\_\_ h) *i*VSA = *i*1  \_\_\_\_\_\_ i) *i*3 = *i*4  \_\_\_\_\_\_ j) *i*2 = - *i*3  \_\_\_\_\_\_ k) *i*2 + *i*3 =*i*VSA |

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| **2** | One of the equations below contains a mistake. Write the correct form of the equation and explain why the original equation is incorrect. For this circuit, *vA* = -3.5 [V].  a) *vC – vA – vB = 0*  b) *iCRC – (-3.5)[V] – iCRB = 0* |

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| **3** |
| Write two KVLs that include *vx*. Write your KVLs in terms of voltages across resistors and voltage sources. To do this you will need to provide labels for voltages across resistors. Be sure these are clear, and that they follow the notation rules given in the first homework assignment. |

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| **4**    For the circuit above:   1. Label voltages for each resistor. 2. Write three KVL equations using the voltages you defined. 3. Label currents through each of the resistors. 4. Rewrite your KVL equations, but this time for voltage across resistors use the product of current and resistance. Be sure to use the appropriate sign in each case. |

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| **5**    For the circuit above:   1. Label currents in each of the resistors. 2. Write two KCL equations at any two essential nodes using the currents you defined. An essential node is a node with three or more components connected to it. |

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| **6** | Find the value of *iS*. R1 = 2.5[Ω]. |

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| **7** | Given: ix = 0.25[A], find:   1. *vX* 2. *vR* 3. *iS* |

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| 8 | Given: *i5* = - 1.5[A], find:   1. *vX* 2. *vR* 3. *iX* 4. *vZ1* 5. *vZ2* |

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|  | For this circuit…   1. Write a KCL at A. 2. Write a KVL around A•B•C•D 3. Use your KCL and KVL to find *ix, iy* 4. Find *viS1*. 5. Find the power delivered to iS1. |
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| **10** | Given: *iZ* = 1.1667[A], find:   1. *vX* 2. *iY* 3. The power absorbed by *v*S1. |

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| **11** | Write 1 KCL and 2 KVLs to find *i1, i2*, and *i3*. |

**12**  A revolutionary new device called the TrombettaMax (TM) is delivering **energy** to the circuit shown below where the energy is



# Find an expression for the voltage *vT*. Give your answer as a numerical expression, as a function of time, *t*.

1. Find an expression for power absorbed by the source *iS1*. Give your answer as a numerical expression, as a function of time, *t*.

