EE16A: Homework 6

Circuit Analysis

In [1]:
```
import numpy as np
```

(a)

In [8]:
```
Vs = 5
Is = 2
R1 = 2
R2 = 2
R3 = 4
a = np.array([[0, 1, 0, 0, 0, 0],
                [1, -1, -1, 0, 0, 0],
                [-R1, 0, 0, 1, -1, 0],
                [0, -R2, 0, 0, 1, -1],
                [0, 0, -R3, 0, 1, 0],
                [0, 0, 0, 1, 0, 0]])
b = np.array([Is, 0, 0, 0, 0, Vs])
print(np.linalg.solve(a, b))
```

```
[ 2.16666667  2.          0.16666667  5.          0.66666667 -3.33333333]
```

In [12]:
```
[ 2.16666667,  2.,          0.16666667,  5.,          0.66666667, -3.333333
```

Out[12]:
```
[2.16666667, 2.0, 0.16666667, 5.0, 0.66666667, -3.33333333]
```

(b)

In [9]:
```
Vs = 5
R1 = 1
R2 = 2
R3 = 3
R4 = 4
R5 = 5
a = np.array([[1, 1, 0, 1, 0, 0, 0, 0, 0],
                            [0, -1, 1, 0, 0, 1, 0, 0, 0],
                            [0, 0, 0, -1, 1, -1, 0, 0, 0],
                            [0, 0, 0, 0, 0, 0, 1, 0, 0],
                            [0, -R1, 0, 0, 0, 0, 1, -1, 0],
                            [0, 0, -R2, 0, 0, 0, 0, 1, 0],
                            [0, 0, 0, -R3, 0 , 0 , 1 ,0, -1],
                            [0 , 0, 0, 0, -R4 , 0 , 0, 0, 1],
                            [0, 0, 0, 0, 0, -R5, 0, 1, -1]])
b = np.array([0, 0, 0, Vs, 0, 0, 0, 0, 0])
print(np.linalg.solve(a, b))
```

```
[-2.38709677  1.70967742  1.64516129  0.67741935  0.74193548  0.06451613
  5.          3.29032258  2.96774194]
```

In [11]:
```
[-2.38709677,  1.70967742,  1.64516129,  0.67741935,  0.74193548,  0.064516
```

Out[11]:
```
[-2.38709677,
 1.70967742,
 1.64516129,
 0.67741935,
 0.74193548,
 0.06451613,
 5,
 3.29032258,
 2.96774194]
```

In [ ]: