

**Fill out information below and attach this cover sheet to the FRONT of your HW.  
If you do not (or enter incorrect information) you WILL loose 10 points on the HW.**

**NAME:** \_\_\_\_\_

**SID #:** \_\_\_\_\_

**Circle One: EE42 / EE100**

**If EE100, Lab Day: \_\_\_\_\_, Time: \_\_\_\_\_**

# **EE 100**

## **Homework # 4**

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1. Problem 4.9            p.139
2. Problem 4.10        p.139
3. Problem 4.12        p.139
4. Problem 4.18        p.140
5. Problem 4.31        p.142
6. Problem 4.46        p.144
7. See the next page.

# Additional Problem to Homework Set 4

## Problem 7

- (a) Write the complete set of 7 *node voltage equations* (**node analysis method**) for the *Shannon circuit* with a *current source* I connected across nodes ① - ⑧.

- (b) Recast your *node equations* from (a) in matrix form :

$$\begin{bmatrix} \dots & \dots & \dots & \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots & \dots & \dots & \dots \end{bmatrix} \begin{bmatrix} e_1 \\ e_2 \\ e_3 \\ e_4 \\ e_5 \\ e_6 \\ e_7 \end{bmatrix} = \begin{bmatrix} \dots \\ \dots \\ \dots \\ \dots \\ \dots \\ \dots \\ \dots \end{bmatrix}$$

- (c) Write the complete set of 7 *mesh current equations* (**mesh analysis method**) for the *Shannon circuit* with a *voltage source* E connected across nodes ① - ⑧.

- (d) Recast your *mesh equations* from (c) in matrix form :

$$\begin{bmatrix} \dots & \dots & \dots & \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots & \dots & \dots & \dots \end{bmatrix} \begin{bmatrix} i_1 \\ i_2 \\ i_3 \\ i_4 \\ i_5 \\ i_6 \\ i_7 \end{bmatrix} = \begin{bmatrix} \dots \\ \dots \\ \dots \\ \dots \\ \dots \\ \dots \\ \dots \end{bmatrix}$$

- (e) Repeat (b) with  $R_5$  replace by a *short* circuit.  
 (f) Repeat (d) with  $R_5$  replace by an *open* circuit.



