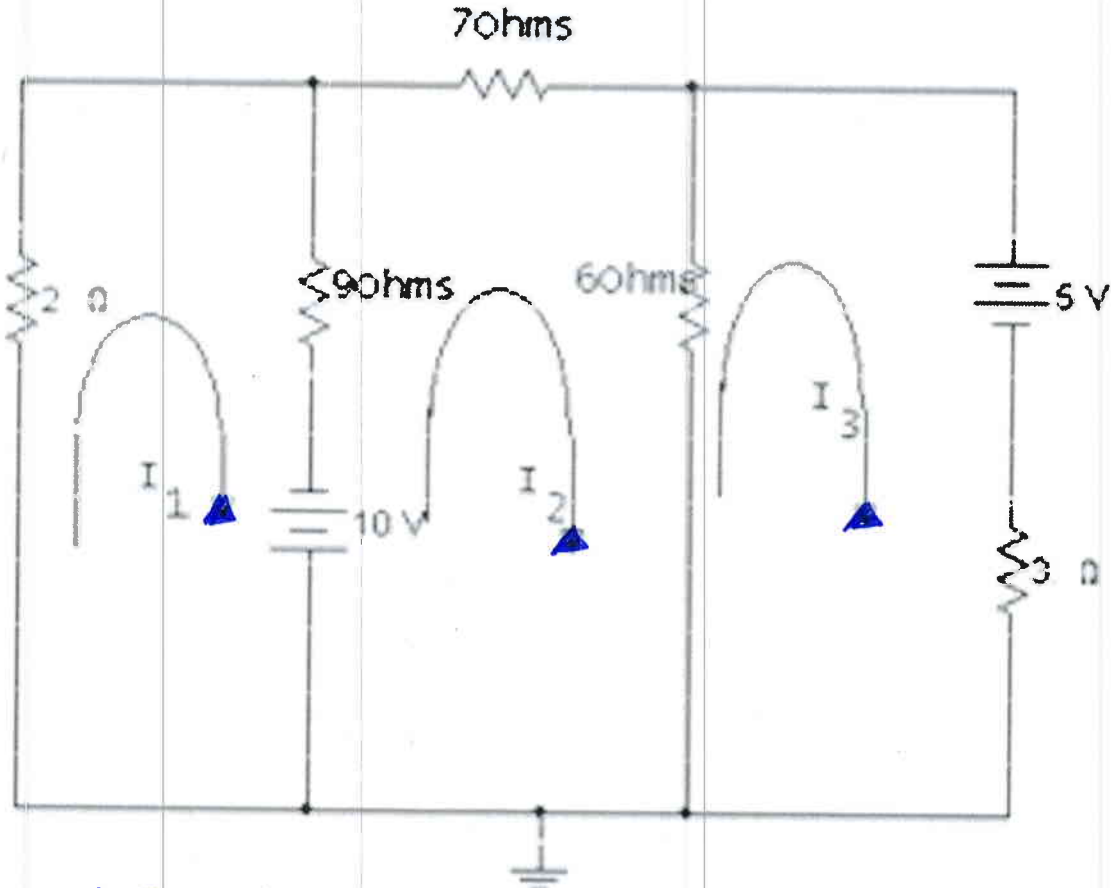


Instructions: Show all work. Answer each question as completely as possible. Use exact values (yes, that means fractions!).

1. What is the rank of the matrix $A = \begin{bmatrix} 1 & -6 & 9 & 0 & -2 \\ 0 & 1 & 2 & -4 & 5 \\ 0 & 0 & 0 & 5 & 1 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$? How is the rank related to the dimensions of Nul A and Col A?

$rank A = 3$
 $rank A = \dim Col A$
 $\dim Nul A = n - rank A$

2. Write the system to solve the loop current shown below. Then solve the system. You may round your answers to 2 decimal places.



$2I_1 + 9I_1 - 9I_2 = -10$
 $-9I_1 + 9I_2 + 6I_2 - 6I_3 + 7I_2 = 10$
 $6I_3 - 6I_2 + 3I_3 = 5$

$11I_1 - 9I_2 = -10$
 $-9I_1 + 22I_2 - 6I_3 = 10$
 $-6I_2 + 9I_3 = 5$

$\vec{I} = \begin{bmatrix} -0.5128 \\ 0.4843 \\ 0.8784 \end{bmatrix}$

or $\vec{I} = \begin{bmatrix} -20/39 \\ 170/351 \\ 925/1053 \end{bmatrix}$