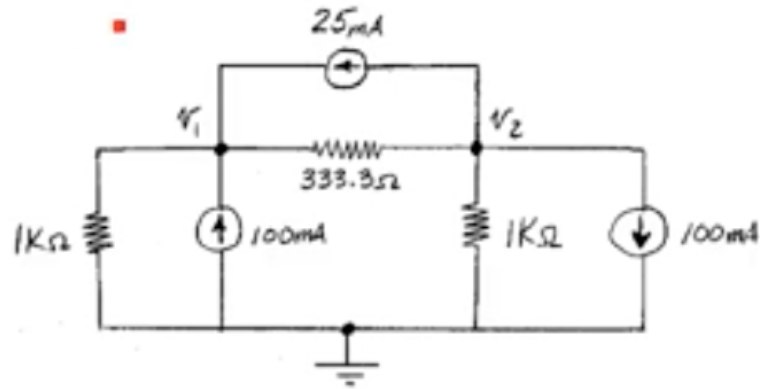


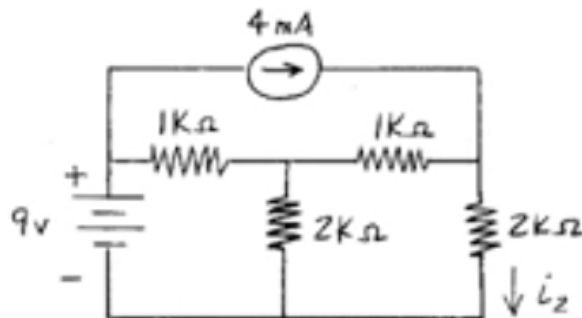
## HOMEWORK-II

1) A) WRITE THE NODE EQUATIONS FOR THE CIRCUIT BELOW



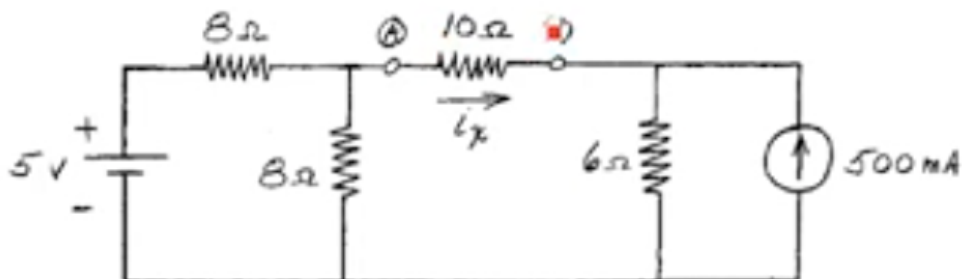
$$\begin{bmatrix} \text{---} \\ \text{---} \end{bmatrix} = \begin{bmatrix} \text{---} & \text{---} \\ \text{---} & \text{---} \end{bmatrix} \begin{bmatrix} V_1 \\ V_2 \end{bmatrix}$$

2)



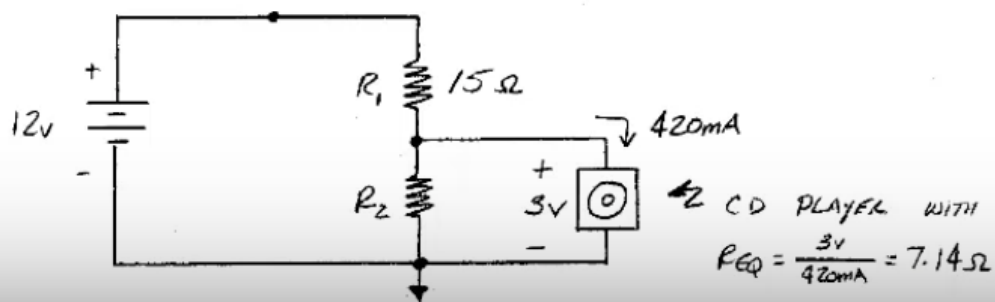
FIND  $i_2$  USING  
SUPERPOSITION

3) FIND THE THEVENIN EQUIVALENT CIRCUIT LOOKING INTO TERMINALS (A)-(B) AND SOLVE FOR  $i_x$ .



4) A SONY DISCMAN CD PLAYER (MODEL D131) OPERATES WITH TWO AA BATTERIES. THIS IS A TOTAL VOLTAGE OF  $2 \cdot 1.5 = 3\text{V}$ . THE PLAYER DRAWS A MAXIMUM CURRENT OF  $420\text{mA}$ .

A) DESIGN A VOLTAGE DIVIDER SUCH THAT WE COULD USE THIS PLAYER IN A CAR IF  $R_1 = 15\ \Omega$ , THAT IS, FIND  $R_2$  FOR THE FOLLOWING CIRCUIT:



4) B) THE MINIMUM CURRENT (DURING PLAYBACK) IS APPROX.  $250\text{mA}$ . THIS GIVES AN  $R_{EQ} = 3\text{V} / 250\text{mA} = 12\ \Omega$ . USING YOUR  $R_2$  FOUND IN A), CALCULATE THE VOLTAGE ACROSS THE CD PLAYER UNDER THESE CONDITIONS.