EE 101 Inclass Assignment-1

Name:Pokala Mohith

Division:S2

Roll No:190050084

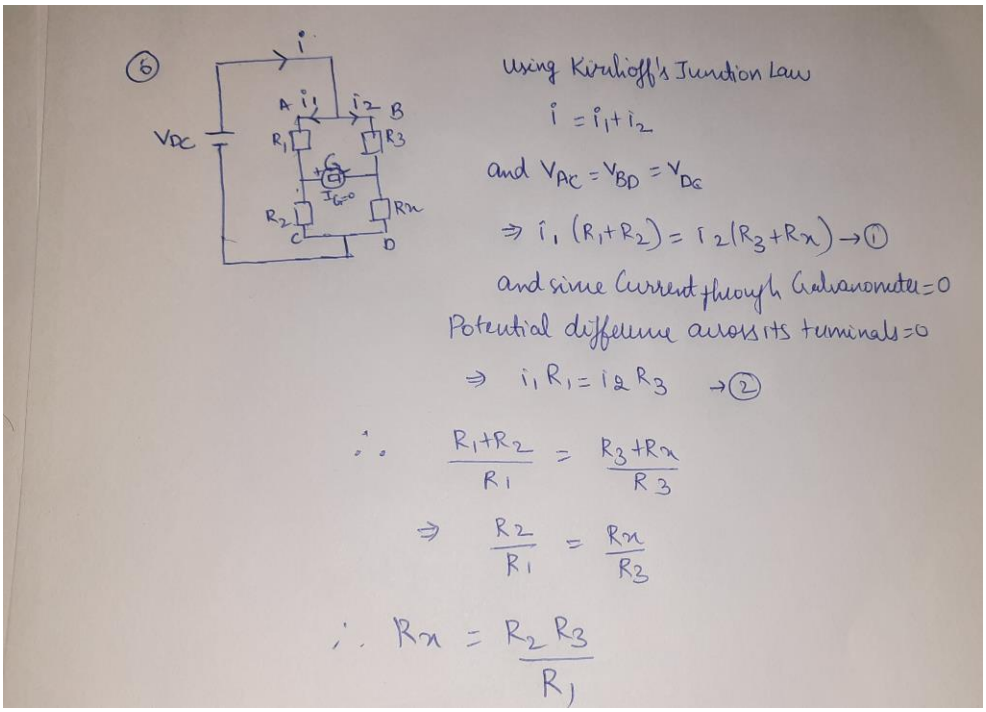
Pool:G

Assigned Questions:2.6,2.7

Question 1 (2.6)

Prove that for a balanced Wheatstone bridge shown below,

$$R_x=(R_2R_3)/R_1$$



Using Kirchhoff's Junction Law

$i = i_1 + i_2$

and $V_{AC} = V_{BD} = V_{DC}$

$\Rightarrow i_1(R_1+R_2) = i_2(R_3+R_x) \rightarrow (1)$

and since Current through Galvanometer = 0

Potential difference across its terminals = 0

$\Rightarrow i_1R_1 = i_2R_3 \rightarrow (2)$

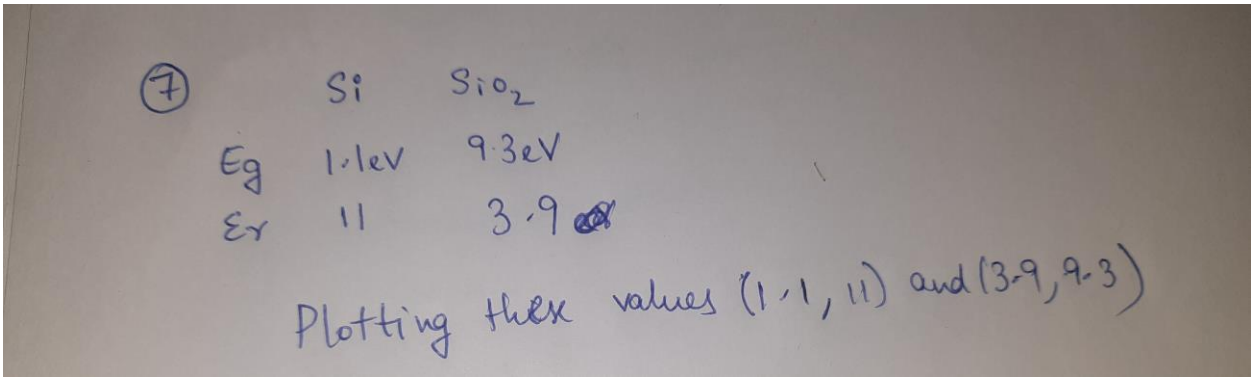
$\therefore \quad \frac{R_1+R_2}{R_1} = \frac{R_3+R_x}{R_3}$

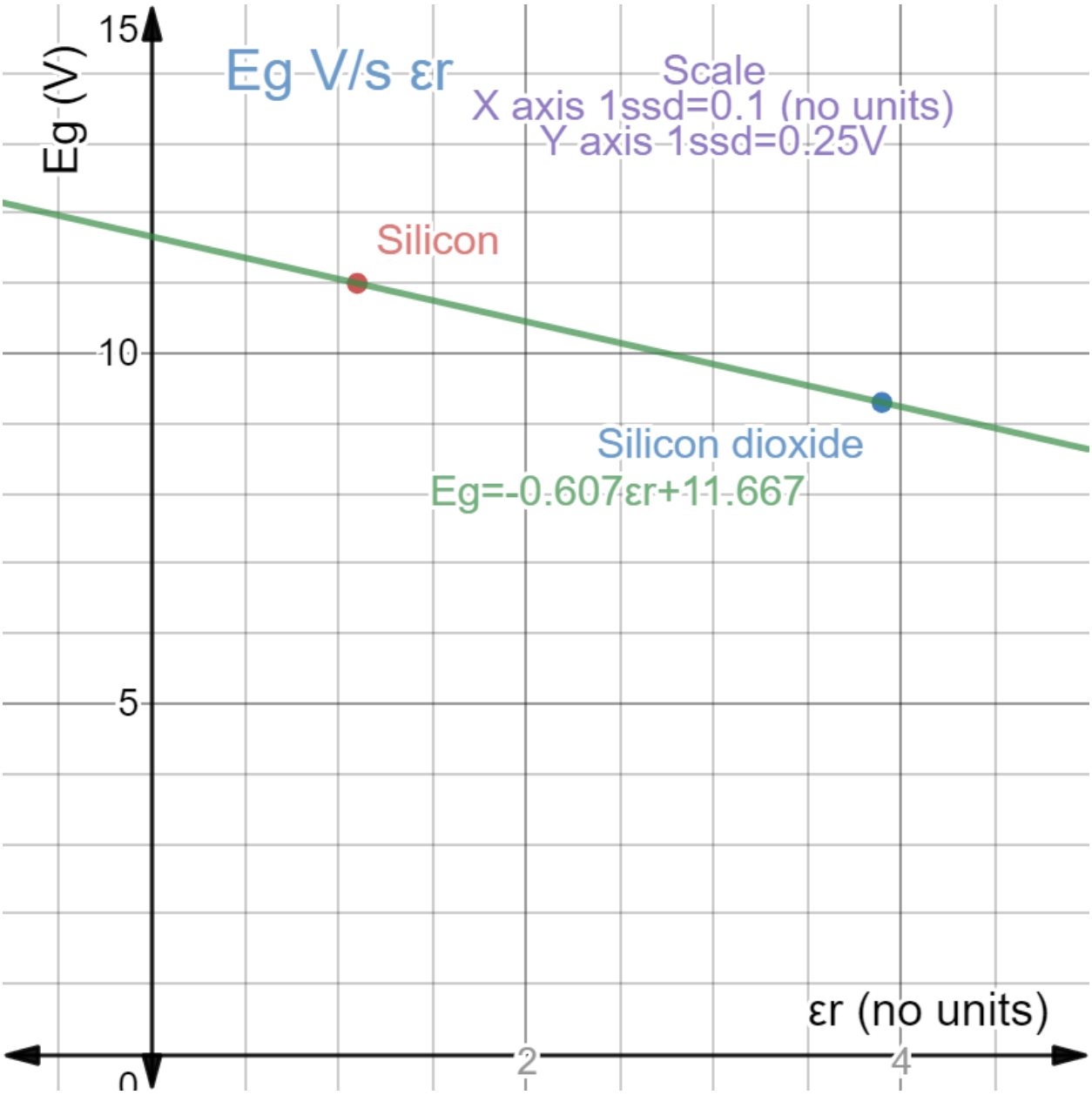
$\Rightarrow \quad \frac{R_2}{R_1} = \frac{R_x}{R_3}$

$\therefore \quad R_x = \frac{R_2R_3}{R_1}$

Question 2(2.7)

The relative permittivity (εr) of Si and SiO2 are 11 and 3.9 respectively. The band gap energy (Eg) of Si and SiO2 are 1.1eV and 9.3eV respectively at room temperature. Plot the relationship between Eg(x-axis) and relative permittivity (εr) (y-axis).





Plot of Eg(x-axis) and εr (y-axis).