Submission Form

Fill up the following slots with appropriate content. You must submit the content of this document from this page only.

1. Your Name : Shadab Iqbal
2. Your ID: 19101072
3. Your Section : 09
4. Experiment No: 01
5. Experiment Title: Verifying the inverse square nature of Coulomb's law and determining the value of Coulomb's constant, “k”.
6. **You must write your ID in each of the graphs you insert here.**

7. **Table 1**: both charges are **positive**

Q1 = 3 uC
Q2 = 7 uC

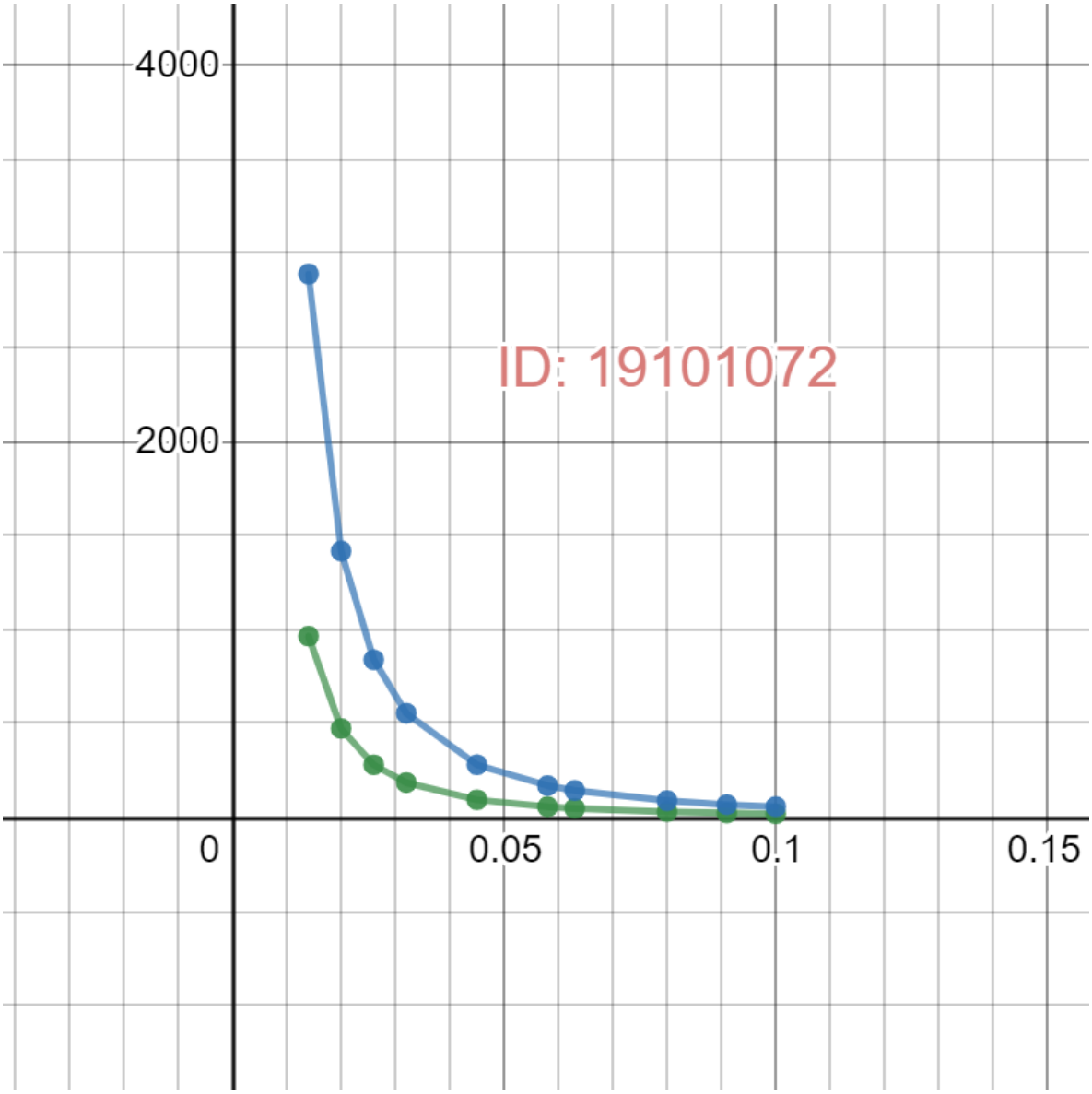
Sl:	Distance ***r*** ***(meter)***	$log(r)$	$\frac{1}{r^2}$	Electrostatic force $\boldsymbol{F_E}$	$log(F_E)$
1.	0.014	-1.853871964	5102.040816	962.952	2.98360464
2.	0.02	-1.698970004	2500	471.846	2.673800278
3.	0.026	-1.585026652	1479.289941	279.199	2.445913858
4	0.032	-1.494850022	976.5625	184.315	2.265560681
5	0.045	-1.346787486	493.8271605	93.204	1.969434551
6.	0.058	-1.236572006	297.2651605	56.105	1.749001567
7.	0.063	-1.200659451	251.9526329	47.553	1.677177921
8.	0.08	-1.096910013	156.25	29.49	1.469674773
9.	0.091	-1.040958608	120.7583625	22.792	1.357782436
10.	0.1	-1	100	18.874	1.275863951

8. **Table 2:** one of the charges are positive and another is negative.

Q3 = 7 uC
Q4 = -9 uC

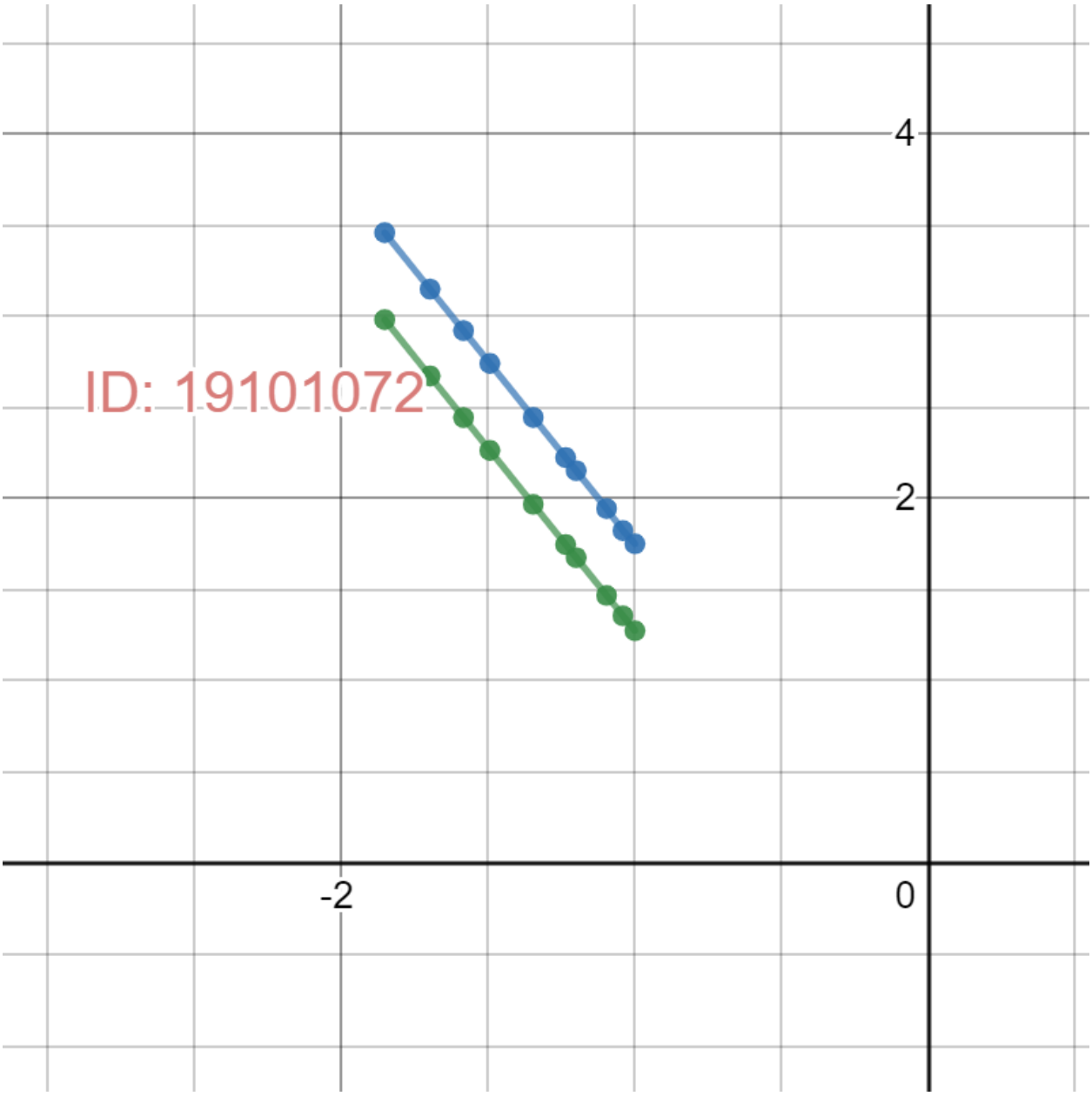
Sl:	Distance ***r*** ***(meter)***	$log(r)$	$\frac{1}{r^2}$	Electrostatic force $\boldsymbol{F_E}$	$log(F_E)$
1.	0.014	-1.853871964	5102.040816	2888.856	3.460725894
2.	0.02	-1.698970004	2500	1415.539	3.150921839
3.	0.026	-1.585026652	1479.289941	837.597	2.923035113
4	0.032	-1.494850022	976.5625	552.945	2.742681935
5	0.045	-1.346787486	493.8271605	279.613	2.446557359
6.	0.058	-1.236572006	297.2651605	168.316	2.226125402
7.	0.063	-1.200659451	251.9526329	142.66	2.15430222
8.	0.08	-1.096910013	156.25	88.471	1.946800936
9.	0.091	-1.040958608	120.7583625	66.897	1.825406642
10.	0.1	-1	100	56.622	1.752985205

9. Draw F_E vs r graph that is you plot r along the x axis and F_E along the y axis. For two tables you will get two curves. You can draw into one curve if you want. Insert the **graph-1** as image here:


4000
2000
0
0.05
0.1
0.15
ID: 19101072

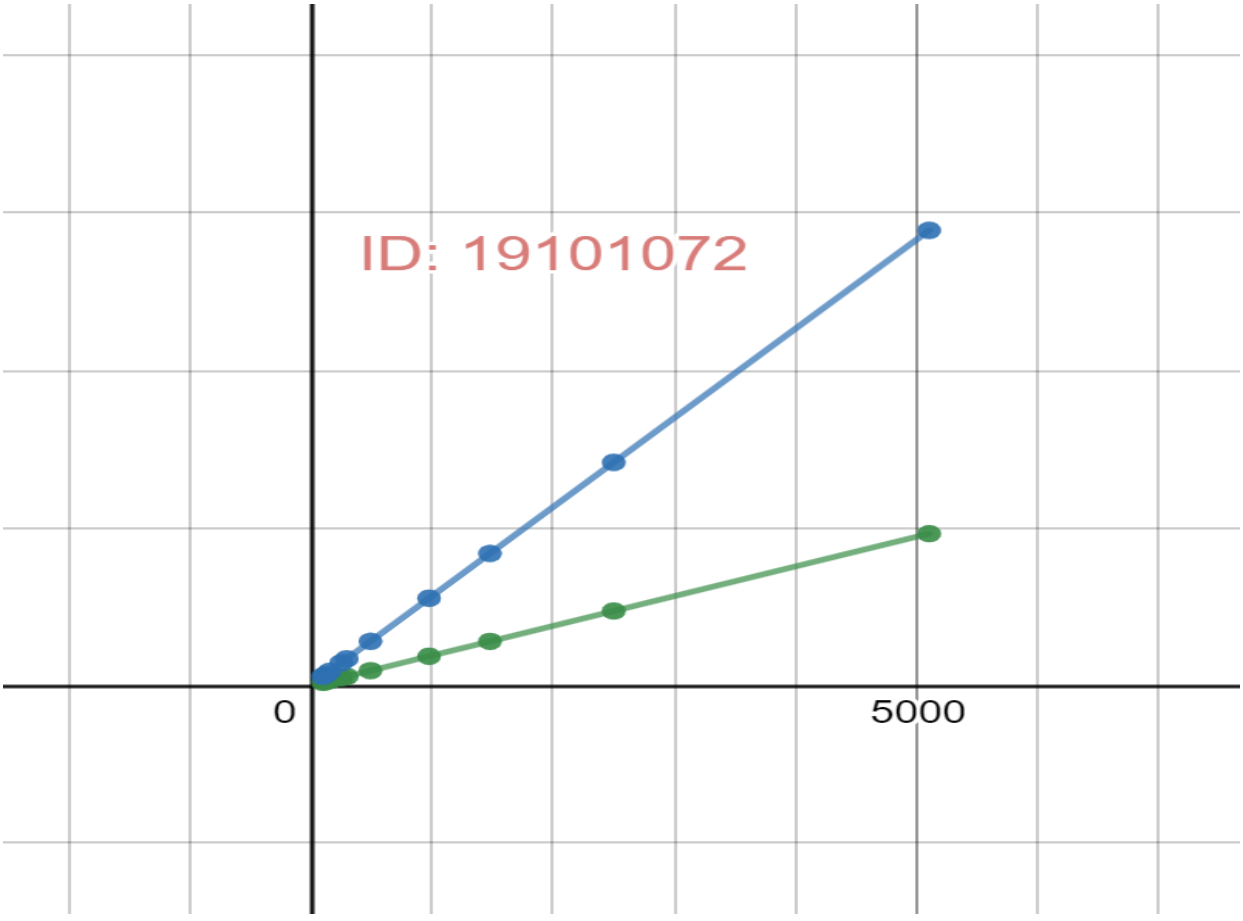
10. Draw $log(F_E)$ vs $log(r)$ graph that is you plot $log(r)$ along the x axis and $log(F_E)$ along the y axis. For two tables you will get two lines. Find the slope from both of the straight lines you get.

Slope from line 1: -2
Slope from line 2: -2.00388
Mean slope: -2.00194
Standard deviation: 0.0019
Insert the **graph-2** here:



11. Draw the Electrostatic Force, F_E vs inverse square distance, $1/r^2$ curve. You plot $1/r^2$ along the x axis and F_E along the y axis. You will get two straight lines for each table. Find the slope of each line.

Slope from line 1: 0.566283
Slope from line 2: 0.188739
For each table you have different Q_1 and Q_2. Calculate k for each table:
$k = slope\ /\ (Q_1 Q_2)$
k From line 1: 0.02696585714
k From line 2: -0.00299585714
Mean k : 0.012
Standard deviation: 0.015
Insert the **graph-3** here:



12. **Please briefly** discuss how the process of taking logs allows to find the inverse squared nature of Coulomb force and anything related to this experiment that you found interesting.

This part (step 12) is for participation grade only, so you are ***strongly*** encouraged to use your **own words** to describe your thoughts. **However, any kind of plagiarism (such as copying and pasting from other students' lab-reports) will not be tolerated and will be subject to disciplinary action according to BracU policy.**

Discuss here:

What I found interesting is that the slope of log(Fe) vs log(r) graph is almost the same for both the cases. And the graph is a straight line.
Moreover, the line is in the negative x-axis and in an increasing form.
The most interesting fact which occurred to me is that the more the distance keeps increasing, the rate of decrement of force keeps decreasing.