Capacitor and Capacitance

1. use capacitance for a parallel plate capacitor,

$$C = \epsilon_0 \frac{A}{d}$$

2. Energy density, $u = \frac{1}{2}\epsilon_0 E^2$

and. $E = \frac{V}{d}$ or, $E = K\frac{Q}{r^2}$ and $V = K\frac{Q}{r}$

3. Q: unchanged - no way to leave the charge

C: ~~de~~ decreases ~~increases~~ as separation increased.

E: unchanged as independent of separation

V: voltage increases as, $C = \frac{Q}{V}$

U: energy increases as, $U = \frac{1}{2}\frac{Q^2}{C}$

4. Q: decreases - would fill by battery

C: decreases -

V: voltage unchanged, as connected with battery

U: decreases. as Q and C

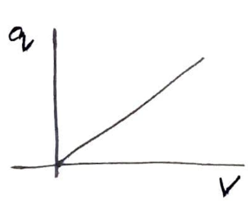
E: decreases, as $E = \frac{V}{d}$

5. use energy, $U = \frac{1}{2}\frac{Q^2}{C}$ and capacitance, $C = 2\pi\epsilon_0 \frac{L}{\ln(b/a)}$

6. Energy $= 100\times10^{3}$ W and 1 hour

Potential difference = 1000 V. $U = \frac{1}{2}QV$

7. Find slope,



$C = \frac{\Delta q}{\Delta V}$ and use $C = \epsilon_0 \frac{A}{d}$

8. $u = \frac{1}{2}\epsilon_0\left(\frac{V}{d}\right)^2$

9. Energy in 1 m^3, $u = \frac{U}{\text{Volume}}$

10. for parallel connection charge relation, $Q = Q_1 + Q_2$

and, $V = \frac{Q_1}{C} = \frac{Q_2}{2C}$ then, $Q_1 = \frac{Q}{3}$.