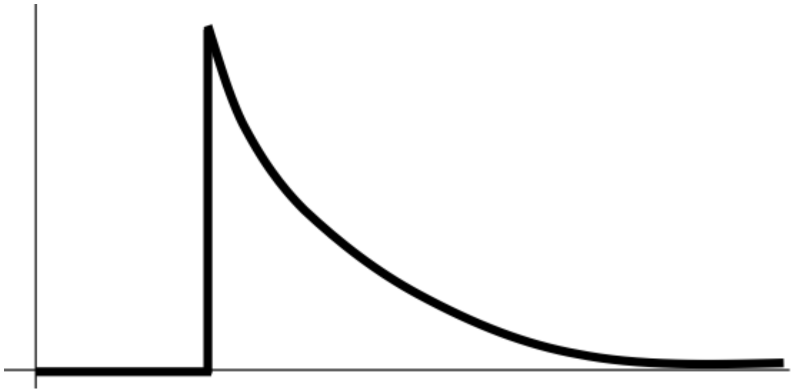


Could this be a plot of $|\mathbf{E}(r)|$? Or $V(r)$? (for SOME physical situation?)

A. Could be $E(r)$, or $V(r)$
B. Could be $E(r)$, but can't be $V(r)$
C. Can't be $E(r)$, could be $V(r)$
D. Can't be either
E. ???

EXAM 1 INFORMATION

- Exam 1 on Wednesday, October 4th (A149 PSS)
  - Across from FRIB (Wilson side)
- 7pm-9pm
  - Arrive on time!
- I will provide a formula sheet (posted on Piazza already)
- You can bring one-side of a sheet of paper with your own notes.
- 4 questions - True/False, Essay, Graphing, Calculations

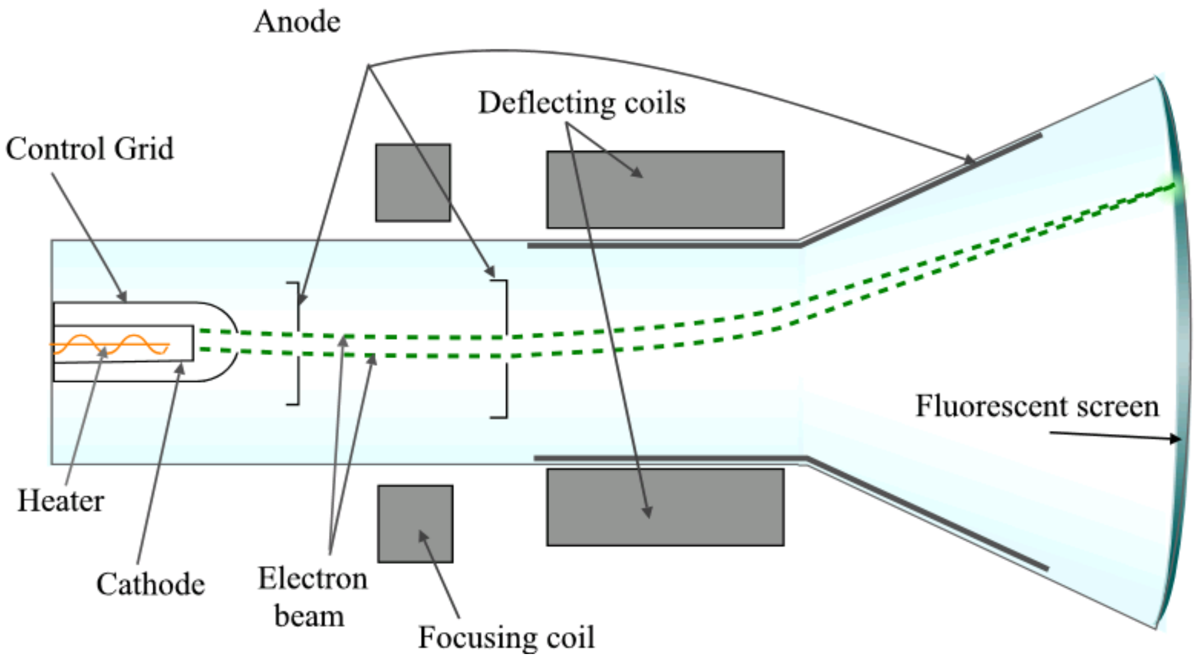
WHAT'S ON EXAM 1?

- Identify whether conceptual statements about $\mathbf{E}$, V, ρ, and/or numerical integration are true or false.
- Sketch and discuss delta functions in relation to charge density, ρ
- Calculate the electric field, $\mathbf{E}$, inside and outside a continuous distribution of charge and sketch the results
- Calculate the electric potential, V, for a specific charge distribution and discuss what happens in limiting cases

We usually choose $V(r \to \infty) \equiv 0$ when calculating the potential of a point charge to be $V(r) = +kq/r$. How does the potential $V(r)$ change if we choose our reference point to be $V(R) = 0$ where R is close to $+q$.

A. $V(r)$ higher than it was before
B. $V(r)$ is lower than it was before
C. $V(r)$ doesn't change (V is independent of choice of reference)

ELECTROSTATIC POTENTIAL ENERGY



Three identical charges $+q$ sit on an equilateral triangle. What would be the final KE of the top charge if you released it (keeping the other two fixed)?

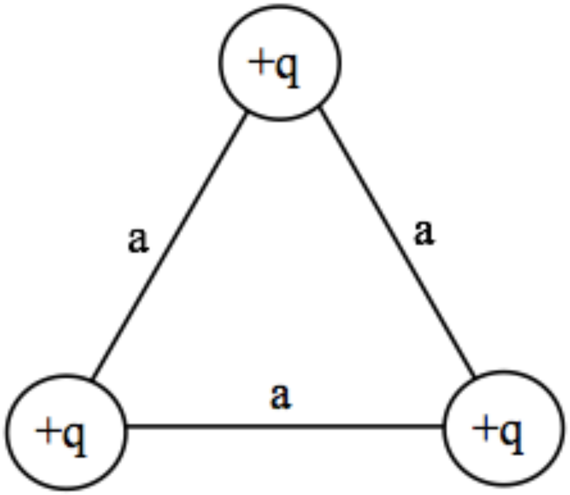
A. $\frac{1}{4\pi\varepsilon_0}\frac{q^2}{a}$

B. $\frac{1}{4\pi\varepsilon_0}\frac{2q^2}{3a}$

C. $\frac{1}{4\pi\varepsilon_0}\frac{2q^2}{a}$

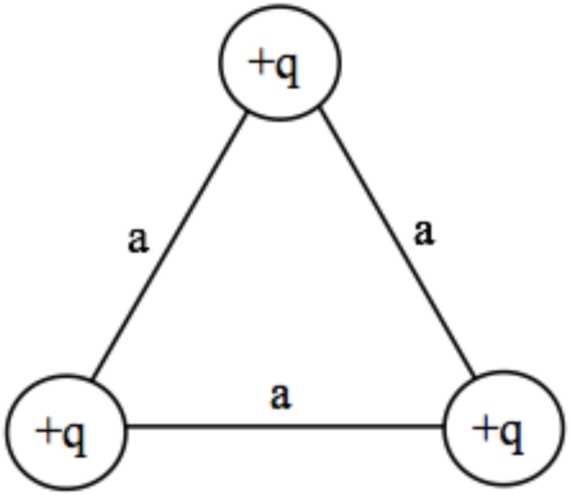
D. $\frac{1}{4\pi\varepsilon_0}\frac{3q^2}{a}$

E. Other



Three identical charges $+q$ sit on an equilateral triangle. What would be the final KE of the top charge if you released *all three*?

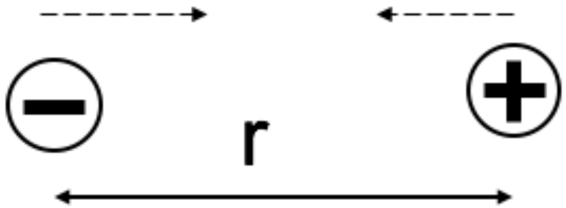
A. $\frac{1}{4\pi\varepsilon_0}\frac{q^2}{a}$
B. $\frac{1}{4\pi\varepsilon_0}\frac{2q^2}{3a}$
C. $\frac{1}{4\pi\varepsilon_0}\frac{2q^2}{a}$
D. $\frac{1}{4\pi\varepsilon_0}\frac{3q^2}{a}$
E. Other



Does system energy "superpose"?

That is, if you have one system of charges with total stored energy W_1, and a second charge distribution with W_2...if you superpose these charge distributions, is the total energy of the new system simply $W_1 + W_2$?

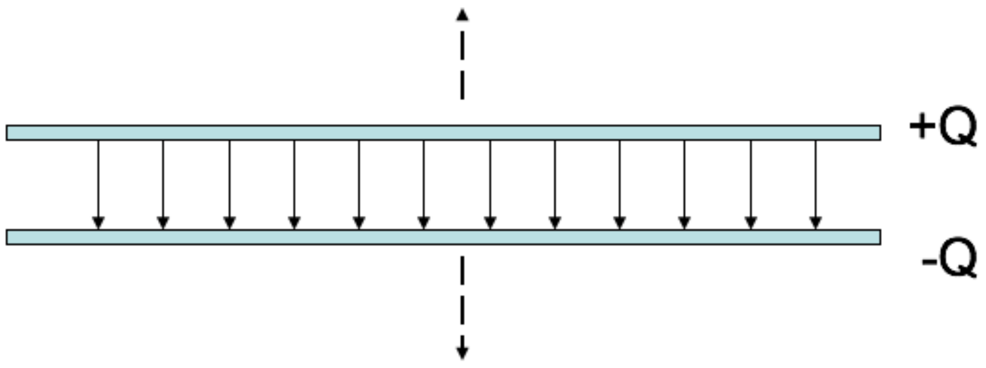
A. Yes
B. No



Two charges, $+q$ and $-q$, are a distance r apart. As the charges are slowly moved together, the total field energy

$$\frac{\varepsilon_0}{2}\int E^2 d\tau$$

A. increases
B. decreases
C. remains constant



A parallel-plate capacitor has $+Q$ on one plate, $-Q$ on the other. The plates are isolated so the charge Q cannot change. As the plates are pulled apart, the total electrostatic energy stored in the capacitor:

A. increases
B. decreases
C. remains constant.