Any questions before quiz

Quiz + Team Quiz + Talk through solution

Handy EM laws and problem solutions:

- **B around a wire** – Biot-Savart \( \frac{\mu l}{2\pi r} \)
- **B in the middle of a coil** – Integrate Biot-Savart \( \frac{\mu l}{2\pi r} \)
- **Helmholtz coil** – two coils lined up to make uniform field in the middle \( B = \frac{8\mu NI}{5\sqrt{5}r} \)
- **EMF (voltage) induced in a coil by B** – Faraday’s / Lenz’s Law \( -N \frac{d\phi}{dt} \) where \( \phi = BA \)
- **E around a point charge** – Integrate over spherical Gaussian surface \( \frac{q}{4\pi r^2 \varepsilon} \)
- **E around a charge line** – \( \frac{\lambda}{2\pi r \varepsilon} \)
- **E around a charge sheet** – \( \frac{\sigma}{2\varepsilon} \)
- **E between parallel plates w/ voltage V** – \( \frac{\sigma}{\varepsilon} \) (or half that depending on how you define it), but we don’t know sigma, instead we know V. Implies a capacitance of \( \varepsilon A/d \)
- **E in a coaxial cable with V on center pin** – E is same as infinite line of charge, but we don’t know lambda, we know V. Implies capacitance of \( 2\pi \varepsilon L / \ln(b/a) \) where a and b are in/out radius.
- **E around a charge hanging out over an infinite plane** – figure this out by introducing an image charge and summing fields.