

25A

A small object of mass  $m$  carries a charge  $q$  and is suspended by a thread between the vertical plates of a parallel-plate capacitor. The plate separation is  $d$ . If the thread makes an angle  $\theta$  with the vertical, what is the potential difference between the plates?

25B

Two capacitors,  $C_1 = 5.00 \mu\text{F}$  and  $C_2 = 12.0 \mu\text{F}$ , are connected in parallel, and the resulting combination is connected to a 9.00-V battery. Find (a) the equivalent capacitance of the combination, (b) the potential difference across each capacitor, and (c) the charge stored on each capacitor.

25C

The inner conductor of a coaxial cable has a radius of 0.800 mm, and the outer conductor's inside radius is 3.00 mm. The space between the conductors is filled with polyethylene, which has a dielectric constant of 2.30 and a dielectric strength of  $18.0 \times 10^6 \text{ V/m}$ . What is the maximum potential difference that this cable can withstand?