Ch 21 #4:

If not stated otherwise, it's standard to just assume that the loop is perpendicular to the B-field, and therefore $\theta = 0°$.

Ch 21 #6:

Calculate the initial and final values of the magnetic flux, taking the initial angle to be 0° and the final angle to be 180°. (The negative final flux value definitely <u>does</u> matter when subtracting the flux values to find change in flux.) Then use these flux values to calculate induced emf.

Ch 21 #14:

The figure they're talking about is back on page 590. For part A, this is one of those problems where you *could* use the alternate Bℓv version of Farady's law. For part B, remember that there are multiple formulas for calculating an E-field, but one in particular has to do with an E-field due to a potential difference between two points some distance apart. The two points are the ends of the rod, and the potential difference is the emf.

Ch 21 #15:

The force to remove the wire is required because, as soon as there's an induced current in the wire, there's a force exerted by the B-field on the wire that resists the wire's motion. So start by calculating the amount of induced current, due to the decreasing area in the B-field. Then calculate the force on a current-carrying wire in a B-field.

One note: The only portion of the wire that receives a resistive force is the 0.35m end segment.

Ch 21 #17:

The figure they're talking about is back on page 590. For part A, you can either think about how the enclosed area is increasing, or your can use the $B\ell v$ version of Faraday's law. On part B, just be careful to include the two different resistance values in series with each other. On part C, the force is just like the one on #15.

Ch 21 #18:

You're going to be calculating induced current, using induced emf and resistance. So you need to find emf (0.00658V), but you also need to find resistance (0.0437Ω), in the same way you used to back in Chapter 18. One note though, be careful about areas on this one. You'll have two different areas in two different formulas, and these areas mean two different things. One is the area of the loop of wire, and one is the cross-sectional area of the wire itself.

Ch 21 #19:

This is definitely one where having some end-strategy helps you start in the right direction. Hopefully you realize that 'charge moving past a point' is referring to the Q in the current formula $I=Q/\Delta t$. So you can set up the following equation: $Q=I\Delta t=(\varepsilon/R)(\Delta t)=(\varepsilon\Delta t)/R$

The reason this equation helps is that you aren't told Δt, so if you start by trying to find induced emf, you quickly get stuck. But if you start by trying to find $\varepsilon\Delta t$, as one quantity equal to $Ba\cos\theta$, then you should figure it out.