5. **REASONING AND SOLUTION** For each of the three rods in the drawing, we have the following:

**Rod A:** The motional emf is zero, because the velocity of the rod is parallel to the direction of the magnetic field, and the charges do not experience a magnetic force.

**Rod B:** The motional emf is, according to Equation 22.1,

\[ \text{Emf} = vBL = (2.7 \text{ m/s})(0.45 \text{ T})(1.3 \text{ m}) = 1.6 \text{ V} \]

The positive end of Rod B is end 2.

**Rod C:** The motional emf is zero, because the magnetic force \( F \) on each charge is directed perpendicular to the length of the rod. For the ends of the rod to become charged, the magnetic force must be directed parallel to the length of the rod.

15. **REASONING** The general expression for the magnetic flux through an area \( A \) is given by Equation 22.2: \( \Phi = BA \cos \phi \), where \( B \) is the magnitude of the magnetic field and \( \phi \) is the angle of inclination of the magnetic field \( B \) with respect to the normal to the surface.

**SOLUTION** Since the magnetic field \( B \) is parallel to the surface for the triangular ends and the bottom surface, the flux through each of these three surfaces is 0 Wb.

The flux through the 1.2 m by 0.30 m face is

\[ \Phi = (0.25 \text{ T})(1.2 \text{ m})(0.30 \text{ m}) \cos 0.0^\circ = 0.090 \text{ Wb} \]

For the 1.2 m by 0.50 m side, the area makes an angle \( \phi \) with the magnetic field \( B \), where

\[ \phi = 90^\circ - \tan^{-1}\left(\frac{0.30 \text{ m}}{0.40 \text{ m}}\right) = 53^\circ \]

Therefore,

\[ \Phi = (0.25 \text{ T})(1.2 \text{ m})(0.50 \text{ m}) \cos 53^\circ = 0.090 \text{ Wb} \]
39. **REASONING AND SOLUTION**
   a. From the drawing, we see that the period of the generator (the time for one full cycle) is 0.42 s; therefore, the frequency of the generator is
   \[ f = \frac{1}{T} = \frac{1}{0.42 \, \text{s}} = 2.4 \, \text{Hz} \]
   b. The angular speed of the generator is related to its frequency by \( \omega = 2\pi f \), so the angular speed is
   \[ \omega = 2\pi (2.4 \, \text{Hz}) = 15 \, \text{rad/s} \]
   c. The magnitude of the maximum emf induced in a rotating planar coil is given by \( (\text{Emf})_0 = NAB\omega \) (see Equation 22.4). The magnitude of the magnetic field can be found by solving this expression for \( B \) and noting from the drawing that \( (\text{Emf})_0 = 28 \, \text{V} \):
   \[ B = \frac{(\text{Emf})_0}{NA\omega} = \frac{28 \, \text{V}}{(150)(0.020 \, \text{m}^2)(15 \, \text{rad/s})} = 0.62 \, \text{T} \]

71. **REASONING AND SOLUTION**  According to Ohm’s law, the emf developed by the coil is \( \text{Emf} = IR \), which, when combined with the definition of electric current becomes \( \text{Emf} = (\Delta q)R/(\Delta t) \). The magnitude of the emf is also given by Equation 22.3 (Faraday's law) without the minus sign:
   \[ \text{Emf} = N \frac{\Delta\Phi}{\Delta t} = N \left( \frac{BA\cos 0^\circ - 0}{\Delta t} \right) = \frac{NBA}{\Delta t} \]
   Combining the two expressions for the emf, we have
   \[ \frac{(\Delta q)R}{\Delta t} = \frac{NBA}{\Delta t} \quad \text{or} \quad B = \frac{(\Delta q)R}{NA} = \frac{8.87 \times 10^{-3} \, \text{C}(45.0 \, \Omega)}{(1850)(4.70 \times 10^{-4} \, \text{m}^2)} = 0.459 \, \text{T} \]