The magnitude of the electric field between 2 circular parallel plates is given by

\[ E = \frac{(8.4 - 30t)}{m} \]  

with \( E \) in volts/meter and \( t \) in seconds. At \( t=0 \), the electric field points up as shown in the figure. The radius of the circular plates is 2 meters. For \( t = 3 \) seconds:

1. What is the direction of the displacement current (up or down)?
2. What is the magnitude of the displacement current 3 m from the center of the plates (do not put in numerical values for \( \varepsilon_0, \mu_0, \) or \( \pi \))?  
3. The displacement current will create a magnetic field. Is the field clockwise or counterclockwise when viewed from above the plates?  
4. What is the magnitude of the magnetic field 3 m from the center of the plates?

1. in 3 seconds

\[ E = 8.4 - 90 = -81.6 \ \text{V/m} \]  
i.e. down

\[ \frac{dE}{dt} = -30 \] so current is opposite \( E \) i.e. up

2. \( E=0 \)

\[ \boxed{i_d = \varepsilon_0 A \frac{dE}{dt}} \]

\[ = \varepsilon_0 \pi (0)^2 (30) \]

\[ = 120 \pi \varepsilon_0 \ \text{Amp} \]

3. \( i \uparrow \), \( B \uparrow \) \( \text{CC} \)

4. \( B = \frac{\mu_0 i_d}{2\pi R} = \frac{\mu_0 120 \pi \varepsilon_0}{2 \pi (3)} = 20 \mu_0 \varepsilon_0 \ \text{Tesla} \)