7. Suppose that a parallel-plate capacitor has circular plates with radius R = 30 mm and a plate separation of 5.0 mm. Suppose also that a sinusoidal potential difference with a maximum value of 150 V and a frequency of 60 Hz is applied across the plates; that is V = (150 V) sin [2π(60 Hz)t]. (a) Find B_{max} (R), the maximum value of the induced magnetic field that occurs at r = R. (b) Plot B_{max} (r) for 0<r<10 cm.

16. The magnitude of the electric field between the two circular parallel plates in Fig. 32-30 is E = (4.0 X 10^5) – (6.0 X 10^4t), with E in volts per meter and t in seconds. At t = 0, E is upward. The plate area is 4.0 X 10^{-2} m^2. For t ≥ , what are the (a) magnitude and (b) direction (up or down) of the displacement current between the plates and (c) is the direction of the induced magnetic field clockwise or counterclockwise in this figure?

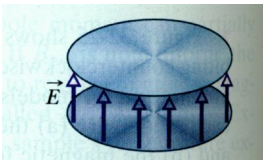

Fig. 32-30 Problem 16.

17. As a parallel-plate capacitor with circular plates 20 cm in diameter is being charged, the current density of the displacement current in the region between the plates is uniform and has a magnitude of 20 A/m^2. ((a) calculate the magnitude B of the magnetic field at a distance r = 50 mm from the axis of symmetry of this region. (b) Calculate dE/dt in this region.

18. A capacitor with parallel circular plates of radius R = 1.20 cm is discharging via a current of 12.0 A. Consider a loop of radius R/3 that is centered on the central axis between the plates. (a) How much displacement current is encircled by the loop? The maximum induced magnetic file has a magnitude of 12.0 mT. At what radius (b) inside and (c) outside the capacitor gap is the magnitude of the induced magnetic field 3.00 mT?

21. In Fig. 32-33, a parallel-plate capacitor has square plates of edge length L = 1.0 m. A current of 2.0 A charges the capacitor, producing a uniform electric field E between the plates, with E perpendicular to the plates. (a) What is the displacement current i_d through the region between the plates? (b) What is dE/dt in this region? (c) What is the displacement current encircled by the square dashed path of edge length d = 0.5 m? (d) What is $\oint \vec{B}\cdot\vec{ds}$ around this square dashed path?

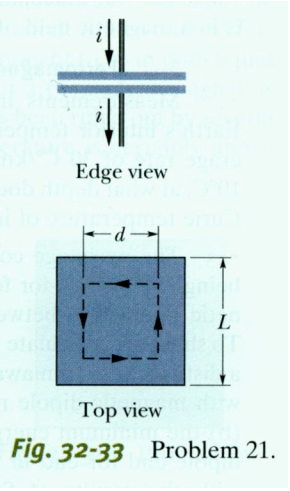

Fig. 32-33 Problem 21.