**Chapter 34. Electromagnetic Waves**

St. ID: , Name:

1. A 0.200-A current is charging a capacitor that has circular plates 10.0 cm in radius. If the plate separation is 4.00 mm, (a) what is the time rate of increase of electric field between the plates? (b) What is the magnetic field between the plates 5.00 cm from the center?

Ans: (a) 7.19×1011 V/m‧s (b) 2.00×107 T

1. A proton moves through a region containing a uniform electric field given by $\rightharpoonaccent{E}=50.0\hat{j}$ V/m and a uniform magnetic field $\rightharpoonaccent{B}=0.200\hat{i}+0.300\hat{j}+0.400\hat{k}$ T. Determine the acceleration of the proton when it has a velocity $\rightharpoonaccent{v}=200\hat{i}$ m/s.

Ans: $-2.87×10^{9}\hat{j}+5.75×10^{9}\hat{k}$ m/s2

1. The distance to the North Star, Polaris, is approximately 6.44 × 1018 m. (a) If Polaris were to burn out today, how many years from now would we see it disappear? (b) What time interval is required for sunlight to reach the Earth? (c) What time interval is required for a microwave signal to travel from the Earth to the Moon and back?

Ans: (a) 681 years (b) 8.32 min (c) 2.56 s

1. Verify by substitution that the following equations are solutions to Equations 33.19 and 33.20, respectively:

 $E=E\_{max}cos\left(kx-wt\right)$

$$B=B\_{max}cos(kx-wt)$$

Ans: