Exercise 1

Show that Ampere's law may also be expressed as $\oint \vec{B} \cdot d\vec{l} = \mu I_f$.

Exercise 2

Show the above relationship.

Exercise 3

A 50 pF parallel plate capacitor is being charged so that the voltage is increasing at a rate 300 V/s. The capacitor plates are circular with radii 10 cm each. Calculate (i) the displacement current density and (ii) the magnetic field strength at a distance of 5 cm from the axis of the capacitor.

(Ans. (i) 4.8×10^{-7} A/m ^{2} (ii) 1.4×10^{-14} T.)

Exercise 4

The magnetic field of a plane electromagnetic wave is given by

$$B_y = B_z = 10^{-8} \sin[\frac{2\pi}{3} x - 2\pi \times 10^8 t] \ \mathrm{T}$$

Determine the electric field and the plane of polarization.

(Ans. Strength of electric field is $3\sqrt{2}$ V/m)

Exercise 5

A 40 watt lamp radiates all its energy isotropically. Compute the electric field at a distance of 2m from the lamp.

(Ans. 30 V peak)

Exercise 6

Assuming that the earth absorbs all the radiation that it receives from the sun, calculate he radiation pressure exerted on the earth by solar radiation.

(Ans. Assuming diffuse radiation 1.33×10^{-6} N/m ^{2})