2-5 A coil having 200 turns links a flux of 3 mWb, produced by a permanent magnet. The magnet is moved, and the flux linking the coil falls to 1.2 mWb in 0.2 s. Calculate the average voltage induced.

2-8 We want to produce a flux density of 0.6 T in an air gap having a length of 8 mm. Calculate the mmf required.

2-9 Conductor AB in Figure 2.29 carries a current of 800 A flowing from B to A.

a. Calculate the force on the conductor.
b. Calculate the force on the moving N pole.
c. Does the force on the N pole act in the same direction as the direction of rotation?

3-12 A motor drives a load at cw speed of 1000 r/min. The motor develops a cw torque of 12 N·m, and the load exerts a ccw torque of 15 N·m.

a. Will the speed increase or decrease?
b. If this situation persists for some time, in what direction will the shaft eventually rotate?

3-17 A motor drives a flywheel having a moment of inertia of 5 kg·m^2. The speed increases from 1600 r/min to 1800 r/min in 8 s. Calculate

a. The torque developed by the motor [N·m]
b. The energy in the flywheel at 1800 r/min [kJ]
c. The motor power [W] at 1600 r/min
d. The power input [W] to the flywheel at 1750 r/min

3-18 A dc motor coupled to a large grinder develops 120 hp at a constant speed of 700 r/min. The moment of inertia of the revolving parts is 2500 lb·ft^2.

a. Calculate the torque [N·m] developed by the motor.
b. Calculate the motor torque [N·m] needed so that the speed will increase to 750 r/min in 5 s. (*Note:* The torque exerted by the grinder remains the same.)

3-19 The electric motor in a trolley bus develops a power output of 80 hp at 1200 r/min as the bus moves up a hill at a speed of 30 miles per hour. Assuming that the gear losses are negligible, calculate the following:

a. The torque developed by the motor [N·m]
b. The force opposing the motion of the bus [N]