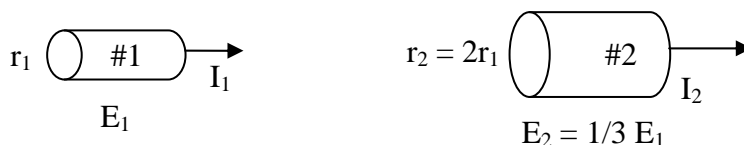# Current examples

Example 1

Wires 1 and 2 are made of the same material. Wire 2 has twice the radius and one-third the electric field strength of wire 1. Compare I_1 and I_2. Compare J_1 and J_2.

r_1 | #1 → I_1
E_1

$r_2 = 2r_1$ | #2 → I_2
$E_2 = 1/3\ E_1$

Example 2

The current in a lightbulb is 0.85 A. The diameter of the filament is 0.25 mm. Find
   a) the current density in the filament.
   b) the electron current in the filament.

Example 3

In an ionic solution, 5.0×10^{15} positive ions with charge $+2e$ pass to the right each second while 6.0×10^{15} negative ions with charge $-e$ pass to the left. What is the current in the solution (give the magnitude and direction).

Example 4

1) A wire consists of two segments, a and b, of different diameters. Compare I_a and I_b. Compare J_a and J_b.

   a → | b → I_b
   I_a
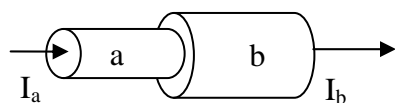
2) The wire is made of aluminum. The diameter of segment a is 1.0 mm and the diameter of segment b is 2.0 mm. The current I_a is 10 A. Find for segments a and b
   a. the current I
   b. the current density J
   c. the electric field E
   d. the drift velocity v_d
   e. the mean time between collisions τ
   f. the electron current i