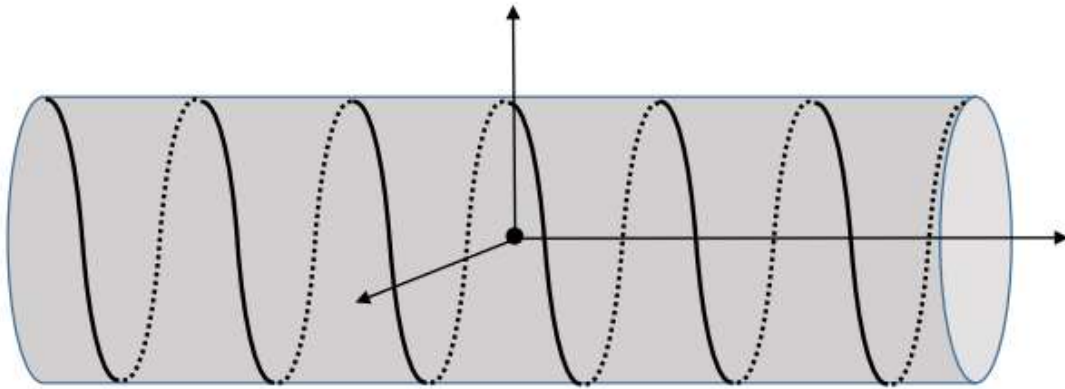


## Problem 2



- 1) Calculate the axial component of the vector potential  $\vec{A}$  at the center of a helix of  $2N$  turns, of radius  $R$ , and of the length  $2H$ , carrying a current  $I$ . (You need to calculate *only* the axial component of the vector potential, and *only* at the origin.)
- 2) Show that the result (for the axial component of the vector potential at the origin) is the same as that for a single wire of length  $2H$  along the side of the helix that carries a current  $I$ . Why is this so?
- 3) Is it possible to use this result to calculate the axial component of  $\vec{B}$  at the center?
- 4) Show that the axial component of  $\vec{B}$  at the center of the helix is

$$\frac{\mu_0 I N}{\sqrt{R^2 + H^2}}$$