6) Biot-Savart
\[ \mathbf{B} = \frac{\mu_0}{4\pi} i \mathbf{L} \times \mathbf{v} / \mathbf{v}^2 \]

a) \[ \mathbf{L} \] along -x axis (to left)
\[ \mathbf{N} \] points along +x axis also
So \[ \mathbf{L} \times \mathbf{N} = 0 \] \[ \Rightarrow \mathbf{B} = 0 \]

b) \[ \mathbf{N} \] is 1 dl for all points on circle
\[ \mathbf{N} \times \mathbf{dl} \] points out of page.

\[ i \cdot \mathbf{B} = \frac{\mu_0}{4\pi} \int \mathbf{N} \cdot \mathbf{dl} = \frac{\mu_0 i}{4\pi\pi^2} \pi \mathbf{N} = \frac{\mu_0 i}{4\pi} \mathbf{N} \]

7) a) Force on dipole in uniform \( \mathbf{B} = 0 \)

b) False - Paramagnetism due to permanent magnetic dipole moment of atoms - not all atoms have

c) Not reasonable - MRI involves \( \mathbf{B} \) and alternating EM field, not radiation

d) False, B = \( \mathbf{N} \times \mathbf{dl} \) points out of paper everywhere

e) For \( i \) going up - + \( \Theta \) carriers, bent to left
   \[ \text{Von left} \rightarrow + \]

For \( \Theta \) carriers, bent to left side of strip
   \[ \Rightarrow \text{Von left} \rightarrow - \]