1 Magnetic Field and Current

Consider the magnetic field

$$\vec{B}(s,\phi,z) = \begin{cases} 0 & 0 \le s < a \\ \alpha \frac{1}{s}(s^4 - a^4)\,\hat{\phi} & a < s < b \\ 0 & s > b \end{cases}$$

(a) Use step and/or delta functions to write this magnetic field as a single expression valid everywhere in space.

(b) Find a formula for the current density that creates this magnetic field.

(c) Interpret your formula for the current density, i.e. explain briefly in words where the current is.