Collision frequency

Calculate ν_{ii}/ν_{ei} for $T_i = 4T_e$ and $m_i = 100m_e$

a) 160

b) 1/4

c) 1/40

d) 1/80

Moments

Which of the following is the fluid velocity $\mathbf{U}_s$?

a) $\int d^3\mathbf{v} \quad (\mathbf{v}-\mathbf{U}_s)(\mathbf{v}-\mathbf{U}_s) f_s(\mathbf{x},\mathbf{v},t)$

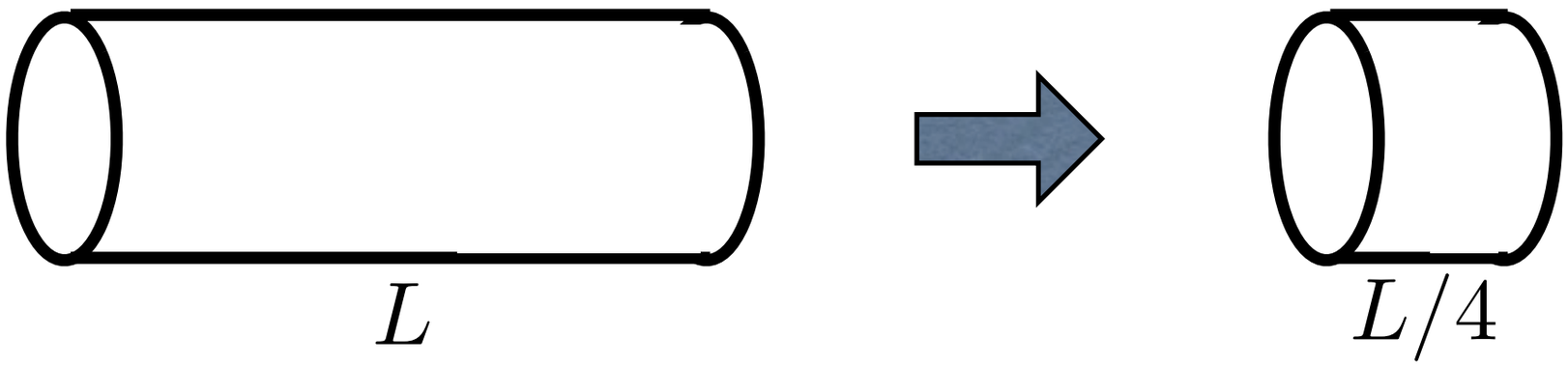
b) $\dfrac{\int d^3\mathbf{v} \quad \mathbf{v} f_s(\mathbf{x},\mathbf{v},t)}{\int d^3\mathbf{v} f_s(\mathbf{x},\mathbf{v},t)}$

c) $\dfrac{\int d^3\mathbf{v} \quad mv^2/2 f_s(\mathbf{x},\mathbf{v},t)}{\int d^3\mathbf{v} f_s(\mathbf{x},\mathbf{v},t)}$

d) $\int d^3\mathbf{v} \quad \mathbf{v} f_s(\mathbf{x},\mathbf{v},t)$

Compression of Plasma

Consider a cylindrical volume of plasma threaded by a uniform axial magnetic field B_0. What is the magnetic field if the plasma is compressed as follows:



a) $16B_0$

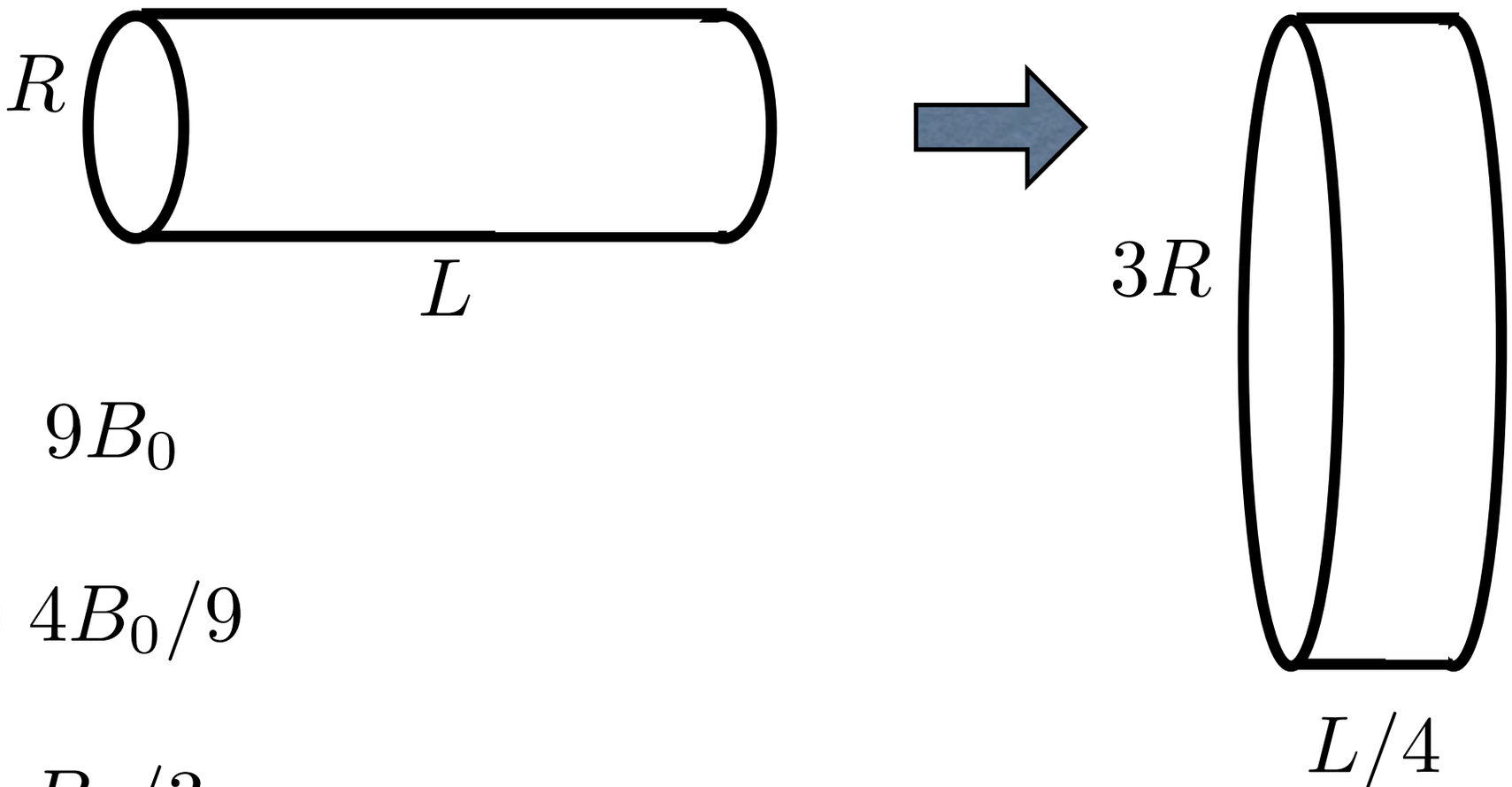
b) $4B_0$

c) B_0

d) $B_0/4$

Changes of Plasma Volume

Consider a cylindrical volume of plasma threaded by a uniform axial magnetic field B_0 . What is the magnetic field if the plasma is changed as follows:



a) $9B_0$

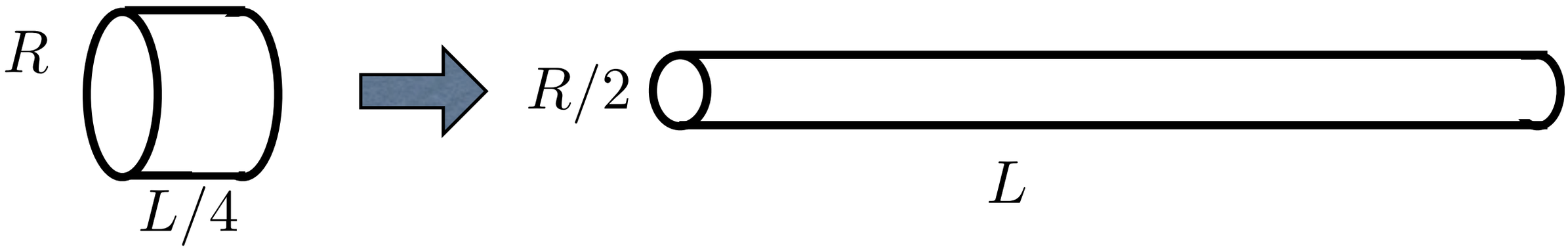
b) $4B_0/9$

c) $B_0/3$

d) $B_0/9$

Changes of Plasma Volume

Consider a cylindrical volume of plasma threaded by a uniform axial magnetic field B_0 with a temperature T_0. If the plasma is strongly collisional, what is the temperature after this plasma is changed as follows?



a) $T_0/8$

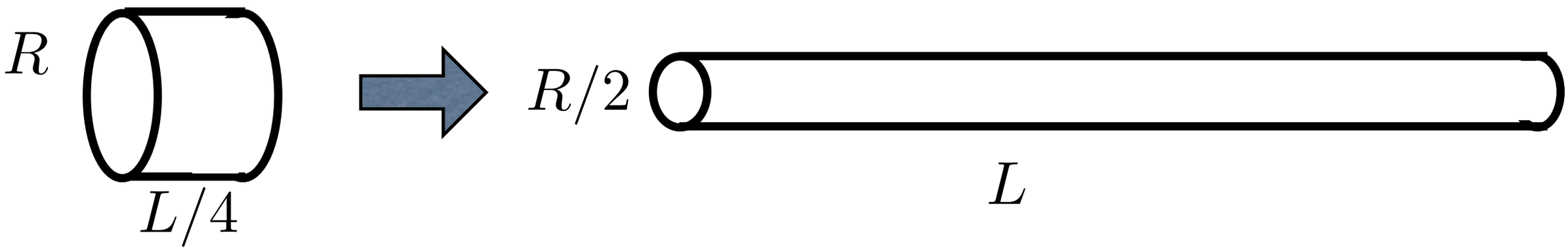
b) $T_0/2$

c) T_0

d) $4T_0$

Changes of Plasma Volume

Consider a cylindrical volume of plasma threaded by a uniform axial magnetic field B_0 . If the plasma is collisionless with initial temperatures, $T_\perp = T_\parallel = T_0$, what are the final temperatures?



a) $T_\perp = 4T_0, \quad T_\parallel = T_0/16$

b) $T_\perp = 2T_0, \quad T_\parallel = T_0/4$

c) $T_\perp = T_0, \quad T_\parallel = T_0$

d) $T_\perp = T_0/4, \quad T_\parallel = 4T_0$

Polar Plot of MHD Wave Velocities

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Which of the following can be deduced from this polar plot of the Fast, Alfven, and Slow wave velocities?

a) $c_s > v_A$

b) $c_s = v_A$

c) $c_s < v_A$

d) Cannot be determined