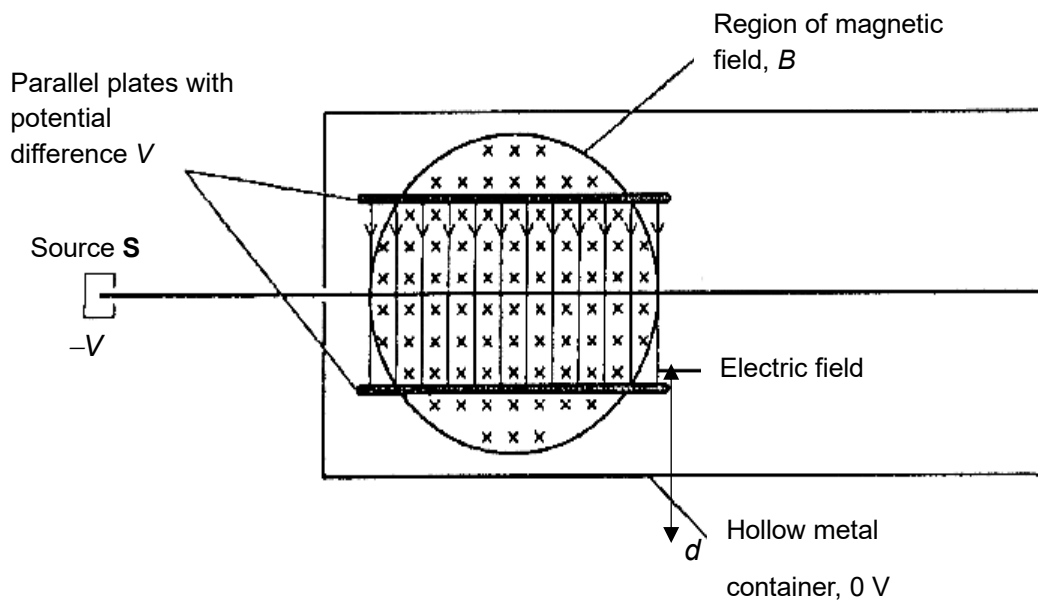






A part of a mass spectrometer is shown in the figure below. Negative ions are generated at the source  $S$ , which is at a potential of  $-V$  with respect to the hollow metal container. Inside the container, there are parallel plates separated by distance  $d$  and a uniform magnetic field  $B$  is applied to the region between the parallel plates.



If the potential difference between the parallel plates is  $V$ , what is the charge to mass ratio of the ions that can pass through the fields undeflected?

**A**

$$\frac{V}{2B^2d^2}$$

**B**

$$\frac{2V}{B^2d^2}$$

**C**

$$\frac{2B^2d^2}{V}$$

**D**

$$\frac{B^2d^2}{2V}$$