

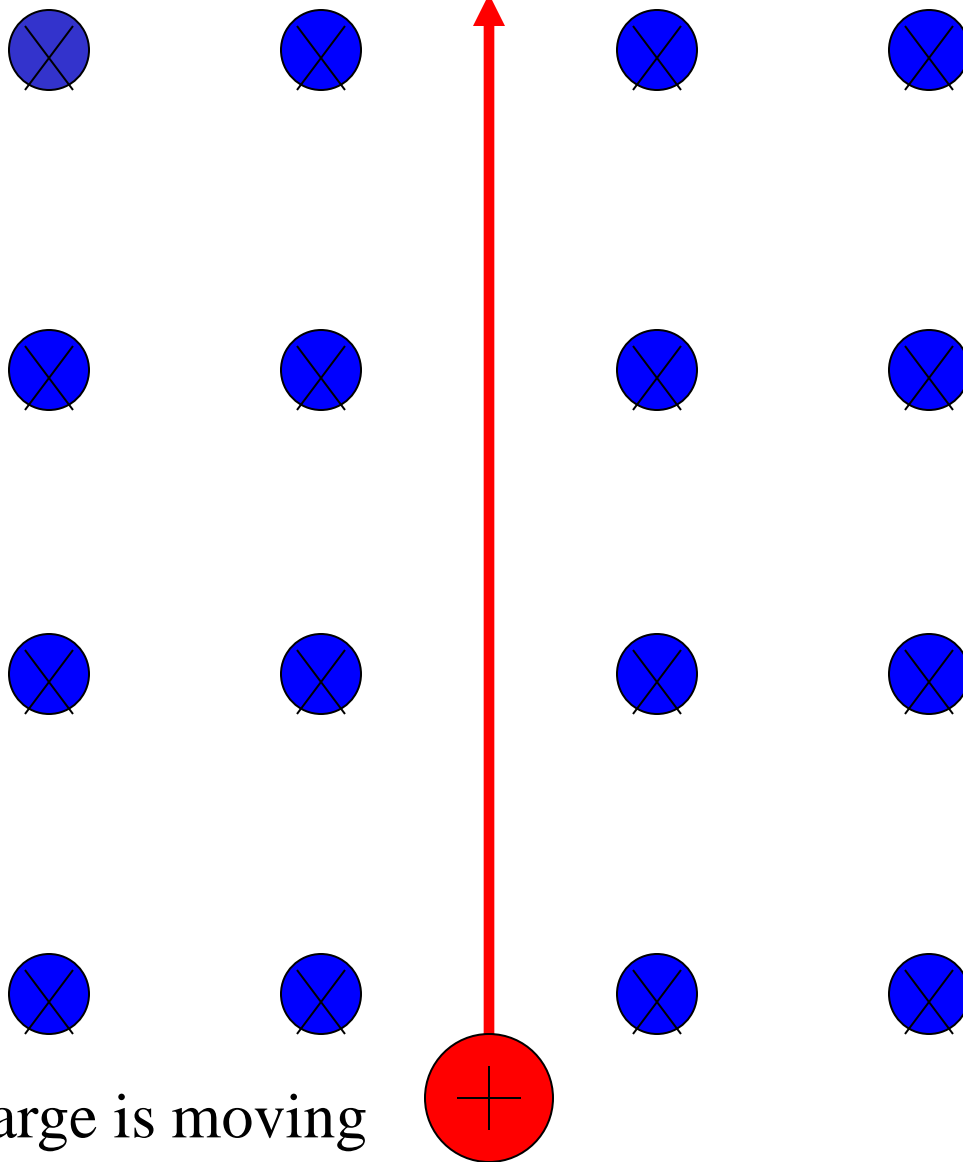
$$\mathbf{F} = \mathbf{B} \mathbf{I} \mathbf{L}$$

Or is it.....

$$\mathbf{F} = q \mathbf{v} \mathbf{B}$$

Also Determine the direction of the Force! ☺

Positive Charge is moving

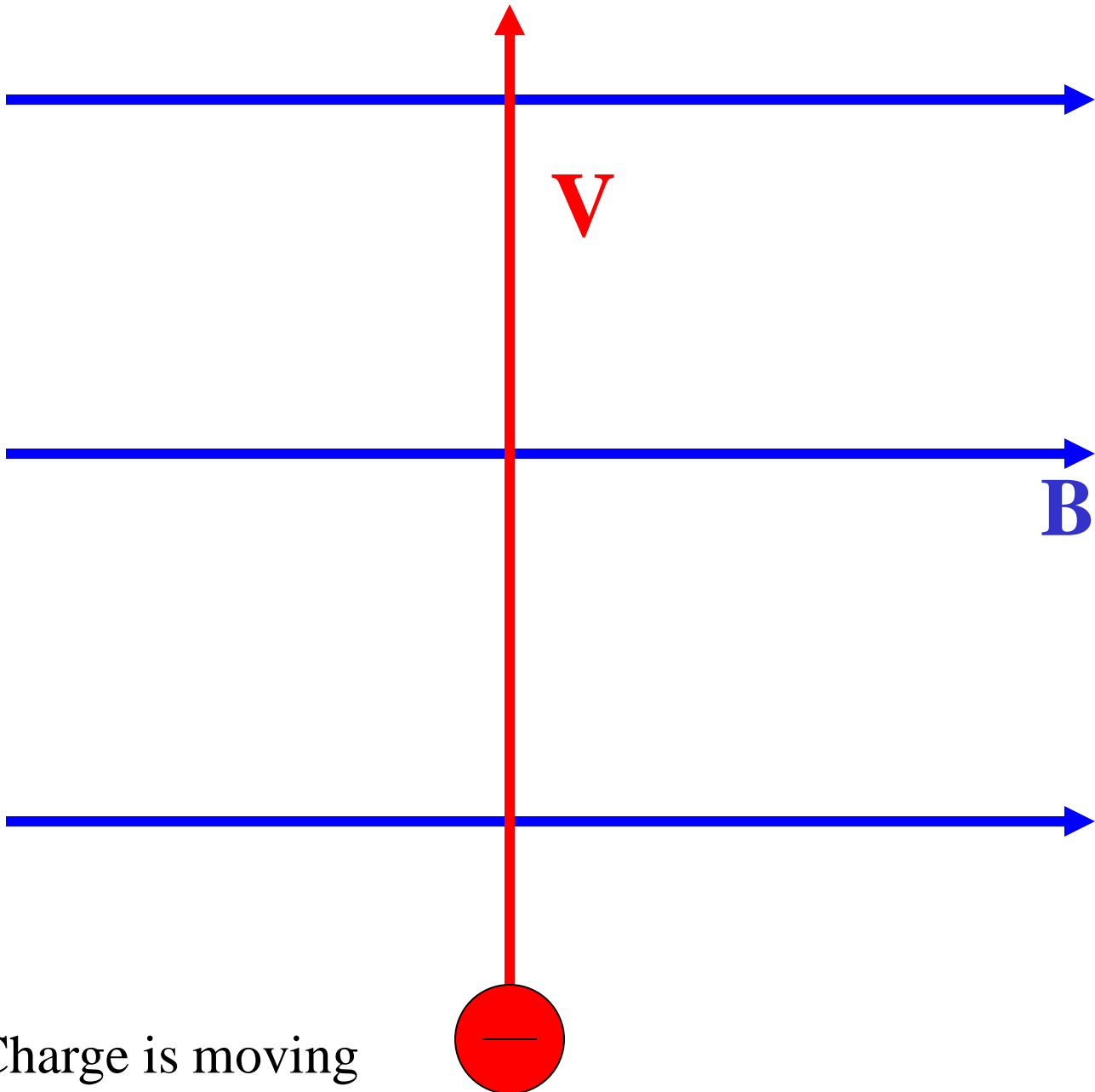


B

Use:  $F=qvB$

Force is going:

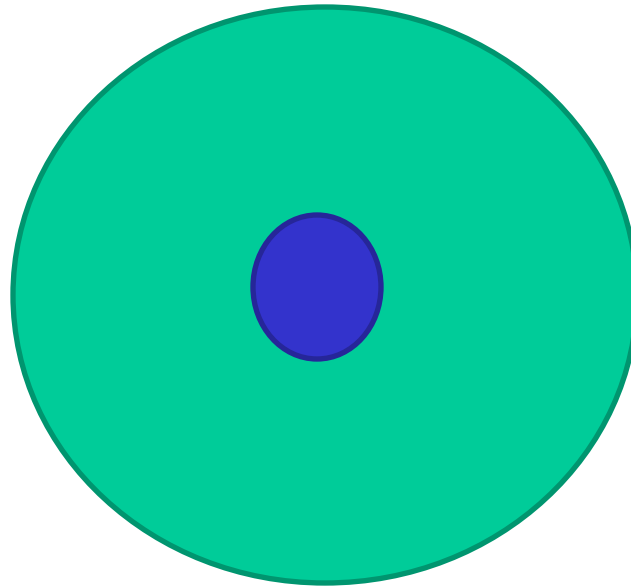


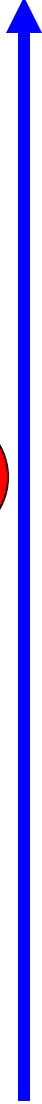


Negative Charge is moving

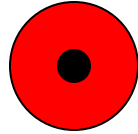
Use:  $F=qvB$

Force is going: Coming out of the page!





**B**



**I**

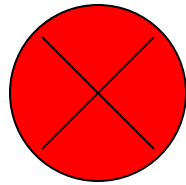
Use:  $F = BiL$

Force is going:





$$\mathbf{F} = 1.5 \times 10^{-12} \text{ N}$$



$$\mathbf{V} = 2.0 \times 10^7 \text{ m/s}$$

Electron

$$\mathbf{B} = ?$$



Use:  $F=qvB$

$$1.5 \times 10^{-12} = (1.6 \times 10^{-19} \text{C}) \times (2.0 \times 10^7 \text{ m/s}) \times B$$

$$B = .46875 \text{ T}$$

Force is going:





The diagram shows a magnetic field  $B$  represented by three parallel blue arrows pointing to the right. The value of the magnetic field is given as  $B = .15 \text{ T}$ . In the center, a red circle with a minus sign represents an electron. A red arrow points to the left from the electron, indicating its velocity  $V = 1.5 \times 10^6 \text{ m/s}$ . The question asks for the force  $F$  acting on the electron.

$$B = .15 \text{ T}$$

Electron

$$V = 1.5 \times 10^6 \text{ m/s}$$

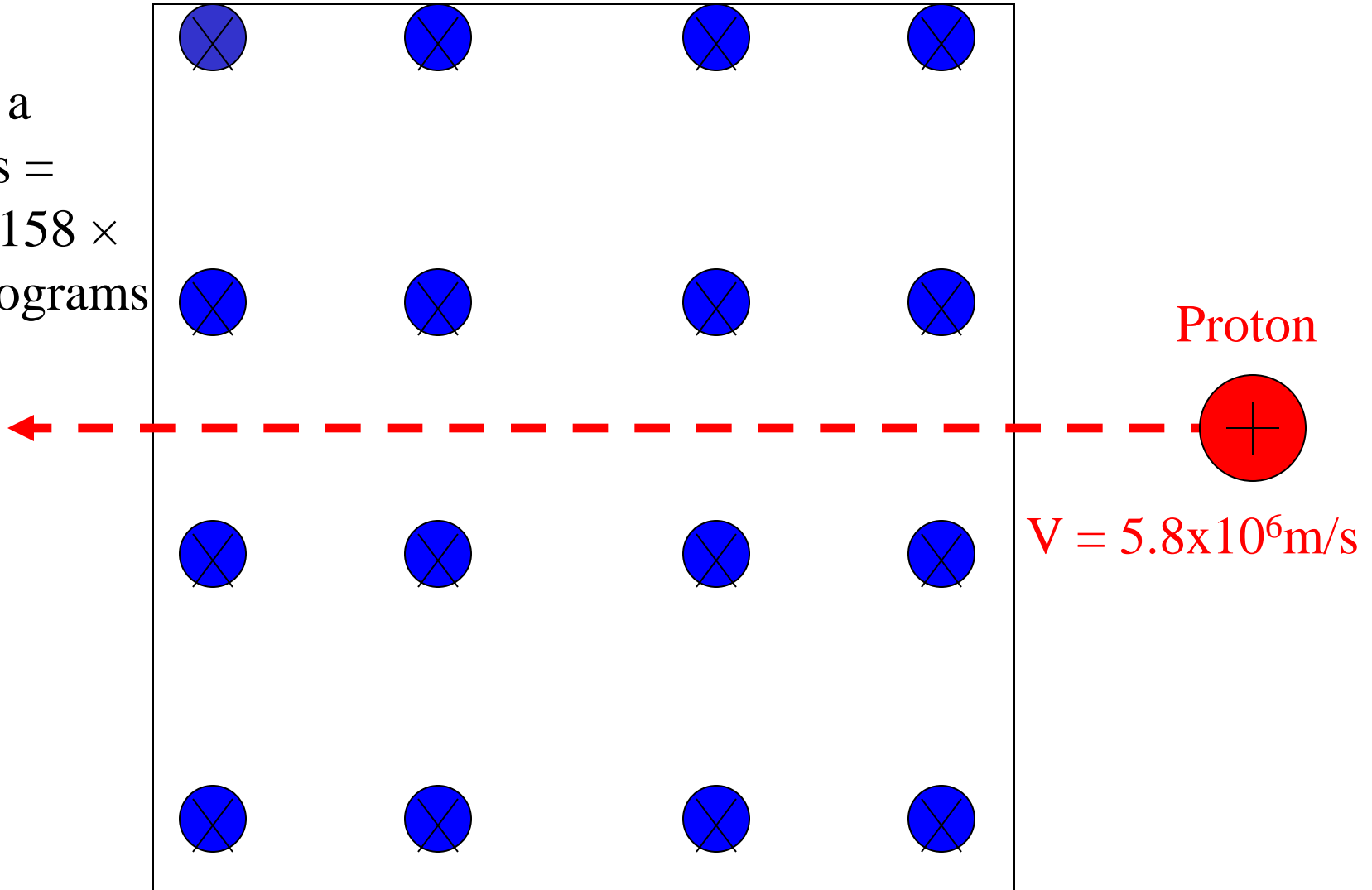
$$F = ?$$

You would break your hand trying this one so the charge will not feel any force

What is the  
acceleration of  
the proton?

$$B = .75 \text{ T}$$

Mass of a  
proton is =  
 $1.67262158 \times 10^{-27}$  kilograms



Use:  $F=qvB$

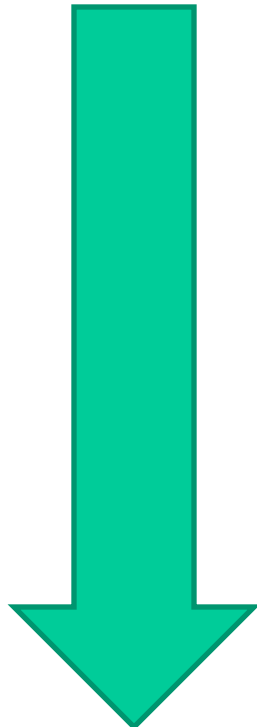
$$F=ma$$

$$ma=qvB$$

$$(1.67262158 \times 10^{-27} \text{ kg}) \times a = (1.6 \times 10^{-19} \text{ C}) \times (5.8 \times 10^6 \text{ m/s}) \times .75 \text{ T}$$

$$a = 4.167 \times 10^{14} \text{ m/s/s}$$

Force is going:

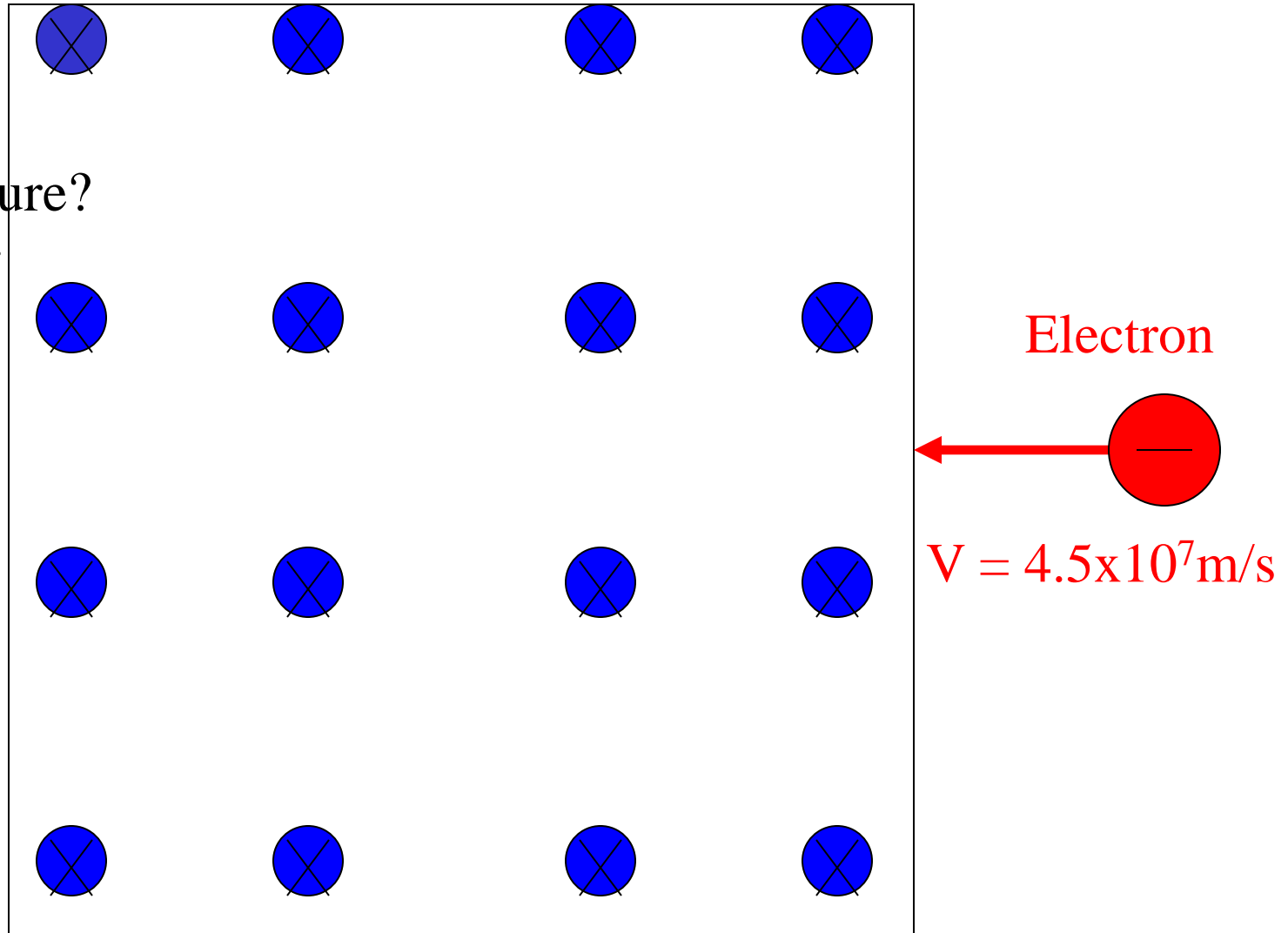


1. What is the acceleration of the electron?

$$B = .75 \text{ T}$$

2. What is the radius of curvature?

*Hint:  $a_c = v^2/r$*



Use:  $F=qvB$

$$F=mv^2/r$$

$$mv^2/r=qvB$$

$$(9.11 \times 10^{-31} \text{ kg})(4.5 \times 10^7 \text{ m/s})^2/r = (1.6 \times 10^{-19} \text{ C}) \times (4.5 \times 10^7 \text{ m/s}) \times .75 \text{ T}$$

$$r = 3.4 \times 10^{-4} \text{ m}$$

Force is going:

