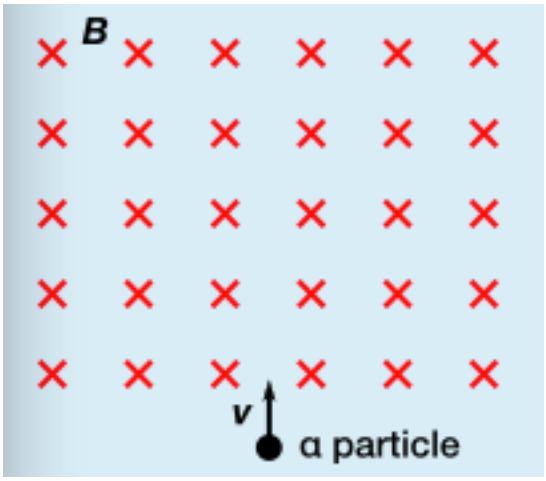
Q 1.



An α particle enters a constant magnetic field as shown in the diagram. The magnetic field is directed into the screen and has a magnitude B = 1.20 T. The initial velocity of the α particle is v = 5.34 × 105 m/s directed up the screen.

What is the size of the force experience by the α particle?
F= _____ N

What is the direction of this force?
Select one:
A. Down the screen
B. To the right
C. To the left
D. Out of the screen
E. Into the screen
F. It is zero so it has no direction
G. Up the screen

What is the magnitude of the acceleration experienced by the α particle?
a= _____ ms^{-2}

This force causes the α particle to undergo circular motion. What is the radius of the path it follows?
r= _____ m

Q2
A power plant produces energy at a voltage of Vi = 19266 V. Before being sent along long distance power lines this electricity is sent through a transformer with 185 turns in the primary coil and 9621 turns in the secondary coil.
What is the voltage of the electricity sent through the long distance wires?

V= _____ v

If the wires have an efficiency of 99.30% and a resistance of 1096 Ω, what current flows through these wires?
I= _____ A

How much power do the wires carry?
P= _____ W

Select the true statements from the following list below (More than one may be correct)
Select one or more:
A. A step down transformer has more turns of wire in the secondary coil than in the primary coil.
B. A step-up transformer will be needed between the long distance wires and people's homes.
C. The electricity that travels along the wires is AC (alternating current).
D. The electricity that travels along the wires is DC (direct current).
E. An iron core increases the efficiency of a transformer in comparison to an air core.
F. Less power is lost when electricity is transmitted at high voltage over a long distance than when transmitted at a low voltage.