**Answer on Question #45721 – Physics – Electromagnetism**

A proton with speed v perpendicular to a magnetic field B is experiences a force F. if the speed of the proton is doubled, the new force is
a. F/2
b. F
c. 2F
d. 4F

**Solution:**
The initial magnetic force is ($v_1$ − speed, q − charge, B − magnetic induction)
$$F = F_1 = Bv_1q \quad (1)$$
The final magnetic force is
$$F_2 = Bv_2q$$
speed of the proton is doubled:
$$v_2 = 2 \cdot v_1$$
$$F_2 = Bv_2q = 2Bv_1q \quad (2)$$
$$(2) \div (1):$$
$$\frac{F_2}{F_1} = \frac{2Bv_1q}{Bv_1q} = 2$$
$$F_2 = 2F_1 = 2F$$
**Answer:** c. 2F.