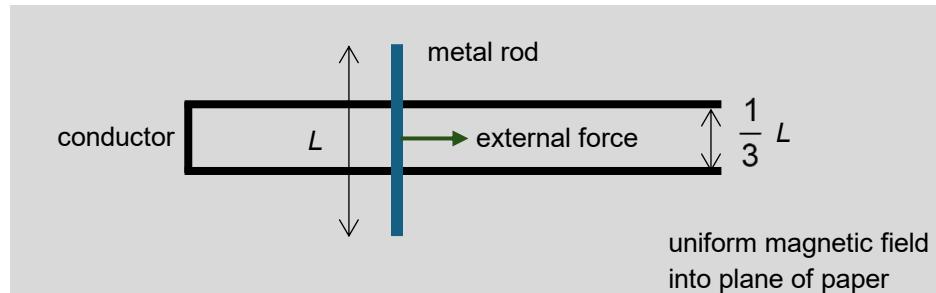


- 25** A metal rod of length  $L$  and resistance per unit length  $r$  is placed on the parallel section of a smooth conductor of negligible resistance. A uniform magnetic field  $B$  is directed perpendicularly into the paper.



The two parallel sections are separated by  $\frac{1}{3}L$ . An external force causes the metal rod to slide at constant speed  $v$ .

Which expression gives the magnitude of the external force?

**A** 
$$\frac{3B^2Lv}{r}$$

**B** 
$$\frac{B^2Lv}{r}$$

**C** 
$$\frac{B^2Lv}{3r}$$

**D** 
$$\frac{B^2Lv}{9r}$$