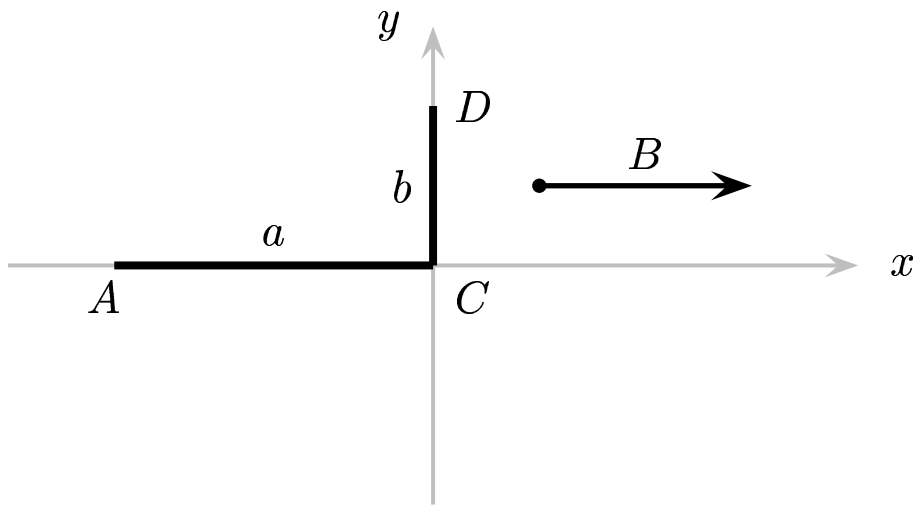
A given current flows from A to C and then to D in wire segment: $AC{=}a$, $CD{=}b$. $\vec{B}$ is constant and parallel to positive x-axis.



Determine the resultant force vector $\vec{F}$, asserted by $\vec{B}$ on the wire segment.

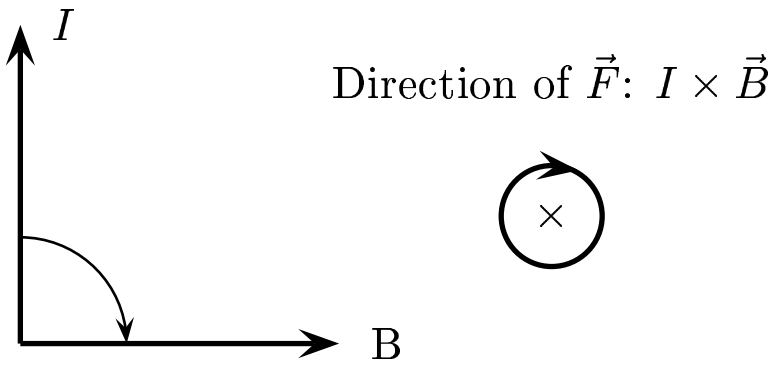
A) $\|\vec{F}\| = I\,b\,B$ and the direction of $\vec{F}$ is $\otimes$.

B) $\|\vec{F}\| = I\,(a+b)\,B$ and the direction of $\vec{F}$ is $\odot$.

C) $\|\vec{F}\| = I\,b\,B$ and the direction of $\vec{F}$ is $\odot$.

D) $\|\vec{F}\| = I\,(a+b)\,B$ and the direction of $\vec{F}$ is $\otimes$.

Since the current in the AC segment is parallel to B, the magnetic force due to the segment AC is, $F = I\,a\,B\,\sin 0°$. The current in the CD segment is perpendicular to the magnetic force, so $F = I\,b\,B\,\sin 90° = I\,b\,B$. Applying right-hand-rule of cross-product, the direction of $\vec{F}$ is $\otimes$. See the sketch.



Answer A.

29.02-03˙Force˙on˙Current˙Segments 2005-11-10