CB

الف)

$dF = BIdL \longrightarrow F = \int \vec{B} I \times \vec{dL}$

$B = (0, 0, \frac{\mu_0 I_1}{2\pi x})$

$dL = (-dx, -dy, 0)$

$\longrightarrow F = \frac{\mu_0 I_1}{2\pi} \int_b^{2b} I_2 \frac{1}{x} dy \; \hat{y} + \frac{\mu_0 I_1}{2\pi} \int_b^{2b} I_2 \frac{1}{x} (-dx) \hat{x}$

$x = y$ ☆

☆ روی ضلع مورب $x = y$ برقرار است

$= \frac{\mu_0 I_1 I_2}{2\pi} \ln(2) \; \hat{y} + \frac{\mu_0 I_1 I_2}{2\pi} \ln(2) \; (-\hat{x})$

CA: $F = \int I \vec{B} \times \vec{dL}$

$B = (0, 0, \frac{\mu_0 I_1}{2\pi x})$

$dL = (dx, 0, 0)$

$\longrightarrow F = \frac{-\mu_0 I_1}{2\pi} \int_b^{2b} I_2 \frac{1}{x} dx \; \hat{y} = \frac{-\mu_0 I_1 I_2}{2\pi} \ln(2) \; \hat{y}$

ب)

$|\mu| = IA = I \times \frac{b \times b}{2} = \frac{I b^2}{2}$

$|\tau| = |\mu||B| = \frac{I b^2 B}{2}$