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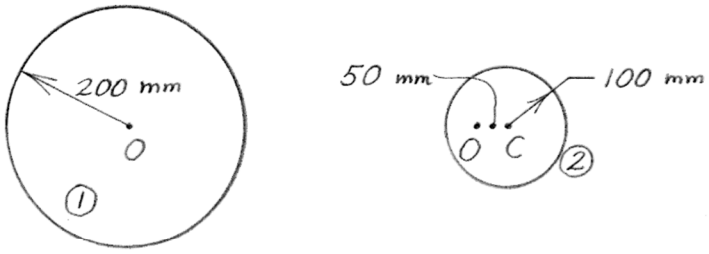

Area $A = A_1 - A_2 = \pi(200^2 - 100^2) = 3(10^4)\pi \text{ mm}^2$

① $I_{O_1} = \frac{1}{2}(\pi \cdot 200^2)(200^2) = 8(10^8)\pi \text{ mm}^4$

② $I_{O_2} = \frac{1}{2}(\pi \cdot 100^2)(100^2) + \pi(100^2)(50^2) = 0.75(10^8)\pi \text{ mm}^4$

So $I_O = I_{O_1} - I_{O_2} = 7.25(10^8)\pi \text{ mm}^4$

$k_O = \sqrt{I_O/A} = \sqrt{\frac{7.25(10^8)\pi}{3(10^4)\pi}} = \underline{155.5 \text{ mm}}$