

[9.2절]

9.35  $a = 20 \text{ mm}$

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$$I_{x1} = \frac{1}{12} b h^3 = \frac{1}{12} (3a) (3a)^3 = \frac{27}{4} a^4 = \frac{27}{4} (20 \text{ mm})^4$$

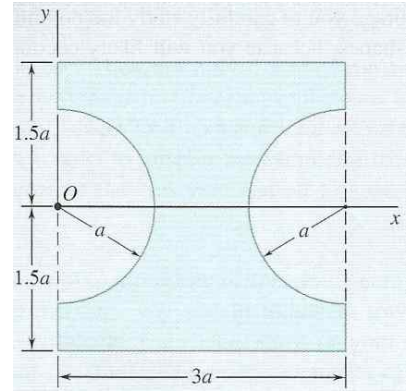
$$= 1,080,000 \text{ mm}^4 = 1,080 \times 10^3 \text{ mm}^4$$

$$I_{x2} = I_{x3} = \frac{1}{8} \pi a^4 = \frac{1}{8} \pi (20 \text{ mm})^4$$

$$= 62,830 \text{ mm}^4 = 62.83 \times 10^3 \text{ mm}^4$$

$$I_x = I_{x1} - I_{x2} - I_{x3}$$

$$= (1,080 - 62.83 - 62.83) \times 10^3 \text{ mm}^4 = 954.3 \times 10^3 \text{ mm}^4$$



$$I_{y1} = \frac{1}{3} b^3 h = \frac{1}{3} (3a)^3 (3a) = 27 a^4 = 27 (20 \text{ mm})^4$$

$$= 4,320,000 \text{ mm}^4 = 4,320 \times 10^3 \text{ mm}^4$$

$$I_{y2} = \frac{1}{8} \pi a^4 = \frac{1}{8} \pi (20 \text{ mm})^4$$

$$= 62,830 \text{ mm}^4 = 62.83 \times 10^3 \text{ mm}^4$$

$$I_{y3} = \frac{1}{8} \pi a^4 - \left( \frac{1}{2} \pi a^2 \right) \left( \frac{4}{3\pi} a \right)^2 + \left( \frac{1}{2} \pi a^2 \right) \left( 3a - \frac{4}{3\pi} a \right)^2$$

$$= \left[ \frac{1}{8} \pi - \frac{8}{9\pi} + \frac{\pi}{2} \left( 3 - \frac{4}{3\pi} \right)^2 \right] a^4$$

$$= (10.530) (20 \text{ mm})^4 = 1,684,800 \text{ mm}^4 = 1,684 \times 10^3 \text{ mm}^4$$

$$I_y = I_{y1} - I_{y2} - I_{y3} = (4,320 - 62.83 - 1,684) \times 10^3 \text{ mm}^4 = 2,573 \times 10^3 \text{ mm}^4$$

$$\Rightarrow I_x = 954 \times 10^3 \text{ mm}^4 = 0.954 \times 10^6 \text{ mm}^4$$

$$I_y = 2,570 \times 10^3 \text{ mm}^4 = 2.57 \times 10^6 \text{ mm}^4$$