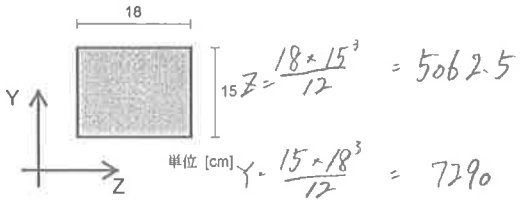
建築構造力学ＩＢ・同演習 第8回　練習問題 実施日2016/12/7	学生証番号		氏名	解答	得点

問3. 下記に示す各断面の図心を通る軸に関する断面2次モーメント I_z, I_y を求めなさい。ただし、解答はcmを用い、有効数字3桁で答えよ。

(1)

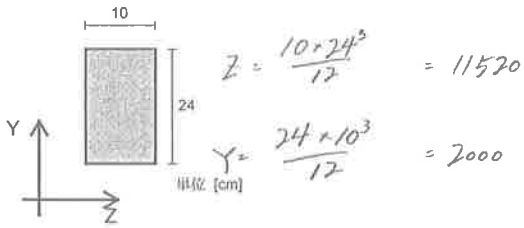


$Z = \frac{18\times15^3}{12} = 5062.5$

$Y = \frac{15\times18^3}{12} = 7290$

$I_z =$ 5060 cm⁴, $I_y =$ 7290 cm⁴.

(2)

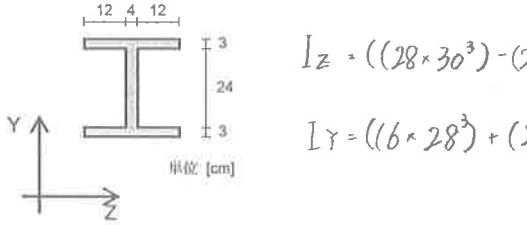


$Z = \frac{10\times24^3}{12} = 11520$

$Y = \frac{24\times10^3}{12} = 2000$

$I_z =$ 11500 cm⁴, $I_y =$ 2000 cm⁴.

(3)

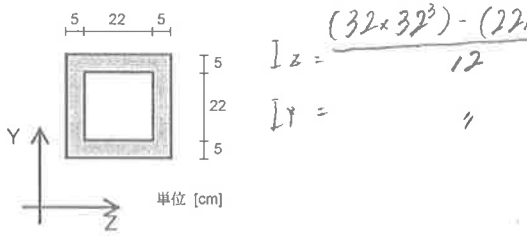


$I_Z = ((28\times30^3)-(24\times24^3))/12 = 35352$

$I_Y = ((6\times28^3)+(24\times4^3))/12 = 11104$

$I_z =$ 35400 cm⁴, $I_y =$ 11100 cm⁴.

(4)

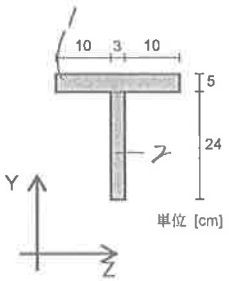


$I_z = \frac{(32\times32^3)-(22\times22^3)}{12} = 67860$

$I_Y =$ 〃 $= 67860$

$I_z =$ 67900 cm⁴, $I_y =$ 67900 cm⁴.

(4)



$I_z = \frac{23\times5^3}{12} + 115\times(26.5-20.917)^2 + \frac{3\times24^3}{12} + 72\times(12-20.917)^2$

$= 13005.05$

$I_Y = \frac{5\times23^3}{12} + \frac{24\times3^3}{12} = 5123.58$

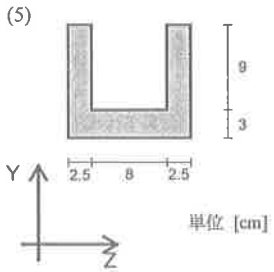
$A_1 = 115 \quad A_2 = 72 \quad A = 187$

$Y_1 = 26.5 \quad Y_2 = 12 \quad S = 26.5\times115 + 12\times72 = 3911.5$

$Z_1 = 11.5 \quad Z_2 = 11.5 \quad Y_0 = 3911.5/187 = 20.917$

$I_z =$ 13000 cm⁴, $I_y =$ 5120 cm⁴.

(5)



$A_1 = 156 \quad A_2 = 72 \quad A = 84$

$Y_1 = 6 \quad Y_2 = 7.5$

$S = 6\times156 - 7.5\times72 = 396$

$Y_0 = 4.714$

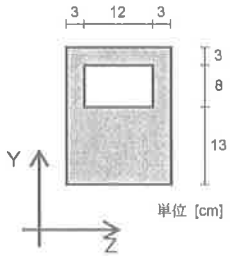
$I_Z = (13\times12^3)/12 + 156\times(6-4.714)^2 - (18\times9^3)/12 - 72\times(7.5-4.714$

$= 1085.14$

$I_Y = (12\times13^3)/12 - (9\times8^3)/12 = 1813$

$I_z =$ 1090 cm⁴, $I_y =$ 1810 cm⁴.

(6)



$A_1 = 432 \quad A_2 = 96 \quad A = 336$

$Y_1 = 12 \quad Y_2 = 17$

$S = 12\times432 - 96\times17 = 3552$

$Y_0 = 3552/336 = 10.571$

$I_Z = (18\times24^3)/12 + 432\times(12-10.571)^2 - (12\times8^3)/12 - 96\times(17-10.5$

$= 17138.29$

$I_Y = (24\times18^3)/12 - (8\times12^3)/12$

$= 10512$

$I_z =$ 17100 cm⁴, $I_y =$ 10500 cm⁴.