Remarks: See §3.2.4, example 7, pages 114 till 115

Answers:

3.24-1. $I_{zz} = 417,6\times10^{6}\ \text{mm}^4$

3.24-2. $I_{zz} = 259,2\times10^{6}\ \text{mm}^4$

3.24-3. $I_{zz} = 1,36\times10^{6}\ \text{mm}^4$

3.24-4. $I_{zz} = 790\times10^{6}\ \text{mm}^4$

Explanation: (lengths in mm)

3.24-1. The centroid of this cross-section is located at half of its height.

$$I_{zz} = \left\{\tfrac{1}{12}\times100\times360^3\right\} + \left\{\tfrac{1}{12}\times200\times120^3\right\} = 417,6\times10^{6}\ \text{mm}^4$$

3.24-2. The centroid of this cross-section is located at half of its height.

$$I_{zz} = \left\{\tfrac{1}{12}\times240\times240^3\right\} - \left\{\tfrac{1}{12}\times120\times120^3\right\} = 259,2\times10^{6}\ \text{mm}^4$$

3.24-3. The centroid lies 30mm from the top edge

$$I_{zz} = 2\times\left\{\tfrac{1}{12}\times10\times60^3 + 10\times60\times20^2\right\} + \left\{\tfrac{1}{12}\times60\times20^3 + 60\times20\times20^2\right\} = 1,36\times10^{6}\ \text{mm}^4$$

3.24-4. The centroid of this cross-section is located at half of its height.

$$I_{zz} = 2\times\left\{\tfrac{1}{12}\times360\times100^3 + 360\times100\times100^2\right\} + \left\{\tfrac{1}{12}\times120\times100^3\right\} = 790\times10^{6}\ \text{mm}^4$$