Remarks: See §3.2.4, particularly page 116

See §3.3.2, example 2, page 126 till 129

Answers:

$$I_{zz} = 4\pi R^3 t$$

Explanation:

One can move the upper semi-circles horizontally with respect to the bottom semi-circles, such that there are 4 complete circles.

Horizontally moving the semi-circles has no effect on I_{zz} (but it does on I_{yy}).