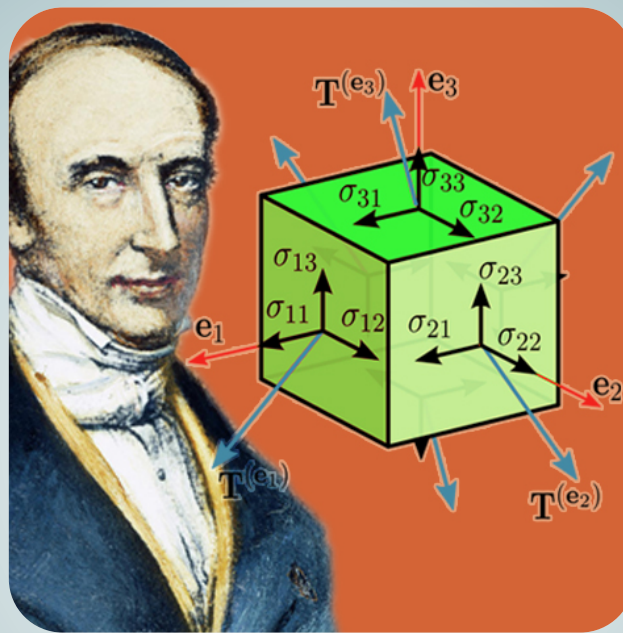


Mechanical Properties of Materials, Processing and Design

Second exam continuous evaluation



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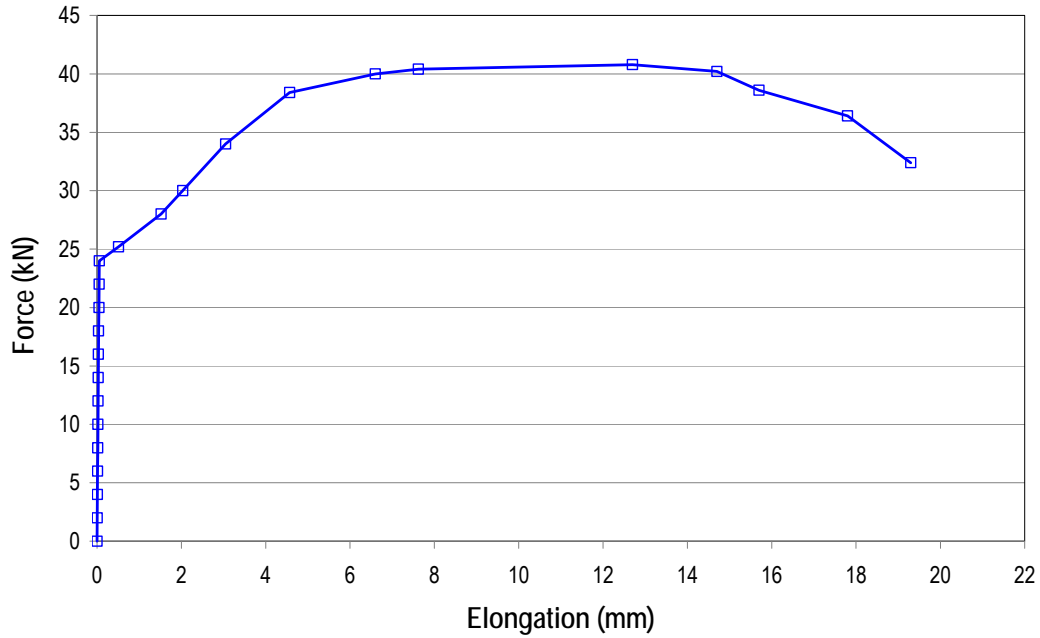
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MECHANICAL PROPERTIES OF MATERIALS - CONTINUOUS EVALUATION - 2nd TEST (25/02/2020)

The figure below shows the result (force vs. elongation) of a tensile test performed on a cylindrical steel ($E=200$ GPa) specimen. Its initial dimensions were the following: diameter, $\varnothing_0=12$ mm; gauge length, $L_0=50$ mm. The final cross section at the necking point was 6.8 mm.



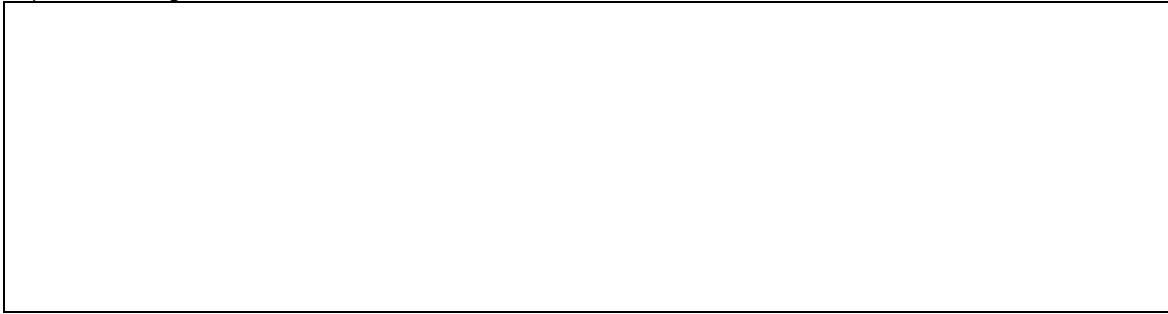
Answer the following questions:

a) Estimate the material yield stress.

b) Determine the tensile strength.

c) Strain for the tensile strength.

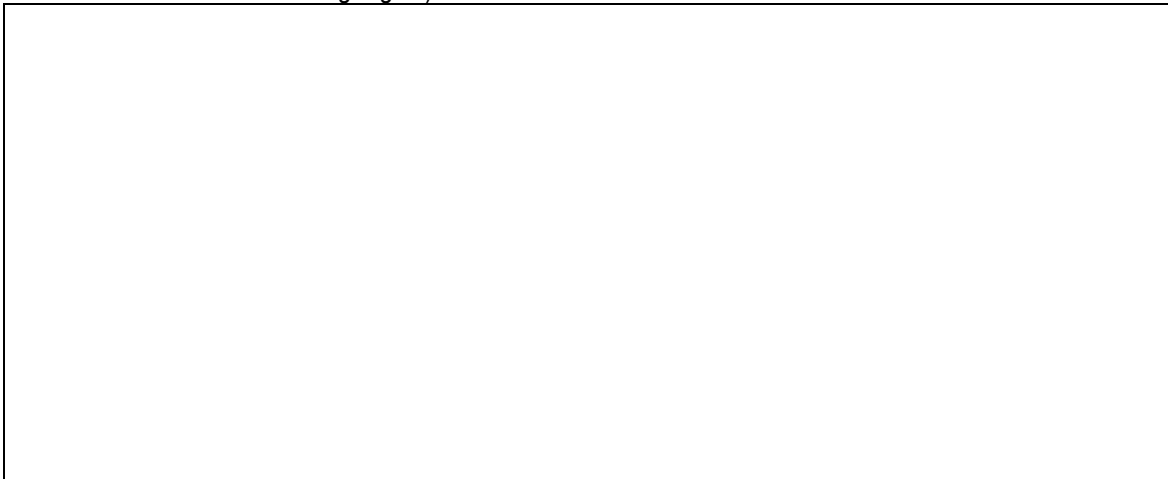
d) Necking coefficient



e) Obtain the real stress in the final necking cross section.



f) Determine the Hollomon's law; take at least seven points for the estimation (reminder: this model describes the hardening region).



g) Taking into account that the maximum elongation in the figure represents ΔL (50 mm), obtain ΔL ($5\sigma_0$).

