

Test 1 questions

Q1: Fundamental design requirements of components of buildings (spaces or constructions, thereunder also loadbearing structures)

Answer: functionality, safety, aesthetics, economics, environment protection

Remarks concerning the correction:

-these are the *fundamental* design requirements common for both spaces and constructions (as parts of buildings)

, and under constructions also for loadbearing structures

-detailed content of these requirements were not asked now, that is why those, who also have given some of them, were not given more points

Q2: Internationally used units of

- a. forces
- b. strengths of loadbearing materials
- c. stresses

Why is it reasonable to use kN/cm^2 for stresses?

Answer: a) $\text{Newton} = \text{kg} \cdot \text{m/s}^2 = \text{N}$, kN

b) $\text{N/m}^2 = \text{Pa}$, $\text{MPa} = \text{N/mm}^2$, kN/cm^2 Pa: Pascal

c) the same units used for strengths

kN/cm^2 is a sympathetic unit for everyday use, because one can feel better the magnitude of the contained units, in that it is bound to by everybody known magnitudes of force and area:

the weight of a thick man and the area of one fingertip.

Remarks concerning the correction:

-3 point were subtracted for those, who have not answered the last question

Q3: Explain the difference between linear elastic and brittle behaviour!

Answer: Linear elastic: the Hook's law: $\sigma = E\varepsilon$ is valid, that is the deformation (specific elongation or shortening) is proportional to stress. The proportionality number is the modulus of elasticity of the material.

Brittle behaviour means that rigid rupture occurs, that is by increasing the stress till the strength of the material, the rupture occurs without any deformation-