1. Give the definition of the following concepts (use formulae or graphs where applicable!)

a) Resilience:

b) Viscosity:

c) Pseudoplastic fluid:

d) Degree of crystallinity:

e) Allotropy:

f) Toughness:

g) Volumetric thermal expansion coefficient:

h) Specific volume:

i) Boltzmann distribution:

j) Dislocation:

2. We compresse with 50 N force a rod made of polimetil-metacrylate (PMMA) with 5 cm length and 5 mm radius. The stiffness of the PMMA is 3 GPa.
a) What percentage of the rod's strain in length?

b) How long is the compressed rod

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3. Answer the question with calculation!
a) What is the molar mass of a polyethylene monomer?

b) The number average molecular weight of polymer molecules is 420 000 g/mol in a plyethylene product. What is the degree of polymerization?

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4. We intend to move gently an object in an AFM microscope in 0.05 nm steps by means of a quartz crystal. How much voltage step is necessary if the piezoelectric coefficient is $3 \cdot 10^{11}$ V/m?

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5. What temperature results 10-fold increase of vacancies in a platinum at room temperature (22°C)?

6. Viscoelasticity. *In your answers use equations, graphs, figures!*
Ho do you define viscoelasticity? What is a Hooke body and a Newton-body? Name and describe their parallel model for viscoelasticity!

Explain one viscoelastic phenomenon!

Give a dental example for the significance of energy dissipation in a viscoelastic system!

7. Ceramics. *In your answers use equations, graphs, figures!*
Structureof ceramics, defects in the ceramics, general properties, classification based on application and based on composition.

Describe the properties and structure of oxide-, silicate- and glass ceramics.

How are ceramics applied in dental applications? (Give exmples too)