Assignment 2

According to Dr. Smith, the maximum credible stress of three-point bend test results with various KI shapes is given by:

\[ \sigma_{\max} = \frac{1}{\sqrt{2}} \frac{K_I}{\sqrt{2\pi r}} \]

where:
- \(\sigma_{\max}\) is the maximum stress, \(K_I\) is the fracture toughness, and \(r\) is the crack radius.

The factor of safety is determined as:

\[ F_S = \frac{\sigma_{\text{allowable}}}{\sigma_{\text{max}}} \]

where \(\sigma_{\text{allowable}}\) is the allowable stress.

6. Rate of crack propagation in a polycrystalline solid is affected by several factors such as:
- Temperature
- Microstructure
- Oxide layer
- Grain size

7. The fracture behavior of a material is characterized by:
- Toughness
- Ductility
- Hardness

8. A Hooke's law describes the relationship between stress and strain. The stressstrain curve is typically linear and reversible. The tensile strength is the maximum stress at which the material can bear. If the material fails, it is due to:
- Brittle fracture
- Plastic deformation
- Fatigue failure

9. The rock mechanics of soil include:
- Undrained shear strength
- Effective stress
- Unconfined compressive strength

10. The average natural soil properties measured by the cone penetrometer test is given by:
- Cone resistance
- Penetration rate

11. The number of cycles to failure for a material is given by:
- Fatigue limit
- Equivalent stress range

12. The analysis of stress and strain in a beam under end loads can be carried out using the following equations:
- Maximum stress
- Maximum strain

13. The mechanical properties of a material are determined through:
- Tensile testing
- Compression testing
- Shear testing

14. The effect of temperature on the mechanical properties of a material can be studied through:
- Isothermal testing
- Thermal cycling

15. The failure of a structural component can be prevented by:
- Reinforcement
- Stress relief
- Material selection