Final exam questions

Subject group name: **Continuum Mechanics**

Neptun code: ZVEGEMMNWCM

Credit points: 5

Subject in this subject group:

Continuum Mechanics (BMEGEMMNWCM)

Program: Mechanical Engineering Modelling, MSc (2N-MW0)

Specialization: Solid Mechanics

Responsible person: Dr. Attila Kossa, kossa@mm.bme.hu
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You can check the current subject forms at the Educational Portal of the Faculty of Mechanical Engineering.

https://oktatas.gpk.bme.hu/

Always check the for updates at edu.gpk.bme.hu before preparing for the exam, especially if the subject group contains at least one subject from your final semester!

Valid from 01 September 2021

Dr. Attila Kossa
associate professor

Continuum Mechanics (BMEGEMMNWCM)

1. Descriptions of motion. The referential (Lagrangian) and spatial (Eulerian) descriptions. Deformation gradient.

2. Stretch ratio. Deformation and strain tensors.

3. Area, volume, and angle changes.

4. Polar decomposition of deformation gradient.

5. Principal stretches and principal directions, spectral representation of the stretch tensors.

6. Displacement vector. Displacement gradient. Geometrical linearization.

7. Velocity and acceleration fields. Material time derivative.

8. Velocity gradient tensor. Rate of deformation and spin (vorticity) tensors.

9. Material time derivatives of the line, area, and volume elements.

10. Material derivatives of deformation and strain tensors.

11. Force, traction stress. Cauchy, first and second Piola-Kirchhoff stresses.

12. Objectivity. Objective stress rates.

13. Conservation of mass. Continuity equation. Reynolds' transport theorem.

14. Balance of linear and angular momentum. Cauchy's equations of motion.

15. Balance of mechanical energy.