



Final exam questions

Subject group name: **Manufacturing Processes**

Neptun code: ZVEGEGTAG94

Credit points: 4

Subject(s) in this subject group:

- **Manufacturing Processes (BMEGEGTAG94)**

Program: Mechanical Engineering, BSc (2NAAG0)

Specialization(s): Engineering Design and Technology

Responsible person(s):

- Dr. Márton TAKÁCS
takacs.marton@gpk.bme.hu
Department of Manufacturing Science and Engineering
Faculty of Mechanical Engineering

You can check the current subject forms at the Educational Portal of the Faculty of Mechanical Engineering.

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

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Valid from 31 January 2024

Márton Takács, PhD

Associate professor

Questions

1. Cutting tool geometry

- Show and name the geometrical features of a standard turning tool.
- What do we mean by the reference plane, working plane, orthogonal plane and passive plane of a standard turning cutter?
- What do we mean by the flank angle, rake angle, immersion angles and inclination angle of a standard turning tool? What do we mean by kinematical angles?
- Explain the means of chip formation and chip breaking. How do the cutting tool geometry and the cutting parameters (cutting speed, feed, depth of cut) affect the chip formation and chip breaking?

2. Cutting tool materials

- Name the cutting tool materials. Put them in sequence by the means of stiffness, and hardness. What do we mean by the contrast of stiffness and hardness, and how can we resolve this problem?
- Which are the tool wear mechanisms and in which circumstances do they occur typically?
- What are the typical tool wear forms? How are they affected by the cutting parameters (cutting speed, feed, depth of cut)? Simple sketches are required, too.
- Show and explain the tool wear diagram.

3. Turning processes

- Explain the different types and setups of the milling processes: longitudinal turning, face turning. Simple sketches about the tool, the process setup and movements are required, too.
- What do the turning's cutting parameters mean: cutting speed, feed, feed rate, depth of cut. How do the cutting parameters affect the surface roughness?
- What are the force components during longitudinal turning? Name the forces and explain their effects on the process with regard to the machined part's shape errors and the power consumption.
- How can we estimate the turning's required power and torque?

4. Milling processes

- Explain the different types and setups of the milling processes: face milling, slab milling. Simple sketches about the tool, the process setup and movements are required, too.
- Compare the setup of down-milling and up-milling (kinematics, chip geometry, characteristics of cutting force, surface roughness, recommended appliance, typical tool wear). Simple sketches about the tool, the process setup and movements are required, too.
- What do the milling's cutting parameters mean: cutting speed, feed per teeth, feed, feed rate, depth of cut, width of cut, contact angle, contact number.

5. Hole making processes

- Explain the variants of hole making processes: central drilling, drilling out, deep hole drilling, boring, countersinking, reaming, tapping, micro drilling. Simple sketches about the tool, the process setup and movements are required, too.
- Explain the geometry of the twist drill. What kind of purposes or effects of the different objects and areas of a twist drill have? Simple sketch is required, too.

6. Thread making processes

- What do we mean by bound and unbound kinematics at thread manufacturing processes? Name examples, too.
- Name and describe the thread manufacturing processes for internal threads. Simple sketches about the tool, the process setup and movements are required, too.
- Name and describe the thread manufacturing processes for external threads. Simple sketches about the tool, the process setup and movements are required, too.

7. Abrasive processes

- What are the structural components of the abrasive tool in general? Simple sketch is required, too.
- Explain the different types and setups of the grinding processes: face grinding, slab grinding, flat grinding, cylindrical grinding (+ sub-variants). Simple sketches about the tool, the process setup and movements are required, too.
- What do we mean by machining with bound and unbound grains?
- Explain the following processes: lapping, honing and superfinishing. Simple sketches about the tool, the process setup and movements are required, too.