

BSc questions for final graduate

1. **A.** What is the smallest unit of the material that has the properties of the material?
B. What are plastics? What are the main constituents?
2. **A.** List the fundamental loading conditions! Draw the tensile diagram of a mild steel!
B. Draw and characterize the structure of amorphous and semi-crystalline thermoplastics and compare to the structure of a thermoset polymers.
3. **A.** What kind of elementary (unit) cells do you know (list and draw)? What is the crystallite?
B. Write the interpretation of tolerance! What tolerances do you know? Describe the gauges and dial indicators (drawings, types, applications)!
4. **A.** Make known with the help of a sketch the main elements of the lathe machine and the characteristic movements! List the main lathe work methods (with schematic drawing)!
B. Draw the material pyramid with minimum 6 different polymers. Characterize each segment of the pyramid.
5. **A.** Define the Stress! How do you calculate the parameters (R_m , R_{eH} , R_{eL} , R_u , A , Z)?
B. Draw the car engine as a closed tribological system (external and internal influences, elements). Define the six tribo-testing categories and compare them. Introduce the most common small-scale laboratory configurations.
6. **A.** What does the Young's modulus mean, how do you calculate this?
B. Give general introduction about POM family.
7. **A.** How do you calculate the engineering yield stress? ($R_{p0.2}$)
B. Life cycle of bio-polymers, classification of the degradation processes.
8. **A.** What is the hardness! Define the hardness! What kind of hardness test do you know? Describe the Brinell hardness test! (Definition, Sign, Formula)
B. Write the determination of measurement and describe the calipers and micrometres (drawings, types, applications)! How can you read these, write the process shortly!
9. **A.** Make known the idea of cutting (definition and drawing), draw the WJMT-system (drawing and make known its elements)! Illustrate with the help of a sketch the edge angles of the single-point tool!
B. Lubrication: compare the hydrodynamic lubrication, the mixed and boundary lubrication. Lubricating materials. What is dynamic and kinematic viscosity?
10. **A.** Give a general introduction about PA material family.

B. List, what kind of drilling operations do you know? Compare the plain- and face milling operations (machined surface, tools)! Illustrate with the help of sketch the main parts of the plain/face milling machine and its movements!

11. **A.** List the main six categories of the tribology tests (from field test to labour test), write the advantages and disadvantages of these categories! List the main steps of a typical tribo test (from the preparation of the specimen to the presentation of the results)!

B. Give general introduction about PEEK family.

12. **A.** List the main tendencies of the modern manufacturing! Draw the schematic view of a lathe machining centres with 3-4-5 axis! Illustrate with the help of a sketch the learned industrial robot types (6 types), show the axis and joints and their work zone!

B. What is the hardness! Define the hardness! What kind of hardness test do you know? Describe the Rockwell hardness method! (Definition, Sign, Formula, Draw)

13. **A.** What is friction? What are the main components? Characterize the friction's components. Describe the adhesive,- abrasive and fretting wear mechanism.

B. Production of polymers: what are polymerisation, polyaddition?

14. **A.** What is the hardness! Define the hardness! What kind of hardness test do you know? Describe the Vickers hardness method! (Definition, Sign, Formula)

B. Give general introduction about UHMW-PE family.

15. **A.** Illustrate the types of flexibilities of FMS and draw the schematic view of a Line type a Loop a Ladder an open field and a robot centred type of FMS (schematic view, shortly the properties)?

B. Describe the adhesive-, fatigue and tribo-chemical wear mechanism.