



Final exam questions

Subject group name: **Composites Technology**

Neptun code: ZVEGEPTAGE1

Credit points: 4

Subject(s) in this subject group:

- **Composites Technology** (BMEGEPTBGE1)

Program: Mechanical Engineering, BSc (2NAAG0)

Specialization(s): Engineering Design and Technology

Responsible person(s):

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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 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 31 January 2024

Gergely Czél, PhD

Associate professor

Questions

1. Why fibres are preferred to reinforce composites? (Build your answer around specific area, volume effect, formability!) Give an example of a quasi-isotropic lay-up sequence!
2. Give the definition of composites! Present the properties and applications of epoxy matrix material!
3. Summarise the role of matrix in composites! Present the properties and applications of glass fibres!
4. Present the wet lay-up process (schematic, typical materials, products, cost elements, cycle time etc.)! Summarise the properties and applications of carbon fibres!
5. Present the spray-up process (schematic, typical materials, products, cost elements, cycle time etc.)! Summarise the properties and applications of unsaturated polyester matrix material!
6. Present the resin transfer moulding technology (schematic, typical materials, products, cost elements, cycle time etc.)! Give an example of a balanced lay-up sequence!
7. Present the vacuum infusion technology (schematic, typical materials, products, cost elements, cycle time etc.)! What is a transversely isotropic material?
8. Present the pultrusion technology (schematic, typical materials, products, cost elements, cycle time etc.)! Give an example of a symmetric lay-up sequence.
9. Present the filament winding technology (schematic, typical materials, products, cost elements, cycle time, control of fibre orientation etc.)! Give an example of an angle-ply lay-up sequence.
10. Present the centrifugal casting technology (schematic, typical materials, products, cost elements, cycle time etc.)! Give an example of a cross-ply lay-up sequence.
11. Present the compression moulding process (schematic, typical materials, products, cost elements, cycle time etc.)! What is an orthotropic material?
12. Present the rule of mixtures for the longitudinal elastic modulus of a unidirectional composite material!
13. Present the prepreg processing and curing in autoclave (schematic, typical materials, products, cost elements, cycle time etc.)! Summarise the 10% rule for the design of composite lay-up sequences!
14. Make a schematic showing the microscopic damage modes in composites (at the fibre-matrix level)! Present the three different load introduction approaches to compression testing of unidirectional composite materials!