Final exam questions

Subject group name: **Fluid Mechanics elective – Multiphase and Reactive Flow Modelling**

Neptun code: ZVEGEÁTNW27

Credit points: 3

Subject in this subject group:

- **Multiphase and Reactive Flow Modelling** (BMEGEÁTNW27)

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

Specialization: Fluid Mechanics

Responsible person:

- Dr. Balázs Havasi-Tóth, havasi-toth.balazs@gpk.bme.hu
  Department of Fluid Mechanics, Faculty of Mechanical Engineering

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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 27 February 2023

Dr. Balázs Havasi-Tóth

assistant professor

Reactive flows

1. Explain the advection-diffusion equation - its origin, significance and practical area of applicability.
2. Explain the role of reaction rates in the reactive source terms of the transport equations.

Multiphase flows

3. List typical flow patterns in two-phase gas-liquid flows; what relevant control parameters do determine the flow pattern?
4. What are the most pertinent empirical or model quantities of two (or more) phase flow?
5. What kind of experimental methods are available to measure them?
6. What are jump conditions, how do they occur in the mathematical description of fluids?
7. Classify the approaches of Computational Multi-Fluid Modelling.

Computational interphase models

8. Compare the Marker-And-Cell and the Volume-Of-Fluid methods; discuss the capabilities, limitations and challenges of the latter.
9. Compare the Volume-Of-Fluid and the Level-Set methods; discuss the possible advantages and disadvantages of the choice between them.
10. Conceptually compare Front Tracking to Smooth Particle Hydrodynamics; for what particular problems is the latter method found preferable?

Interpenetrating media models

11. Compare the concepts and challenges of Multi-Fluid and Mixture modelling; explain the problem of closure in terms of necessary and available information.