

TOPICS for the STATE EXAM from the course titled „Vehicle Properties and Conceptual Design”

15 January 2020

General philosophy of questions:

1. The Examiner aims to check,
 - a. whether the student has a good engineering thinking in the given topic
 - b. whether he/she can have a good discussion about the given topic in a dialogue format
 - c. whether he has clues about the key figures (for example: typical values for drag, typical hot-spot temperatures, etc.) in the area of vehicle development
2. The student draws a certain topic from the list below, in which area 3-5 questions will be asked by the Examiner
3. The Examiner's questions will be provided in „layers”, with:
 - a. top layer (first question): easiest, foundation-knowledge based question
 - b. bottom layer (last question): hardest, detailed understanding based question
4. Preparation for the questions:
 - a. The top level question will be given to the student in writing and the student will be asked to work it out in the preparation time.
 - b. The deeper level questions *might be* listed in writing, or *can be* asked by the Examiner on the spot, i.e. as a response to the top level question's answer from the student.
5. The student will be evaluated on the basis on how deep he/she could go in the layers with successfully answering the questions.
 - a. Answering all layers successfully: outstanding result
 - b. Answering only the top layer question correctly (and not being able to answer any other questions): minimum expectation to get a passing grade
 - c. Not being able to answer even the top layer question: fail

Topics of top layer questions:

Note: a combination of related topics can also be given by the Examiner

- General:
 - Roles of Conceptual Design within Technical Development
 - Vehicle Development process vs Conceptual Design process
 - Megatrends driving the design of modern vehicles
 - V-diagram
 - Vehicle properties
 - Basics of Systems Engineering
 - Autonomous vehicles
 - Advantages and disadvantages of alternative drivetrains
 - Challenges of electric vehicles
 - Ergonomy and cockpit design philosophy
 - Novel manufacturing technologies
 - Novel materials
 - Future technologies (fully autonomous cars, adaptive structures, last mile solutions, 3rd dimension, etc.)