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.)