# Topics for Final Examination in Flow Measurements (BMEGEÁTMW03)

Last update: 02 January 2012 – Dr. János VAD, course responsible

1/ Carry out a brief comparison in various velocity metering devices, such as Pitot-static probe; hot-wire anemometer (CTA); LDA, PIV, stereo PIV, from the perspective of their fundamental features (number of velocity components; point-like or tomographic measurements; invasive / non-invasive technique). Specify one applicational example for each technique, and give a reason.

2/ Give an example, with explanation, for the following statement: A flow measurement technique (instrumentation) is „of high standard" only IF the entire experimental procedure and the evaluation of results are also of high standard.

3/ Give an example, with explanation, for the following statement: Paradox: „we need to know the answer before we begin the measurement."

4/ Give an example, with explanation, for full exploitation of a sophisticated measuring technique. Demonstrate how the use of the same technique becomes senseless in absence of full exploitation of the opportunities delivered by it.

5/ Static pressure probe, Ser disk, coin probe: operational principle with a sketch; one applicational example for each, with justification.

6/ Pitot probe, Kiel probe, Pitot-static probe: operational principle with a sketch; one applicational example for each, with justification.

7/ Venturi probe, S-probe, peak probe: operational principle with a sketch; one applicational example for each, with justification.

8/ Cylinder probe, finger probe, five hole probe: operational principle with a sketch; one applicational example for each, with justification.

9/ Diaphragm manometers: electric capacitor principle with a sketch; three applicational examples.

10/ Propeller velocimeter (e.g. "Mini-air"), rotating vane anemometer: operational principle with a sketch; one applicational example for each, with justification.

11/ Thermal anemometer, resistance thermometer: operational principle with a sketch; one applicational example for each, with justification.

12/ Measurement of unsteady pressure: three principles (capacitor, pieso-inductive, pieso-resistive) with sketches; one applicational example for each, with justification.

13/ Comparison between flow rate measurements i) deduced from velocity measurements and ii) using contraction elements, illustrated by examples (invasiveness, capability for following unsteadiness, expenses, demands and regulations, accuracy).

14/ Flowmeters: ultrasonic flowmeter (e.g. transit time principle); magneto-inductive (MHD) flowmeter. Operational principle with a sketch; advantages and limits; one applicational example for each, with justification.

15/ Flowmeters: capacitive cross-correlation technique; vortex shedding flowmeter. Operational principle with a sketch; advantages and limits; one applicational example for each.

16/ Flowmeters: Coriolis flowmeter; variable area flowmeter (rotameter). Operational principle with a sketch; advantages and limits; one applicational example for each.

17/ Flowmeters: turbine flowmeter; volumetric (e.g. oval wheel) flowmeters. Operational principle with a sketch; advantages and limits; one applicational example for each.

18/ Laser Doppler anemometry. Operational principle with a sketch (e.g. single component, backscattering); advantages and limits; one applicational example.

19/ Hot wire anemometry (e.g. CTA). Operational principle with a sketch; advantages and limits; one applicational example.

20/ Particle Image Velocimetry. Operational principle with a sketch; advantages and limits; one applicational example.