1. The curvature variometer of Roland Eötvös consisted of two small bodies of identical mass, affixed at the ends of a light horizontal rod suspended by its middle onto a thin torsion fibre.

Eötvös measured the period of the rotary oscillations of the curvature variometer (for small oscillations) by the foot of Hill Gellért in two different arrangements: in the first one, the horizontal rod, oscillating on a horizontal plane, pointed towards the centre of the hill in its equilibrium position, whereas in the second one it oscillated around a position perpendicular to the previous one. In the first case, he found the period of the rod to be 564.6 seconds, while in the second one it was 572.2 seconds.

Assume that the gravitational effect of Hill Gellért is equivalent to the attraction of a point-like body of identical mass, at a distance of 300 metres from the apparatus horizontally. Now, using the above measurement data of Eötvös, estimate the angle by which Hill Gellért modifies the direction of a plumb line at the position of the measurement.

2. There are 1 and 2 cubic centimetres of perfume in two straight, vertically test tubes of identical cross-section, 20 cm and 40 cm long, respectively, and open at the top. Approximately how many times longer does it take the perfume to completely evaporate from the second test tube than from the first?

Is the answer modified if the tops of the test tubes are closed, only leaving a small (identical) hole on each cover?

3. The cross-section of a solenoid (long, straight coil) is a square of side d, while its length is L ($L \gg d$). Deep inside the solenoid, a homogeneous magnetic field of induction B is built up, due to the direct current flowing in the coil. The coil is in a vertical position (see the figure on page 178). Right above the top end of the coil, a conducting frame of the form of a horizontal square with sides d is suspended on vertical threads of length l ($l \gg d$).

The mass of the frame is m, its electrical resistance is R. The solenoid is suddenly pulled to the right horizontally. In what direction does the frame, suspended as a pendulum, swing out and how high does it rise?