**太原工业学院第四届大学生物理学术竞赛竞赛题目**

**（中、英对照）**

**1. Invent Yourself**

Design an instrument for measuring current using its heating effect. What are the accuracy, precision and limits of the method?

自己发明

设计一种利用热效应测量电流的仪器。该方法的准确度、精密度和局限性是什么？

**2. Inconspicuous Bottle**

Put a lit candle behind a bottle. If you blow on the bottle from the opposite side, the candle may go out, as if the bottle was not there at all. Explain the phenomenon.

不起眼的瓶子

将点燃的蜡烛放在瓶子后面。如果你从蜡烛的对面吹瓶子，蜡烛同样可能熄灭，好像瓶子根本不在那里。解释这个现象。

**3. Swinging Sound Tube**

A Sound Tube is a toy, consisting of a corrugated plastic tube, that you can spin around to produce sounds. Study the characteristics of the sounds produced by such toys, and how they are affected by the relevant parameters.

摇摆的声管

声管是一种玩具，由波纹塑料管组成，你可以旋转声管产生声音。研究这些玩具发出的声音的特性，以及它们如何受到相关参数的影响。

**4. Singing Ferrite**

Insert a ferrite rod into a coil fed from a signal generator. At some frequencies the rod begins to produce a sound. Investigate the phenomenon.

“歌神”铁氧体

将铁氧体棒插入信号发生器供电的线圈中。在某些频率下，铁氧体棒开始发出声音。研究这一现象。

**5. Sweet Mirage**

Fata Morgana is the name given to a particular form of mirage. A similar effect can be produced by shining a laser through a fluid with a refractive index gradient. Investigate the phenomenon.

甜蜜的海市蜃楼

法塔莫干纳是一种特殊形式的海市蜃楼的名字。而使用激光照射具有折射率梯度的流体时，也会产生类似的效果。研究这一现象。

**6. Saxon Bowl**

A bowl with a hole in its base will sink when placed in water. The Saxons used this device for timing purposes. Investigate the parameters that determine the time of sinking.

撒克逊碗

一个底部有洞的碗放在水中会下沉。撒克逊人用这个装置来计时。研究决定下沉时间的参数。

**7. Balls on a String**

Put a string through a ball with a hole in it such that the ball can move freely along the string. Attach another ball to one end of the string. When you move the free end periodically, you can observe complex movements of the two balls. Investigate the phenomenon.

绳子上的球

将绳子穿过一个带有洞的球，这样球就可以沿着绳子自由移动。把另一个球系在绳子的一端。当你周期性地移动绳子的自由端时，你可以观察到两个球的复杂运动。研究这一现象。

**8. Soap Membrane Filter**

A heavy particle may fall through a horizontal soap film without rupturing it. However, a light particle may not penetrate the film and may remain on its surface. Investigate the properties of such a membrane filter.

肥皂膜过滤器

一个重颗粒可以通过一个水平的肥皂膜而不会使其破裂。然而，轻粒子可能无法穿透膜并可能停留在其表面上。研究这种膜过滤器的性能。

**9. Magnetic Levitation**

Under certain circumstances, the “flea” of a magnetic stirrer can rise up and levitate stably in a viscous fluid during stirring. Investigate the origins of the dynamic stabilization of the “flea” and how it depends on the relevant parameters.

磁悬浮

在某些特定情况下，磁力搅拌器的“搅拌子”在搅拌时，能在粘性流体中稳定地上升和悬浮。研究“搅拌子”动态稳定的起源，以及它如何依赖相关参数。

**10. Conducting Lines**

A line drawn with a pencil on paper can be electrically conducting. Investigate the characteristics of the conducting line.

画出来的导线

用铅笔在纸上画的线可以导电。研究这种导线特性。