

第六届西南地区大学生物理学术竞赛暨第十三届 中国大学生物理学术竞赛西南地区预选赛第一轮通知

西南地区各高校：

中国大学生物理学术竞赛（CUPT）是中国借鉴国际青年物理学家锦标赛（IYPT）的模式创办的国内全国性赛事。该项活动得到了教育部的支持，是实践国家教育中长期发展规划纲要的重要大学生创新竞赛活动之一。CUPT 已经在全国连续举办了 12 届，以其独特的竞赛模式和理念吸引了越来越多的知名高校和物理精英参与，并已成为国内具有重要影响力的大学生物理竞技赛事之一。

基于 CUPT 活动对大学生的创新意识、创新能力、协作精神和实践能力方面具有独特的作用。为了提升西南地区大学生的物理科研素养和创新意识，加强各高校大学生及教师之间的学术交流，落实学校培养高素质本科生和创新人才培养注入新动力，由教育部高等学校物理学类专业教学指导委员会西南地区分委会、西南地区各高校一起倡导，在西南地区举办“西南地区大学生物理学术竞赛”（SWUPT）。

本届 SWUPT 由教育部高等学校物理学类专业教学指导委员会西南地区分委会主办，云南省物理学会、云南师范大学物理与电子信息学院承办，欢迎高校师生前来参加比赛或观摩交流。现将有关事项通知如下：

一、赛事要求

1. 每所参赛学校可派 1-2 支代表队和 1-2 名领队，每支代表队由 5 名学生选手组成，领队可由教师或学生担任。
2. 每所观摩学校必须有领队带队，观摩人数最多 8 人，观摩人员可以是老师或学生。
3. 受比赛规则限制，报名参赛代表队必须参加比赛，不得临时退出。
4. SWUPT 竞赛规则参照 IYPT 比赛规则，竞赛工作语言为中文。

5. 第六届 SWUPT 试题采用第 35 届 IYPT 问题中的 12 道题(题号为: 1、2、3、4、6、7、8、11、12、14、15、17) (详见附录 1)。

6. 各参赛和观摩高校推荐裁判要求:

参赛高校: 若派 1 支参赛代表队, 请至少推荐 2 名裁判; 若派 2 支参赛代表队, 请至少推荐 3 名裁判。观摩高校: 请推荐 1 名裁判。

(请裁判务必提前熟悉比赛题目和相关研究内容)

二、赛事安排

1. 竞赛时间: 2022 年 5 月底到 6 月初, 具体时间详见第二轮通知。

2. 竞赛地点: 云南师范大学呈贡校区。

3. 报名方式与时间: 请拟参赛高校将报名回执(附件 1 及附件 2)(如人员未定, 可只发领队信息), 于 2022 年 2 月 18 日前发至信息员邮箱: 369580408@qq.com。

4. 欢迎加入 SWUPT QQ 群, 群号: 893232247。

5. 会议期间食宿统一安排, 交通食宿费用自理。

三、联系方式

1. 通讯地址: 云南省昆明市呈贡区雨花片区 1 号, 云南师范大学物理与电子信息学院, 邮编: 650500。

2. 联系人: 欧全宏, 手机: 15908891183 邮箱: ouquanhong@163.com

刘文广, 手机: 15987101479 邮箱: tianti_liu@foxmail.com

有关第六届 SWUPT 筹备情况及相关信息, 我们将在 QQ 群里及时公布, 欢迎各位老师和学生在 QQ 群里提出建议和指导。

教育部高等学校物理学类专业教学指导委员会西南地区分委会

云南省物理学会

云南师范大学物理与电子信息学院 (代章)

2022 年 01 月 03 日

物理与电子信息学院

附录 1

Problems for the 35th IYPT 2022

1. Invent Yourself

Create a non-invasive device that determines the direction of fluid flow inside an opaque pipe. Optimise your device so that you can measure the smallest flow possible.

2. Rayleigh Disk

A disk suspended vertically by a thin thread is placed in an acoustic field. This device can be used to measure the intensity of sound by turning about the axis of the thread. Investigate the accuracy of such a device.

3. Ring on the Rod

A washer on a vertical steel rod may start spinning instead of simply sliding down. Study the motion of the washer and investigate what determines the terminal velocity.

4. Unsinkable Disk

A metal disk with a hole at its centre sinks in a container filled with water. When a vertical water jet hits the centre of the disc, it may float on the water surface. Explain this phenomenon and investigate the relevant parameters.

5. Bimetallic Oscillator

A simple electric oscillator can be made using a bimetallic contact-breaker. Investigate the relevant parameters that affect the frequency of such an oscillator.

6. Tennis Ball Tower

Build a tower by stacking tennis balls using three balls per layer and a single ball on top. Investigate the structural limits and the stability of such a tower. How does the situation change when more than three balls per each layer and a suitable number of balls on the top layer are used?.

7. Three-Sided Dice

To land a coin on its side is often associated with the idea of a rare occurrence. What should be the physical and geometrical characteristics of a cylindrical dice so that it has the same probability to land on its side and one of its faces?

8. Equipotential Line

Place two electrodes into water, supply a safe voltage and use a voltmeter to determine electric potential at various locations. Investigate how the measured equipotential lines deviate from your expectations for different conditions and liquids.

9. Water Spiral

If a stream of liquid is launched through a small hole, then under certain conditions it twists into a spiral. Explain this phenomenon and investigate the conditions under which the spiral will twist.

10. Droplet Explosion

When a drop of a water mixture (e.g. water-alcohol) is deposited on the surface of a hydrophobic liquid (e.g. vegetable oil), the resulting drop may sometimes fragment into smaller droplets. Investigate the parameters that affect the fragmentation and the size of the final droplets.

11. Balls on an Elastic Band

Connect two metal balls with an elastic band, then twist the elastic band and put the balls on a table. The balls will begin to spin in one direction, then in the other. Explain this phenomenon and investigate how the behaviour of such a "pendulum" depends on the relevant parameters.

12. Strange Motion

Sprinkle small floating particles on the surface of water in a bowl. Bring a strong magnet above and near to the water surface. Explain any observed motion of the particles.

13. Candle Powered Turbine

A paper spiral suspended above a candle starts to rotate. Optimise the setup for maximum torque.

14. Ball on Membrane

When dropping a metal ball on a rubber membrane stretched over a plastic cup, a sound can be heard. Explain the origin of this sound and explore how its characteristics depend on relevant parameters.

15. Boycott Effect

If particles are suspended in a liquid that has a lower density than the particles, the particles will settle to the bottom of the container. The rate of settling can be affected by tilting the container that holds the liquid. Explain this phenomenon and investigate the effect of relevant parameters.

16. Saving Honey

When rotating a rod coated with a viscous liquid (e.g. honey), under certain conditions the liquid will stop draining. Investigate this phenomenon.

17. Invisibility

Lenticular lenses can be used to distort light and make objects disappear. Investigate how changing the properties of the lens and the geometry of the object affect the extent to which the object can be detected.



群名称:第六届SWUPT群
群号:893232247