

**2004 香港物理奧林匹克**  
**Hong Kong Physics Olympiad 2004**  
**比賽詳情及規則 Details and Regulations**

1. **Date 舉行日期** : 30 May 2004 (Sunday)      二零零四年五月三十日 (星期日)
2. **Time 時間** : 9:00 a.m. – 1:00 p.m.      上午九時至下午一時
3. **Venue 地點** : Indoor Sports Complex, Hong Kong University of Science and Technology  
香港科技大學何善衡體育館
4. **Schedule 程序** : 9:00 a.m. – 9:30 a.m.      Registration 報到  
9:30 a.m.      Be Seated 進場就坐  
9:40 a.m.      Event Starts 比賽開始  
12:40 p.m.      Event Ends 比賽結束

5. **Notes to Nomination 提名須知** :

- 5.1. Each secondary school may nominate **FOUR S4 – S6 students as official nominees** to participate in the competition. Each school may also nominate **at most TEN S4 – S5 students as supernumerary nominees**. To provide more opportunities for the S4 and S5 students to participate in the event, each school **should NOT nominate more than TWO S6 students** in the nomination list. Unless notified otherwise, official nominees are accepted in principle while supernumerary nominees would be informed of the result of nomination by early May, after due arrangement. Further information will be released through the website <http://gifted.hkedcity.net>. Students concerned should take the initiative to refer to the website regularly.

每所中學可提名**四名中四至中六正選學生**參賽。學校亦可因應學生的表現**額外提名不多於十名中四至中五的候選學生**。爲了提高中四和中五學生的參與機會，每所學校的提名學生名單中，**中六學生不得多於兩名**。除另函通知外，獲學校提名的正選學生原則上已被接納參加比賽，唯額外提名的學生則有待安排後於五月初公布其參賽資格。進一步的資料，將在網頁 <http://gifted.hkedcity.net> 發放，學生須主動瀏覽該網頁。

- 5.2. School participated in the event is also requested to nominate a **teacher-in-charge** to coordinate the event. The teacher-in-charge may be invited to participate in the follow-on professional development programmes.

參賽學校須委派一名**負責教師協助統籌學生**參賽。負責教師將有機會獲邀參加相關的培訓活動。

6. **Mode of Competition 比賽形式** :

- 6.1. The competition comprises a three-hour written test.  
以筆試形式進行，限時三小時。
- 6.2. There will be multiple-choice and open-ended questions in bilingual versions. Contestants must answer all questions. They can answer in either Chinese or English.  
試題分爲選擇題及開放式問答題，題目中英對照，參賽學生可選擇以中文或英文作答，但必須解答全卷所有題目。
- 6.3. Contestants should present the solutions clearly when solving open-ended questions.  
作答開放式問答題時，參賽學生須清楚交代解題步驟。
- 6.4. The multiple-choice questions aim at assessing the contestants' basic knowledge in physics. As such, only those who rank high in the top 30% in the multiple-choice

section are eligible for consideration of prize award.

選擇題旨在評估參賽學生的物理學基礎知識。於選擇題部分取得分數最高的30%參賽學生才可角逐獎項。

- 6.5. For details of last year's questions and solutions, please visit the website <http://gifted.hkedcity.net> or <http://hkpho.phys.ust.hk/>.

有關去年的比賽試題和題解，請瀏覽網頁 <http://gifted.hkedcity.net> 或 <http://hkpho.phys.ust.hk/>。

## 7. Notes to Competition 比賽須知：

- 7.1. Questions set will mainly base on HKCEE syllabus, but will also cover other topics. For details, please visit the website <http://gifted.hkedcity.net> or <http://hkpho.phys.ust.hk/>.

題目主要以中學會考物理課程為基礎，亦會涉及其他範疇。詳情請瀏覽網頁 <http://gifted.hkedcity.net> 或 <http://hkpho.phys.ust.hk/>。

- 7.2. Calculators that are permitted in HKCEE can be used for the event. Measuring instruments like rulers, compasses, etc. can also be used.

比賽時，學生可使用香港考試及評核局所認可型號的計算器。直尺、圓規及其它量度工具亦可作輔助之用。

- 7.3. NO equations/formulae will be provided.

試卷並不提供任何方程式或公式。

- 7.4. Contestants must report to the designated venue in school uniform punctually at 9:00 a.m. Those who failed to comply may risk disqualification.

參賽學生須準時于比賽當日上午 9 時正到達比賽場地報到，並必須穿著整齊校服，否則其參賽資格會被取消。

- 7.5. Any changes in the regulations will be announced on the day of the event.

賽例如有更改，將於比賽當天公佈。

- 7.6. Queries should reach the officer-in-charge immediately after the event. The decision of the Organizing Committee will be final.

如有疑問，參賽學生須于比賽完畢後，立即向會場主任提出。籌辦委員會具有最終的裁決權。

8. There will be First, Second and Third Honours together with Honorable Mention. Certificate of Participation would be issued to all other contestants in recognition of their achievement.

本賽事設有個人一等獎、二等獎、三等獎及優異獎。其他參賽學生亦會獲頒參加證書以示嘉許。

9. Results and details of the Prize Giving Ceremony will be released through the website <http://gifted.hkedcity.net>. Students are advised to refer to the website regularly.

比賽結果及頒獎安排將在網頁 <http://gifted.hkedcity.net> 發放。學生應經常瀏覽網頁。

10. High-achieving contestants enrolled for the follow-on enhancement training programmes will be informed of the arrangement at a later date.

獲接納參加賽後的增益培訓活動的優異參賽學生將獲另函通知有關的安排。

11. For enquiries, please contact Ms PW Cheng of the *Support Measures for the Exceptionally Gifted Students Scheme*, Gifted Education Section, EMB at 2490 6142.

如有查詢，請致電 2490 6142 與教育統籌局資優教育組《特別資優學生培育支援計劃》鄭邦媛女士聯絡。

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**比賽範圍Scope of the Competition**

The scope of the Hong Kong Physics Olympiad is mainly based on the HKCEE Physics Syllabus, but also includes the following topics:

香港物理奧林匹克的比賽範圍主要以中學會考物理課程為基礎，亦會涉及以下範疇：

**Mechanics 力學**

1. Application of Newton's second law of motion in two dimensions, projectile motion 牛頓運動第二定律在二維空間的應用、拋體運動
2. Application of Newton's second law of motion with constant rate of change of mass 牛頓運動第二定律在質量有勻速變化情況的應用
3. Uniform circular motion 勻速圓周運動
4. Hooke's Law 虎克定律
5. Density, buoyancy, pressure (solid and liquid) 密度、浮力、壓力(固體和液體)
6. Centre of mass 質心
7. Coefficient of friction, static friction and limiting friction 摩擦系數、靜摩擦、極限摩擦
8. Conservation of momentum in 2-D 二維空間的動量守恆
9. Equilibrium of coplanar forces 共面力的平衡

**Mechanics of Rigid Bodies 剛體力學**

1. Torque 轉矩

**Oscillations and waves 振盪與波**

1. Interference in thin film (mathematical method on superposition is not required) 薄膜干涉 (不包括「疊加的數學處理方法」)
2. Huygen's principle 惠更斯原理

**Electric Charge and Electric Field 電荷與電場**

1. Electric field strength and potential gradient 電場強度和電勢梯度
2. Internal resistance of power supply and meters 電源和電錶的內電阻
3. Force experienced by a charged particle in a uniform electric field ( $F = qE$ ) 勻電場中帶電粒子所受的力

**Current and Magnetic Field 電流與電場**

1. Lorentz force experienced by a moving charged particle in a uniform magnetic field ( $F = qv \times B$ ) 移動中帶電粒子在勻磁場中所受的洛倫茲力
2. Electromagnetic induction, magnetic flux and Faraday's law of electromagnetic induction, magnetic field due to currents (e.g. solenoid, coil, straight line, etc). 電磁感應、磁通量與法拉第電磁感應定律、電流產生的磁

場(例：螺線管、線圈、直導線等)

2. Magnetic field due to long straight wire, circular loop and long solenoid 載電流在長直導線、圓形線圈和長螺線管所產生的磁場
3. Kirchhoff's laws for Double-loop circuits 基爾霍夫定律在雙繞環電路的應用

### **Optics 光學**

1. Lens formula 透鏡公式
2. Optics include planar and curved mirrors 光學包括平面和曲面的反射鏡
3. Phase change during reflection 反射時的相位變化