



22nd International Young Physicists' Tournament
第22届国际青年物理学家锦标赛



中国 南开大学

TIANJIN, CHINA, 21 - 28 JULY 2009

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Introduction to Nankai University

A key multidisciplinary and research-oriented university directly under the jurisdiction of the Ministry of Education, Nankai University, located in Tianjin on the border of the sea of Bohai, is also the alma mater of our beloved late Premier Zhou Enlai.

Nankai University was founded in 1919 by the famous patriotic educators, Mr. Zhang Boling and Mr. Yan Xiu. During the Anti-Japanese war (1937-1945), Nankai University, Peking University (Beijing University) and Tsinghua University (Qinghua University) united in Kunming to form the renowned Southwest Associated University. The University has produced batches of prominent talents such as late Premier Zhou Enlai, Dr. Shiing-shen Chern, Dr. Ta-you Wu and playwright Cao Yu. On December 25th, 2000 the State Ministry of Education signed an agreement with Tianjin Municipal Government on jointly establishing and developing Nankai University. Since then, Nankai University has been listed among universities for priority development in the 21st century.

Nankai University now occupies an area of 1,620,000 m² with a floor space up to 1,170,000 m². The total collection of the University library reaches 3,290,000 volumes. Besides its main campus located in Balitai, Nankai University also has campuses in Yingshui Road, TEDA College in Tianjin Economic Development Area, Financial Engineering College in the city of Shenzhen, Research Institute in Yunnan Province, and the first American Confucius College in the University of Maryland, all of which reasonably form a multi-campus pattern for comprehensive development.

Nankai University is considered to be one of comprehensive universities with the widest scan of disciplines. It features a balance between the Humanities and the Sciences, a solid foundation and a combination of application and creativity. The University has 22 academic colleges, together with Graduate School, China APEC Institute, School for Continuing Education, Advanced Vocational School, Modern Distance Education School and Binhai School (independently financed). Nankai University offers 71 undergraduate specialties, 206 Master's programs, 117 Doctoral programs, 17 Post-Doctoral research stations and 16 authorized primary Doctoral specialties. Equipped with top academic capability and creative spirit,

Nankai University has a well-balanced faculty team in age and specialties. Among the 1,696 faculties, there are 607 Doctoral supervisors, 650 professors and 664 associate professors, 8 academicians of Chinese Academy of Science and Chinese Academy of Engineering, 4 academicians of The 3rd World Academy of Science, 10 members of the Subject Assessment Division

Nankai University has a full-fledged education system for producing undergraduates, postgraduates on master's and doctoral programs and post-doctoral researchers. Currently, the University has the total enrollments of 21,905 students, including 12,499 undergraduate students, 6,357 master's candidates, 3,049 doctoral candidates, 1,048 foreign students, 6,754 part-time adult students and 8,095 students on distance education program.

Nankai University is the center for both education and academic research. A large number of academic achievements have been made and acknowledged home and abroad. The number of SCI theses ranked the top eighth among Chinese universities and in 2005 the number was up to 839. In 2005, three research fruits won the National Second Prize of natural science and one National Second Prize for science and technology progress. The "Star of Nankai" supercomputer cluster designed and made mutually by Nankai University and IBM of America has got through the testing by experts with a running speed of 3.231TFlops, the fastest speed by far in China. Nankai University actively takes the advantages of disciplines, technology, talents and information to enhance the industrialization and commercialization of research fruits serving the national and local economy and social development.

Nankai University focuses on the students' all-round capability and creativity in teaching and education. Under its educational philosophy of "art to regulate the country, science to strengthen the country and business to richen the country", the University leaders point out a teaching guideline of "paying attention to quality education, cultivating capability, consolidating knowledge foundation and widening disciplinary spheres, strictly administrating and ensuring high quality". It establishes a complete educational system by connecting class teaching, scientific experiments, academic activities and social practice. A flexible educational system has been set up, including the system of credits, system of "major plus minor" education and double degrees. The late Premier Zhou Enlai, Nankai's prominent alumni, has

been the model for all students to form a healthy disposition with high morality, spirit of creativity and the practical capability.

Nankai University has broad international communications by establishing exchanging and collaborative relationships with more than 100 international universities and academic institutions. Nobel Laureates Chen Ning Yang, Tsung-Dao Lee, Samuel Chao Chung Ting, Robert A. Mundell, and Reinhard Selton as well as former President of Korea Kim Dae Jung and former US Secretary of State Henry Kissinger were all conferred Honorary Professors of Nankai University. Many other world-known scholars and entrepreneurs have been invited as Visiting Professors of Nankai University.

**22nd International Young Physicists' Tournament
Tianjin, China, 21 - 28 July 2009**

IYPT2009 Local Organizing Committee

Position / Title	Name	Position / Title	Name
Executive chairperson	Jingjun Xu	Member	Wei Zhang
Executive chairperson	Naijia Guan	Member	Weigang Zhang
Secretary	Chuanyong Li	Member	Jian Gao
Secretary	Romano Rupp	Member	Naijian Mao
Member	Jianguo Tian	Member	Feng Ding
Member	Haiyan Gao	Member	Ruiling Dong
Member	Kexin Yang	Member	Xiaowen Zhu
Member	Ningning Zhang	Member	Qian Sun
Member	Wanguang Zhang	Member	Huitian Wang
Member	Yunlong Bai		

IYPT2009 Local Advisory Committee

Position / Title	Name
President of Nankai University	Zihe Rao
Vice president, Tianjin Association of Science Federation	Yi Jiang
Director, Department of High Education, Tianjin Education Commission	Weiguo Zhang
Vice dean of studies of Nankai University	Wenjun Bu

IYPT Executive Committee

Title	Name	Country
President	Mr. Allinson	Australia
Secretary General	Dr. Martin Plesch	Slovakia
Treasurer	Mr. John Balcombe	United Kingdom
Member	Mr. Rudolf Lehn	Germany
Member	Dr. Brigitte Pagana-Hammer	Austria
Member	Dr. Kreso Zadro	Croatia
Member	Dr. ChuanYong Li	China

IYPT2009 International Organizing Committee Members

Title	Name	Country
Mr	Philip O'Neill	Australia
Prof. Dr.	Martin Hopf	Austria
Mr.	Henadzi Koltun	Belarus
Mrs.	Silvina Simeonova	Bulgaria
Mr.	Qian Sun	China
Ms.	Lidia Saric	Croatia
Dr.	Zdenek Kluiber	Czech Republic
Mr.	Heikki Pokela	Finland
Mr.	Nicolas Chevalier	France
Mr.	George Laskhishvili	Georgia
Dr. PhD.	Zsuzsanna Rajkovits	Hungary
Prof.	Masno Ginting	Indonesia
Ms.	Dina Izadi	Iran
Mr.	Francisco Swaminathan	Kenya
Prof.	Myeong Hoi Kwon	Korea
Mr.	Paul Haines	New Zealand
Mr.	Kingsley Imadeking	Nigeria
Dr.	Andrzej Nadolny	Poland
Prof. Dr. Sci.	Valentin Lobyshev	Russia
Ms.	Theresa Thor	Singapore
Assoc. Prof.	Frantisek Kundracik	Slovakia
Mr.	Kim Freimann	Sweden
Mr.	Samuel Byland	Switzerland
Dr.	Burin Asavapibhop	Thailand
Mr.	John Balcombe	United Kingdom
Master	Oleg Matveichuk	Ukraine

IYPT2009 Independent Jurors

Title	Name	Country	Title	Name	Country
Prof. Dr.	Martin Hopf	Austria	Prof.	Jing Chen	China
Mr.	Henadzi Koltun	Belarus	Dr.	Xuwei Cao	China
Mrs.	Silvina Simeonova	Bulgaria	Dr.	Weiqliang Lu	China
Mr.	Fong Song	China	Mr.	Heikki Pokela	Finland
Mr.	Qian Sun	China	Mr.	Irakli Machabeli	Georgia
Prof.	Zhan Xu	China	Dipl. Phys.	Hermann Klein	Germany
Dr.	Pengfei Zhang	China	Dr.	Djoko Triyono	Indonesia
Prof.	Shihong Ma	China	Dr.	Christpher Nigel John Drew	Kenya
Prof.	Qingli He	China	Pro.	In Sang Yang	Korea
Prof.	Sheng Li	China	Mr.	Kent Hogan	New Zealand
Prof.	Jun Shen	China	Mr.	Francis Ekwenta	Nigeria
Prof.	Sihui Wang	China	Dr.	Pawel Kaczor	Poland
Prof.	Haiyu Wang	China	Dr.	Sergey Pivovarov	Russia
Dr.	Ping Zhang	China	Dr.	YeYeo	Singapore
Prof.	Yujun Zheng	China	Assoc. Prof.	Frantisek Kundracik	Slovakia
Prof.	Ping Wu	China	Prof.	Gunnar Tibell	Sweden
Dr.	Yanbang Wang	China	Dr.	Iliana Massarek	Switzerland
Prof.	Dejun Li	China	Dr.	Sergiy Koleboshyn	Ukraine
Prof.	Xueqian Li	China			

IYPT2009 Teams

Nation	Leaders	Students	
Australia	Philip O'Neill Kathryn Zealand	O'Neill Scott Thomas Alcorn Jessica Morton	Zealand Yap Daniel Kim
Austria	Armin Fuith Thomas Lindner	Bernhard Zatloukal Michael Scherbela Markus Kunesch	Johannes Tiefhig Angel Usunov
Belarus	Ivan Antsipau	Aliaksandr Mamoika Andrej Achapouskij Stanislau Piatrusha	Sergei Gluchko Iryna Suhaka
Bulgaria	Dimitar Ribarov Svilen Rusev	Vladislav Marchev Aslihan Shenol Evgenia Manova	Krasimir Ivanov Georgi Koshov
China	RuoYang Zhang Xiao Dong	Hongyu Zhu Jinglin Huang XiaoYue Ding	Xu Chen Xiaoyu Jiang
Croatia	Lidia Saric Damir Klicek	Lora Grbanovic Krunoslav Laljek Dino Santl	Dino Halusek Petra Vuckovic
Czech Republic	Zdenek Kluiber Jan Dirlbeck	Josef Hazi Le Quang Ondrej Matejka	Miroslav KozakDung Frantisek Koudelka
Finland	Jopi Kekkonen Risto Kiuru	Arttu Voutilainen Mikko Leino Pekka Lehtela	Joonas Kivi Joonas Haapala
France	Nicolas Chevalier Patrice Bottineau	Theau Peronnin Romain Lucken Annitha Subramaniam	Segolene Goujon Arthur Cahen
Georgia	George Laskhishvili Teimuraz Gachechiladze	Daviti Gachechiladze Mariami Gachechiladze Mariami Nadareishvili Guram Mikaberidze Zurabi Pirtskalaishvili	
Germany	Fabian Buehler Bernd Kretschmer	Britta Vincon Marc Burock Lukas Kaiser	Dominic Dold Simeon Voelkel
Hungary	Judit Illy Zsuzsanna Rajkovits	Orsolya Pipek Eva Kunsagi-Mate Marton Lajer	Susanne Prokop Zsolt Heizler
Indonesia	Masno Ginting Endang Kariasih	James Davidta Ginting Asri Kartika Putri Deo Kiatama	Harvianto Shinta Mariana

Iran	Dina Izadi Lida Khosrosereshki	Saba Zargham Zahra Karimi Mohammad Ali Eslami Bardia Hejazi Reza Montazeri Namin
Kenya	Francisco Swaminathan Ian Gordon Stamp	Pulkit Shamsbery Nadia Marie Antoinette Abigail Elizabeth Hooper Mehreen Manzoor Dalmus Maurice Otieno
Korea	Chan Oung Park Kwang Joo Kim	Chan Lee Hong Kim Hyung Kyu Jun Minkyu Shim Nakwon Choi
New Zealand	Paul Haines Gavin Jennings	John Chen Stanley Roache Gemma Potaka Max Ferguson Guozhi Zhang
Nigeria	Kingsley Imade Uno Uno	Fortune Anya Stephen Abenga Gregory Ahungwa Olanrele Adebambo Irene Agbecha
Poland	Andrzej Nadolny Stanislaw Lipinski	Inga Rub Albert Slawinski Urszula Wlodkowska Jan Bihalowicz Michal Tomaszewski
Russia	Evgeny Mogilevskiy Valentin Lobyshev	Artem Astapov Ludmila Kudryashova Ilya Mordvintsev Yana Grishina Marat Zakirov
Singapore	Mark Wee Theresa Thor	Jie Liang Lee Jiahuang Lin Jie Yeo Gaurav Manek Kewei Li
Slovakia	Tomas Kulich Marcela Hrda	Lukas Bosko Eugen Hruska Maria Kieferova Peter Vanya Zuzana Coculova
Sweden	Kim Freimann Per Brantmark	Jakob Lavrod Yahia Al-Jebari Michelle Foldschak Blanka Kesek Frida Gundmark Turesson
Switzerland	Samuel Byland Daniel Keller	Seraina Glaus Zhihao Li Timo Welti Christina Wild Matteo Felder
Thailand	Burin Asavapibhop Nitit Sripongpun	Thanapol Chancharung Thummanoon Kunanuntakij Bongkot Nimmanterdwong Seelwan Sathitrattanacheewin Phatthamon Saenmuk
United Kingdom	Steve Adams Max Chalfin	Philipp Legner Charles Jones Benjamin Powell Gessica Howarth David Kell Davies
Ukraine	Olena Filatova Oleg Matveichuk	Dmytro Fleyta Iryna Brynza Oleksandr Chaykovskyy Vadym Asafaylo Tetiana Brytavska

IYPT2009 Visitors

Nation	Students
Austria	Tim Hell
Austria	Katharina Wittmann
China	Xuanhua Chen
China	Weiyu He
China	Pingdao Wang
China	Ningyue Wang
Czech Republic	Jaroslav Kocvara
Czech Republic	Anna Svecova
Iran	Alireza Rihimi Ebrahim Abadi
Iran	Azita Seyed Fadaei
Kenya	Maria Cunningham
Korea	Hong Jung
Korea	Myeong Hoi Kwon
New Zealand	Mark Ferguson
Nigeria	Grace Agbo
Nigeria	Elijah Umoh

Nation	Students
Nigeria	Chris Dura Aondo
Nigeria	Felix Olofu
Nigeria	Chinemelum Okeke
Poland	Maciej Lisicki
Russia	Maria Tomkevich
Singapore	Barnabas Tan
Singapore	Chu Lin Wong
Sweden	Mattias Andersson
Switzerland	Matthias Heidrich
Switzerland	Beda Buchel
Thailand	Pornpun Waitayangkoon
Thailand	Ram Tiwari
Thailand	Kris Singnuan
Thailand	Narumon Suwonjandee
Thailand	Tipawan Iamsamang

IYPT2009 Observers

Nation	Students
Argentina	Jacobo Sitt
Latvija	Tamara Brice
Latvija	Agris Auce
Myanmar	Adem Engin
Taiwan Normal University	Hsien-chung Kao
Taiwan Normal University	Yung-Yuan Hsu

IYPT2009 Schedules

Tuesday 21 July 2009	Arrival Welcome Dinner
Wednesday 22 July 2009	Morning: Opening ceremony Afternoon: PF1
Thursday 23 July 2009	PF2; PF3;
Friday 24 July 2009	PF4; Sports
Saturday 25 July 2009	PF5; City tour
Sunday 26 July 2009	Excursion or sports (Great Wall, Badaling)
Monday 27 July 2009	Finals; Closing ceremony; Performance party(Evering)
Tuesday 28 July 2009	Departure of the teams and jurors, IOC Meeting
Wednesday 29 July 2009	IOC Meeting
Thursday 30 July 2009	Departure of IOC members

Time of Physics Fights**8:30 to 11:30 a.m****14:30 to 17:30 p.m**

Activities

Sports

14:00-18:00 24 July 2009

We will be having sports on 24/Jul afternoon in the gym of Nankai University. There is a competition for 3-person basketball on country basis. You may also play badminton and table tennis for fun. Some fun games are also provided. If you are good at these activities, please get yourself to be prepared. Surely we will provide some rackets, shuttle cocks and pingpang balls.

Ancient Cultural Street in TIANJIN

25 July 2009

The 580-metre-long Ancient Cultural Street is a major tourist destination where Tianjin's old traditions remain largely intact. Imitation Qing buildings, which house nearly 100 shops are scattered along the street with the Tianhou Temple in the center. Built in 1320 during the Yuan, the Tianhou (Heavenly Queen) Temple, also known as Temple of the Patron Goddess, is one of many temples established in China's coastal areas in honour of the mythological angel known more popularly as Mazu. Grand sacrificial ceremonies were held in the temple on Mazu's birthday, which fell on the 23rd day of the 3rd lunar month. Today the temple has been converted into the Tianjin Folklore Museum.

Badaling Great Wall

26 July 2009

The Great Wall is a symbol of Chinese civilization, and one of the wonders that the Chinese people have created. Badaling Great Wall, the most representative part, was promoted as a key national cultural relic, protected under the approval of the State Council in 1961. In 1988, it was enlisted in the World Cultural Heritage Directory by UNESCO. July 7, 2007 has once again witnessed the worldwide reputation that the Great Wall gained: it was listed among the New Seven Wonders of the

World.

Badaling Great Wall is situated in Yanqing County, over 70 kilometres (43 miles) north of Beijing. It is the most well-preserved section of the Great Wall, built during the Ming Dynasty (1368-1644). This section with an average altitude of over 1,000 meters (3,282 feet) is the outpost of the Juyongguan Pass. The mountain slope is very steep and the roads are tortuous. These features made it a military stronghold. Badaling Great Wall is like a strong dragon winding its way along the mountain ranges.

The Great wall originally functioned as a fortification. As early as the Qin Dynasty (221BC-206BC), Qinshihuang, the first emperor of Qin Dynasty unified the whole nation and began to build the Great Wall to protect China's borders from the intrusion of the northern nomadic tribes. Most parts of the preserved Badaling Great Wall were built and reinforced during the Ming Dynasty to defend the capital against the intrusion of these Mongolian people. The structure of the wall consists of huge bar-stones and bricks. The inside of the wall has been formed by tampering earth and small stones, which makes the wall very firm and strong. Internally, the wall is about six meters (20 feet) wide, which would allow horses to gallop five abreast. A number of small holes have been drilled on the wall to allow archers to shoot arrows. There is a barrel-drain and a moat both inside and outside the wall. In a word, military fortification has been paramount in the consideration of every wall detail.

The signal fire platforms were an important part of the whole fortification of ancient China. A signal fire platform is actually a blockhouse that was built on the top of the wall. It was used to send warning signals. Since the Ming Dynasty, the amount of smoke and gunfire released conveyed specific military information about the enemy. One release of smoke with one shot of gunfire signified 100 enemies; two smoke releases with two shots of gunfire meant 500 enemies; three smoke releases with three shots of gunfire indicated more than 1,000 enemies. Once one signal platform fired a beacon, the others would follow likewise so as to alert the command as to the strength of the enemy.

Badaling Great Wall was the earliest part of the great Wall opened to tourists. It has drawn tens of millions of tourists both from home and abroad. More than 370 foreign leaders and celebrities have visited there.

The Schedule for Great Wall visit

Date	Time	Activity Arrangement
26/Jul	5:30-6:00	Get on buses
	6:00-10:00	Way to Badaling Great Wall
	10:00-10:30	Entrance to the Great Wall
	10:30-13:30	Visiting Great Wall
	13:30-13:45	Go to restaurant
	13:45-14:30	Lunch
	14:30-18:30	Go back to Nankai University

IYPT2009 Problems

1. *Stearin engine*

A candle is balanced on a horizontal needle placed through it near its centre of mass. When the candle is lit at both ends, it may start to oscillate. Investigate the phenomenon. Maximize the output mechanical power of the system.

2. *Coupled compasses*

Place a compass on a table. Place a similar compass next to the first one and shake it gently to make the needle start oscillating. The original compass' needle will start oscillating. Observe and explain the behaviour of these coupled oscillators.

3. *Resonating modes*

Place a mobile phone inside a metallic container with a hole in it. Investigate under what conditions the mobile phone starts to ring after calling it.

4. *Ghostly images*

When a photo is taken with a flash, bright "disks" may appear as shown in the picture. Investigate and explain the phenomenon.

5. *Stop a drip*

To prevent dripping from a bottle after pouring, it can be turned slightly. Investigate the motion of the bottle for no drop to fall.

6. *Roundabout*

Put a plastic cup on a thin layer of liquid on a flat solid surface. Make the cup rotate. On what parameters does the rotational deceleration of the cup depend?

7. *Skateboarder*

A skateboarder on a horizontal surface can accelerate from rest just by moving the body, without touching external support. Investigate the parameters that affect the motion of a skateboard propelled by this method.

8. *Air pocket*

A vertical air jet from a straw produces a cavity on a water surface. What parameters determine the volume and depth of the cavity?

9. *Drying*

Investigate the drying process of a vertical wet paper sheet. How does the boundary of drying move?

10. Optical tube

Look down a cylindrical metal tube which is shiny on the inside. You will notice dark and light bands. Investigate the phenomenon.

11. Transformers

The "simple transformer law" relates output voltage to input voltage and turns ratio. Investigate the importance of frequency and other parameters in determining the non-ideal behaviour of transformers.

12. Hot ball

Put a hot metal ball on parallel horizontal rails. The ball starts to move. Investigate the phenomenon.

13. Sand ripples

Investigate how the formation of sand ripples under shallow water depends on various parameters.

14. Bouncing drop

Investigate the motion of water droplets falling on a hydrophobic surface (e.g. coated with soot or teflon).

75. Electro-oscillator

A mass is hung from the middle of a horizontal wire. When a current is passed through the wire, the mass may start to oscillate. Describe and explain this phenomenon.

16. Electromagnetic motor

Attach a strong light magnet to the head of a steel screw. The screw can now hang from the terminal of a battery. Completing the circuit by a sliding contact on the magnet causes the screw to rotate. Investigate the parameters that determine the angular velocity of the screw.

17. Corrugation

After traffic has used an unpaved road for some time the surface of the road gets a "wave" structure with a well defined wavelength. Investigate and explain this phenomenon.

The Regulations of the International Young Physicists' Tournament

1. International Young Physicists' Tournament

The International Young Physicists' Tournament (IYPT) is a competition among teams of secondary school students in their ability to solve complicated scientific problems, to present solutions to these problems in a convincing form and to defend them in scientific discussions, called Physics Fights (PF).

II. The problems of the IYPT

The 17 problems are formulated by the International Organizing Committee (IOC) and sent to the participating countries not later than in October. These problems may be used in regional and national tournaments.

III. The participants of the IYPT

1. The national teams

Any invited country, as well as the host country, is represented by one team. A country can only take part in the IYPT that has already taken part in the past or sent an observer in one of the last three years.

2. The membership of the teams

The IYPT team is composed of five secondary school students. The secondary school graduates could participate in the IYPT in the year of their graduation. The participation of university students is not allowed. The LOC may allow participation of teams of four or three students. The composition of the team cannot be changed during the Tournament. The team is headed by a captain who is the official representative of the team during the PF.

3. The team is accompanied by two team leaders.

IV. The Jury

The Jury is nominated and organized by the LOC in cooperation with EC. The Jury consists of at least five members, if possible from different countries. Team leaders, at least one from each team, are included in the Jury. The team leaders cannot be members of the Jury in the PF where their teams participate and should not, if possible, grade the same team more than twice.

V. The agenda of the IYPT

The IYPT is carried out in a period determined by the LOC (from May to July).

All teams participate in five Selective PFs. Selective PFs are carried out according to a special schedule, following the rule that, if possible, no team meets another team more than once. This schedule should be known before numbers are ascribed to the teams by lot. The best teams participate in the Final PF.

The host country provides a cultural program for the participants.

VI. The Physics Fight regulations

Three or four teams participate in a PF, depending on the total number of teams. In the course of a PF the members of a team communicate only with each other.

Before the beginning of a PF, the Jury and the teams are introduced.

The PF is carried out in three (or four) Stages. In each Stage, a team plays one of the three (four) roles: Reporter, Opponent, Reviewer (Observer). In the subsequent Stages of the PF, the teams change their roles according to the schemes:

<i>Three teams PF</i>				<i>Four teams PF</i>				
Stage	1	2	3	Stage	1	2	3	4
Team				Team				
1	Rep	Rev	Opp	1	Rep	Obs	Rev	Opp
2	Opp	Rep	Rev	2	Opp	Rep	Obs	Rev
3	Rev	Opp	Rep	3	Rev	Opp	Rep	Obs
				4	Obs	Rev	Opp	Rep

VII. The Stage regulations

The performance order in the Stage of a PF	Reserved time in minutes
The Opponent challenges the Reporter for the problem.....	1
The Reporter accepts or rejects the challenge.....	1
Preparation of the Reporter.....	5
Presentation of the report.....	12
Questions of the Opponent to the Reporter and answers of the Reporter.....	2
Preparation of the Opponent.....	3
The Opponent takes the floor, maximum 5 min. (E)	

and discussion between the Reporter and the Opponent.....	15
Questions of the Reviewer to the Reporter and the Opponent and answers to the questions.....	3
Preparation of the Reviewer.....	2
The Reviewer takes the floor.....	4
Concluding remarks of the Reporter.....	2
Questions of the Jury.....	5

In the Final PF the procedure of challenge is omitted.

The official language of the IYPT is English.

VIII. The team performance in the Stages

The Reporter presents the essence of the solution to the problem, attracting the attention of the audience to the main physical ideas and conclusions.

The Opponent puts questions to the Reporter and criticizes the report, pointing to possible inaccuracy and errors in the understanding of the problem and in the solution. The Opponent analyses the advantages and drawbacks of both the solution and the presentation of the Reporter. The discussion of the Opponent should not become a presentation of his/her own solution. In the discussion, the solution presented by the Reporter is discussed.

The Reviewer presents a short estimation of the presentations of Reporter and Opponent.

The Observer does not participate actively in the PF.

During one PF only one member of a team takes the floor as Reporter, Opponent or Reviewer; other members of the team are allowed to make brief remarks or to help with the presentation technically. No member of a team may take the floor more than twice during one Selective PF or, as Reporter, more than three times in total during all Selective PFs. During the Final PF any team member can take the floor only once.

The LOC must inform about the devices available for presentations not later than two months before the IYPT.

IX. The rules of problem-challenge and rejection

1. All problems presented in the same PF must be different.
2. Selective PF

The Opponent may challenge the Reporter on any problem with the exception for a problem that:

- a) was rejected by the Reporter earlier;

- b) was presented by the Reporter earlier;
- c) was opposed by the Opponent earlier;
- d) was presented by the Opponent earlier.

If there are less than five problems left to challenge, the bans d), c), b), a) are successively removed, in that order.

During the Selective PFs the Reporter may reject the challenge of three different problems in total without penalty. For every subsequent rejection the coefficient of the Reporter (see section X) is decreased by 0.2. This reduction continues to apply during the following selective PFs.

3. Final PF

Within four hours after the announcement of the results of the Selective PFs the teams participating in the Final choose their problems. In case teams choose the same problem, priority is given according to the order of presentation in the Final (see section XII). The choice should be made public immediately.

X. The grading

After each stage the Jury grades the teams, taking into account all presentations of the members of the team, questions and answers to the questions, and participation in the discussion. Each Jury member shows integer marks from 1 to 10. The mean of the highest and the lowest marks is counted as one mark which is then added to the remaining marks. This sum is used to calculate the mean mark for the team. The mean marks are multiplied by various coefficients: 3.0 or less (see section IX) for the Reporter, 2.0 for the Opponent, 1.0 for the Reviewer and then transformed into points.

XL The resulting parameters

1. For a team in the PF

The sum of points (*SP*) is the sum of mean marks, multiplied by the corresponding coefficients and rounded to one decimal.

2. For a team in the Tournament

The total sum of points (*TSP*) equals the sum of *SP* of the team in all Selective PFs. The number of fights won (*FW*) is the number of Selective PFs, in which a team received the highest *SP* from all three or four teams participating in the same PFs.

XII. The Final

The three teams having the highest *TSP* in the Selective PFs participate in the Final. In case teams have equal *TSP*, their participation in the Final is decided by *FW*. If team(s) winning all their Selective PFs (*FW*=5) did not reach the Final by *TSP*, the best of them (determined by *TSP*) takes part in the final as fourth team.

The order of presentation in the Final is determined by position by entering the final: the higher the *position*, the lower the number in the scheme of section VI.

XIII. The final team ranking of the IYPT

The students of the team winning the Final are awarded 1st place certificates and gold medals. If two or three teams have the same *SP* result in the Final, the winner is nominated according to the highest *TSP*, *in case of equality by FW*. The other teams participating in the Final are awarded 2nd place certificates and silver medals. 3rd place certificates and bronze medals are awarded to students in half (rounded down) of all participating teams, having the highest *TSP* and not participating in the Final. All other students receive certificates of participation. Team leaders obtain certificates indicating the ranking of their team.

XIV. The status of the regulations of the IYPT

The regulations are established by the IOC and may be changed only by the IOC.

Accepted by e-mail vote on 15th January 2009

南开大学校园图

Nankai University

北



1:1000



2005年1月22日