STATUTES OF THE ASIAN PHYSICS OLYMPIADS

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 # 1

In recognition of the importance of physics in all fields of science and technology, and the need to provide a comprehensive education for young people, as well as to foster closer international collaboration between Asian countries in Physics Education in high schools, an annual physics competition has been organized for high school students. This competition is called the "Asian Physics Olympiad" and it is an individual competition. By the term “Asian countries”, one should understand countries whose capitals are located in the region traditionally recognized as Asia or Australia (Australasia). The Asian Physics Olympiad should be conducted not later than two months prior to the International Physics Olympiad.

 # 2

The competition is organized by the Ministry of Education or another appropriate institution of one of the participating Asian countries, who will host the competition. Hereinunder, the term "Ministry of Education” is used in the above meaning. The organizing country is obliged to ensure equal participation of all the delegations, and to invite teams from all those countries that participated during the last three years. In addition, it has the right to invite other countries.

The Asian Physics Olympiad is a purely educational event. No country may have its team excluded from participation on any political grounds resulting from political tensions, lack of diplomatic relations, lack of recognition of some country by the government of the organizing country, imposed embargoes and similar reasons. When difficulties preclude formal invitation of the team representing a country, students from such a country should be invited to participate as individual members.

Within five years of its entry in the competition, a country should declare its intention to be the host for a future Olympiad. This declaration should propose a timetable so that a provisional list of the order of countries willing to arrange Olympiads can be compiled.

A country which refuses to organize the competition may be barred from participation, even if delegation from that country has taken part in previous competitions.

Any kind of religious or political propaganda against any other country at the Olympiad is forbidden. A country which violates this rule may be barred from participation.

 # 3

The Ministries of Education of the participating countries, as a rule, assign the organization, preparation and execution of the competition to a physics society or another institution in the organizing country. The Ministry of Education of the organizing country shall notify the Ministries of Education of the participating countries of the name and address of the institution assigned to the organization of the competition.

 # 4

Each participating country sends a team consisting of students from general or technical high schools, i.e. schools which are not considered as technical colleges. Also students who finished their school examination in the year of the competition can be members of a team as long as they have not started the university studies. The age of the participants should not exceed twenty on June 30th of the year of the competition. Each participating country shall send a delegation, normally comprising of eight students (contestants) and at most two accompanying persons (delegation leaders).

The delegation leaders become members of the International Board, where they have equal rights. The members of the International Board are treated as the contact persons in the participating countries for matters pertaining to the Asian Physics Olympiad until the next competition.

The competition shall be conducted in the friendly atmosphere designed to promote future collaborations and the competition shall foster closer networks and friendships within the scientific community in Asia. To that effect, all the possible political tensions between the participants should not be reflected in any activity during the competition. Any political activity directed against any individuals or countries is strictly prohibited.

The delegation leaders should be trained in physics and who are capable of solving the problems in the competition competently. The delegation leaders are expected to be able to speak English.

The delegation head of each participating team should, before or on arrival, hand over to the organizers a list containing personal data regarding the contestants (given name, family name, date of birth, home address, type and address of the school attended).

 # 5

The working language of the Asian Physics Olympiad is in English. Also, the competition problems and their solutions should be prepared in English; the organizers, however, may prepare those documents in other languages as well.

 # 6

The financial principles of the organization of the competition are as follows:

* The Ministry which sends the students to the competition covers the roundtrip travel costs of the students and the accompanying persons to the place at which the competition is held.

* All other costs from the moment of arrival until the moment of departure are covered by the Ministry of the organizing country. In particular, this concerns the costs for board and lodging for the students and the accompanying persons, the cost of excursions, awards for the winners, etc.

The Organizing Committee may establish a voluntary fee to cover a part of organization expenses.

 # 7

The competition is conducted on two days, one for the theoretical competition and one for the experimental competition. There should be at least one day of rest between these two days. The time allotted for solving the problems should normally be five hours. There should be three theoretical problems and one or two experimental problems.

When solving the problems, the contestants may make use of tables of logarithms, tables of physical constants, non-programmable pocket calculators and drawing material. These aids will be brought by the students themselves. Collections of formulae from mathematics or physics are not allowed.

The theoretical problems should involve at least four areas of physics taught at high school level (see Appendix). High school students should be able to solve the competition problems with standard high school mathematics and without extensive numerical calculation.

The host country has to prepare one spare problem which will be presented to the International Board if one of the first three theoretical problems is rejected by two thirds of members of the International Board. The rejected problem cannot be considered again.

 # 8

The competition tasks are chosen and prepared by the host country.

 # 9

The marks available for each problem are defined by the organizer of the competition, but the total number of points for the theoretical problems should be 30 and for the experimental 20. The laboratory problems should consist of theoretical analysis (plan and discussion) and experimental execution.

The winners will receive diplomas or honorable mentions in accordance with the number of points obtained after moderation as follows:

The smaller number between the average marks of the top three contestants and the twice of the median of all contestants is considered as 100%.

The contestants who accumulate more than 90% of points receive first prize (diploma).

The contestants who accumulate more than 78% but less than 90% receive second prize (diploma).

The contestants who accumulate more than 65% but less than 78% receive third prize (diploma).

The contestants who accumulate more than 50% but less than 65% receive an honorable mention.

The contestants who accumulate less than 50% of points receive certificates of participation in the competition.

The mentioned marks corresponding to 90%, 78%, 65% and 50% should be calculated by rounding down to the nearest integers. The participant who obtains the highest score (Absolute Winner) will receive a special prize and a diploma.

Other special prizes can be awarded.

 # 10

The obligations of the organizer:

a) The organizer is obliged to ensure that the competition is conducted in accordance with the Statutes.

b) The organizer shall produce a set of "Organization Rules", based on the Statutes, and inform the participating countries well before the competition. These Organization Rules shall provide details of the Olympiad not covered in the Statutes, and give the names and addresses of the institutions and persons responsible for the Olympiad.

c) The organizer shall establish a precise program for the competition (schedule for the contestants and the accompanying persons, program of excursions, etc.), which is sent to the participating countries in advance.

d) The organizer should check immediately after the arrival of each delegation whether its contestants meet the conditions of the competitions.

e) The organizer shall choose (according to # 7 and the list of physics contents in the Appendix to these Statutes) the problems and ensure that the problems are formulated correctly in English and in other languages stipulated in # 5. It is advisable to select problems where the solutions require a certain level of creative capability and a considerable level of knowledge. Everyone taking part in the preparation of the competition problems shall maintain strict confidentiality regarding the problems.

f) The organizer must provide the teams with interpreters.

g) The organizer should provide the delegation leaders with photostat copies of the solutions of the contestants in their delegation before the final classification.

h) The organizer is responsible for the grading of the problem solutions.

i) The organizer shall draft a final list of participants proposed as winners of the prizes and honorable mentions during the last International Board meeting.

j) The organizer prepares the prizes (diplomas), honorable mentions and awards for the winners of the competition.

k) The organizer is obliged to publish the proceedings of the Olympiad in English. Each of the participants of the competition (delegation leaders and contestants) should receive one copy of the proceedings free of charge not later than one year after the competition.

 # 11

The scientific part of the competition must be within the competence of the International Board, which includes the leaders of all the delegations.

The Board is chaired by a representative of the organizing country. He is responsible for the preparation of the competition and serves on the Board in addition to the accompanying persons of the respective teams.

Decisions are carried by a majority vote. In the case of equal number of votes for and against, the chairman has the casting vote.

 # 12

The delegation leaders are responsible for the proper translation of the problems from English (or other languages stipulated in # 5) to the lingua franca of the participants.

 # 13

The International Board has the following responsibilities:

a) To carry out the competition and ensure that it is conducted according to the regulations;

b) To ascertain, after the arrival of the competing teams, that all their members meet the requirements of the competition in all aspects. The Board will disqualify those contestants who do not meet the stipulated conditions. The costs incurred by a disqualified contestant are covered by his/her country;

c) To discuss the Organizer's choice of tasks, the suggested solutions and the suggested evaluation guidelines before each part (Theory and Experiment) of the competition. The Board is

authorized to change or reject suggested tasks but not to propose new ones. Changes may not affect experimental equipment. There will be a final decision on the formulation of tasks and on the evaluation guidelines. The participants in the meeting of the International Board are obliged to maintain confidentiality of the materials concerning the tasks until the competition is over. They should not render any assistance to any of the participants during this period of examination secrecy;

d) To ensure correct and judicious classification of the prize winners; Note that the grading of those contestants who do not receive prizes or honorable mentions shall not to be disclosed;

e) To establish the winners of the competition and make a decision concerning presentation of the prizes and honorable mentions. The decision of the International Board is final;

f) To review the results of the competition.

g) To select the country which will be assigned the organization of the next competition.

The International Board is the only body having the right to make decisions regarding the barring of countries from participation in the Asian Physics Olympiads as a result of a violation of these Statutes.

Observers may be present at the meetings of the International Board, but they shall not vote or take part in the discussion.

 # 14

The institution in charge of the Olympiad shall announce the results and present the awards and diplomas to the winners at an official gala ceremony. It shall invite representatives of the organizing Ministry and any appropriate scientific institutions to the closing ceremony of the competition.

 # 15

The long term work involved in organizing the Olympiads is coordinated by a "Secretariat for the Asian Physics Olympiads". This Secretariat consists of the President and Secretary. They are elected by the International Board for a period of five years. They shall be invited to each Asian Physics Olympiad at the cost (including travel expenses) of the organizing country.

 # 16

The present Statutes have been drafted on the basis of the Statutes of the International Physics Olympiads.

Changes in these Statutes, the insertion of new paragraphs or exclusion of old ones, can only be made by the International Board and requires a qualified majority (2/3) of the votes.

No changes shall be made to these Statutes or Syllabus unless each delegation obtained written text of the proposal at least three months in advance.

 # 17

Participation in the Asian Physics Olympiad signifies acceptance of the present Statutes by the Ministry of Education of the participating country.

 # 18

The original statements of these Statutes are written in English.

Appendix to the Statutes of the Asian Physics Olympiads

THE SYLLABUS

（the same as those described in the International Physics Olympiads）

General

a) The extensive use of the calculus (differentiation and integration) and the use of complex numbers or solving differential equations should not be required to solve the theoretical and practical problems.

b) Questions may contain concepts and phenomena not contained in the Syllabus but sufficient information must be given in the questions so that candidates without previous knowledge of these topics would not be at a disadvantage.

c) Sophisticated practical equipment likely to be unfamiliar to the candidates should not dominate a problem. If such devices are used then careful instructions must be given to the candidates.

d) The original texts of the problems have to be set in the SI units.

A. Theoretical Part

The first column contains the main entries while the second column contains comments and remarks if necessary.

1. Mechanics

a)Foundation of kinematics of a point mass.	Vector description of the position of the point mass, velocity and acceleration as vectors.
b)Newton's laws, inertial systems.	Problems may be set on changing mass.
c)Closed and open systems, momentum and energy, work, power.	
d)Conservation of energy, conservation of linear momentum, impulse.	
e)Elastic forces, frictional forces, the law of gravitation, potential energy and work in a gravitational field.	Hooke's law, coefficient of friction (F/R = const), frictional forces static and kinetic, choice of zero of potential energy.
f)Centripetal acceleration, Kepler's laws	

2. Mechanics of Rigid Bodies

a)Statics, center of mass, torque.	Couples, conditions of equilibrium of bodies.
b)Motion of rigid bodies, translation, rotation, angular velocity, angular acceleration, conservation of angular momentum.	Conservation of angular momentum about fixed axis only
c)External and internal forces, equation of motion of a rigid body around the fixed axis, moment of inertia, kinetic energy of a rotating body.	Parallel axes theorem (Steiner's theorem), additivity of the moment of inertia.|
d)Accelerated reference systems, inertial forces.	Knowledge of the Coriolis force formula is not required

3. Hydromechanics

No specific questions will be set on this but students would be expected to know the elementary concepts of pressure, buoyancy and the continuity law.

4. Thermodynamics and Molecular Physics

a)Internal energy, work and heat, first and second laws of thermodynamics.	Thermal equilibrium, quantities depending on state and quantities depending on process.
b)Model of a perfect gas, pressure and molecular kinetic energy, Avogadro's number, equation of state of a perfect gas, absolute temperature.	Also molecular approach to such simple phenomena in liquids and solids as boiling, melting etc.
c)Work done by an expanding gas limited to isothermal and adiabatic processes.	Proof of the equation of the adiabatic process is not required.
d)The Carnot cycle, thermodynamic efficiency, reversible and irreversible processes, entropy(statistical approach), Boltzmann factor.	Entropy as a path independent function, entropy changes and reversibility, quasistatic processes.

5. Oscillations and waves

a)Harmonic oscillations, equation of harmonic oscillation.	Solution of the equation for harmonic motion, attenuation and resonance - qualitatively.
b)Harmonic waves, propagation of waves, transverse and longitudinal waves, linear polarization, the classical Doppler effect, sound waves.	Displacement in a progressive wave and understanding of graphical representation of the wave, measurements of velocity of sound and light, Doppler effect in one dimension only, propagation of waves in homogeneous and isotropic media, reflection and refraction, Fermat's principle.
c)Superposition of harmonic waves, coherent waves, interference, beats, standing waves.	Realization that intensity of wave is proportional to the square of its amplitude. Fourier analysis is no required but candidates should have some understanding that complex waves can be made from addition of simple sinusoidal waves of different frequencies. Interference due to thin films and other simple systems (final formulae are not required), superposition of waves from secondary sources (diffraction)
6. Electric Charge and Electric Field	
a)Conservation of charge, Coulomb's law.	
b) Electric field, potential, Gauss' law.	Gauss' law confined to simple symmetric systems like sphere, cylinder, plate etc., electric dipole moment
c)Capacitors, capacitance, dielectric constant, energy density of electric field.	
7. Current and Magnetic Field	
a)Current, resistance, internal resistance of source, Ohm's law, Kirchhoff's laws, work and power of direct and alternating currents, Joule's law.	Simple cases of circuits containing non-ohmic devices with known V-I characteristics.
b)Magnetic field (B) of a current, current in a magnetic field, Lorentz force.	Particles in a magnetic field, simple applications like cyclotron, magnetic dipole

	moment.
c)Ampere's law.	Magnetic field of simple symmetric systems like straight wire, circular loop and long solenoid.
d)Law of electromagnetic induction, magnetic flux, Lenz's law, self-induction, inductance, permeability, energy density of magnetic field.	
e)Alternating current, resistors, inductors and capacitors in AC-circuits, voltage and current(parallel and series) resonances.	Simple AC-circuits, time constants, final formulae for parameters of concrete resonance circuits are not required.
8. Electromagnetic waves	
a)Oscillatory circuit, frequency of oscillations, generation by feedback and resonance.	
b) Wave optics, diffraction from one and two slits, diffraction grating, resolving power of a grating, Bragg reflection.	
c)Dispersion and diffraction spectra, line spectra of gases.	
d) Electromagnetic waves as transverse, waves polarization by reflection, polarizers.	Superposition of polarized waves.
e)Resolving power of imaging systems.	
f) Black body, Stefan-Boltzmann law.	Planck's formula is not required

9. Quantum Physics

a) Photoelectric effect, energy and impulse of the photon. — Einstein's formula is required

b)De Broglie wavelength, Heisenberg's uncertainty principle.

10. Relativity

a)Principle of relativity, addition of velocities, relativistic Doppler effect.

b)Relativistic equation of motion, momentum, energy, relation between energy and mass, conservation of energy and momentum.

11. Matter

a) Simple applications of the Bragg equation.

b) Energy levels of atoms and molecules (qualitatively), emission, absorption, spectrum of hydrogenlike atoms.

c) Energy levels of nuclei (qualitatively), alpha-, beta- and gamma-decays, absorption of radiation, half-life and exponential decay, components of nuclei, mass defect, nuclear reactions

B. Practical Part

The Theoretical Part of the Syllabus provides the basis for all the experimental problems. The experimental problems given in the experimental contest should contain measurements.

Additional requirements:

1. Candidates must be aware that instruments affect measurements.

2. Knowledge of the most common experimental techniques for measuring physical quantities mentioned in Part A.

3. Knowledge of commonly used simple laboratory instruments and devices such as calipers, thermometers, simple volt-, ohm- and ammeters, potentiometers, diodes, transistors, simple optical devices and so on.

4. Ability to use, with the help of proper instruction, some sophisticated instruments and devices such as double-beam oscilloscope, counter, ratemeter, signal and function generators, analog-to-digital converter connected to a computer, amplifier, integrator, differentiator, power supply, universal (analog and digital) volt-, ohm- and ammeters.

5. Proper identification of error sources and estimation of their influence on the final result(s).

6. Absolute and relative errors, accuracy of measuring instruments, error of a single measurement, error of a series of measurements, error of a quantity given as a function of measured quantities.

7. Transformation of dependence to the linear form by appropriate choice of variables and fitting a straight line to experimental points.

8. Proper use of the graph paper with different scales (for example polar and logarithmic papers).

9. Correct rounding off and expressing the final result(s) and error(s) with correct number of significant digits.

10. Standard knowledge of safety in laboratory work. (Nevertheless, if the experimental set-up contains any safety hazards the appropriate warnings should be included into the text of the problem.)