



INSTITUTE OF PHYSICS, SRI LANKA 1

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(Incorporated by an Act of Parliament, Act No. 12 of 1986)

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NATIONAL ASTRONOMY AND ASTROPHYSICS OLYMPIAD COMPETITION, MARCH 29, 2008

Those who sat for the National Astronomy and Astrophysics competition held in 2007 has won 10 national awards (2 Gold, 3 Silver and 5 Bronze medals) presented by the National Science Foundation at a ceremony held in the BMICH. Further more, five students excelled at the National Competition represented Sri Lanka at the 1st International Olympiad on Astronomy and Astrophysics held in Thailand from Nov 30 – Dec 9, 2007. Three honorable mentions were won by the Sri Lankan students in this event with Sri Lankan team recognized as the 13th best team. The purpose of this event is to popularize Astronomy and Astrophysics, and to attract bright high school students all over the world to Science and especially towards Astronomy and Astrophysics. The 2nd IOAA will be held in Bandung, Indonesia from August 19-28, 2008. The Institute of Physics Sri Lanka jointly with the Arthur C Clarke Institute for Modern Technologies in collaboration with the Department of Physics, University of Colombo and Ministry of Education have made arrangement to hold a separate national competition related to this event.

The 2nd National Astronomy and Astrophysics Olympiad competition will be held on March 29, 2008 from 10.00 a.m.-11.00 a.m. The knowledge of the applicants will be tested with one hour theory paper on Astronomy. Those who wish to participate in this competition must inform the Institute of Physics on or before March 15, 2008 and register themselves by sending the prescribed application form together with a cheque or money order worth Rs 400/- as the examination fee. Application forms can be downloaded from the IPSL or ACCIMT websites. Cheques should be drawn in favour of the **Institute of Physics, Sri Lanka** and money orders should be written in favour of **Dr. J. P. Liyanage**, Asst. Treasurer, Institute of Physics, Sri Lanka payable at the **post office, University of Colombo**. The examination will commence at 10.00 a.m. at the Departments of Physics in the Universities of Colombo, Peradeniya, Ruhuna, and Jaffna. Please post your registration form together with the examination fee (cheque or money order) and two self addressed stamped envelopes to the following address by March 15, 2008:

Dr. K. P. S. Chandana Jayaratne, Coordinator, Astronomy and Astrophysics Olympiad, Institute of Physics Sri Lanka, C/o Department of Physics, University of Colombo, Colombo 3.

Those who do well in the national competition will be given medals and certificates. Maximum of five students could be selected to participate at the 2nd IOAA. Those selected students will be trained extensively before the departure. To participate in the International Olympiad, the age of the contestants must not exceed twenty (20) years on August 1st, 2008.

Refer the IPSL website www.ip-sl.org or ACCIMT website www.accimt.ac.lk for further details including the course syllabus.

Dr. K.P.S.Chandana Jayaratne / Coordinator, Astronomy and Astrophysics Olympiad
Tel: 0714 800800 (between 12.00-1.00 p.m. and 9.00 – 10.00 p.m.), 011 2584777

Syllabus of the Astronomy and Astrophysics Olympiad Competition

1. Basic Astrophysics

Celestial Mechanics Kepler's Laws, Newton's Laws of Gravitation, Electromagnetic Theory & Quantum Physics Electromagnetic spectrum, Radiation Laws, Blackbody radiation, Doppler effect; Thermodynamics Thermodynamic equilibrium, Ideal gas, Energy transfer; Spectroscopy and Atomic Physics Absorption, Emission, Scattering, Spectra of Celestial objects, Line formations; Nuclear Physics Basic concepts

2. Coordinates and Times

Celestial Sphere Spherical trigonometry, Celestial coordinates, Equinox and Solstice, Circumpolar stars, Constellations and Zodiac; Concept of Time Solar time, Sidereal time, Julian date, Heliocentric Julian date, Time zone, Universal Time, Local Mean Time

3. Solar System

The Sun Solar structure, Solar surface activities, Solar rotation, Solar radiation and Solar constant, Solar neutrinos, Sun-Earth relations, Role of magnetic fields, Solar wind; The Solar System Earth-Moon System, Formation of the Solar System, Structure and components of the Solar System, Structure and orbits of the Solar System objects, Sidereal and Synodic periods Phenomena Tides, Seasons, Eclipses, Aurorae, Meteor Showers

4. Stars

Stellar Properties Distance determination, Radiation, Luminosity and magnitude, Color indices and temperature, Determination of radii and masses, Stellar motion, Stellar variabilities; Stellar Interior and Atmospheres Stellar nucleosynthesis, Energy transportation, stellar atmospheres and spectra; Stellar Evolution Stellar formation, Hertzsprung-Russell diagram, Pre-Main Sequence, Main Sequence, Post-Main Sequence stars, End states of stars

5. Stellar Systems

Binary Star Systems Classification, Mass determination in binary star systems, Light and radial velocity curves of eclipsing binary systems, Doppler shifts in binary systems; Star Clusters Classification and Structure ; Milky Way Galaxy Structure and composition, Rotation, Interstellar medium; Normal and Active Galaxies Classification, Distance determination ; Accretion Processes Basic concepts

6. Cosmology

Elementary Cosmology Cluster of galaxies, Dark matter, Gravitational lenses, Hubble's Law, Big Bang, Cosmic Microwave Background Radiation

7. Instrumentation and Space Technologies

Multi-wavelength Astronomy; Observations in radio, microwave, infrared, visible, ultraviolet, X-ray, and gamma-ray wavelength bands, Earth's atmospheric effects; Instrumentation and Space Technologies Ground- and space-based telescopes and detectors (e.g. charge-coupled devices, photometers, spectrographs), Magnification, resolving and light-gathering powers of telescopes