

International Science Olympiad (ISO)	International Maths Olympiad (IMO)
English International Olympiad (EIO)	General Knowledge International Olympiad (GKIO)
International Computer Olympiad (ICO)	International Drawing Olympiad (IDO)
National Essay Olympiad (NESO)	National Social Studies Olympiad (NSSO)
National Hindi Olympiad (NHO)	National Logical Reasoning Olympiad (NLRO)
Abacus Olympiad (AO)	Astronomy Space Olympiad (ASO)

Total Questions : 50

Time : 65 min



### PATTERN & MARKING SCHEME

Section	Subjective	HOT'S (High Order Thinking Section)
No. of Questions	45	5
Marks per Ques.	1	1

### SYLLABUS

**Section - 1 :** Advanced Orbital Mechanics, Tidal Locking, Changing Satellite Paths, Stellar Classification, Degenerate Matter, Variable Stars, Relativity, Gravitational Lensing, Early Universe , Astronomical Instruments , Doppler Effect, Deep Space Communication, Commercial Spaceflight and Space Law

**Section - 2 :** High Order Thinking Section - Syllabus as per Section 1

## Astronomy Space

- If the distance between a planet and the Sun is tripled, by what factor does the gravitational force between them change?
  - It increases by 3
  - It decreases by 3
  - It increases by 9
  - It decreases by 9
- Tidal locking occurs when the gravitational pull between two bodies causes:
  - The smaller body stops rotating entirely.
  - The rotation period of a body to match its orbital period.
  - The bodies to physically merge together.
  - The magnetic fields of both bodies align.
- Which star color indicates the highest surface temperature according to the Morgan-Keenan (MK) stellar classification system?
  - Red
  - Yellow
  - White
  - Blue
- What is the most common reason a Low Earth Orbit (LEO) satellite's path changes naturally over time?
  - The satellite runs out of battery power.
  - It is being pulled away by the Sun's gravity.
  - It collides with tiny air molecules (atmospheric drag) that slow it down.
  - The Earth's rotation pushes it into a higher path.
- Which subatomic particles are responsible for the degeneracy pressure that supports a White Dwarf?
  - Protons
  - Neutrons
  - Photons
  - Electrons

06. According to Albert Einstein's theory of relativity, what happens to time as an object approaches the speed of light?
- Time speeds up
  - Time slows down
  - Time stops completely
  - Time reverses
07. In astronomy, the Doppler Effect is mainly used to:
- Measure star size.
  - Detects motion of stars and galaxies.
  - Calculate temperature of planets.
  - Measure distance of the Moon.
08. During a specific time of year, the Sun is directly overhead at the Tropic of Cancer (23.5° N), and the Northern Hemisphere experiences its longest day. What is this celestial event called?
- Autumnal Equinox
  - Summer Solstice
  - Winter Solstice
  - Vernal Equinox

**High Order Thinking Section:**

09. NASA's Deep Space Network (DSN) consists of three ground station complexes located roughly 120 degrees apart in longitude. What is the primary reason for this specific geographic distribution?
- To divide the workload equally among different countries.
  - To reduce the amount of power required for signal transmission.
  - To ensure continuous communication with a spacecraft as the Earth rotates.
  - To prevent signals from different spacecraft from interfering with each other.
10. Choose the correct matching sequence:

Column I	Column II
1. Outer Space Treaty	A. Government permission to operate satellites
2. SpaceX	B. Private company developing reusable rockets
3. Space Tourism	C. Commercial travel to space for civilians
4. Satellite licensing	D. Space is the common heritage of all countries

- 1-C, 2-A, 3-B, 4-D
- 1-A, 2-C, 3-D, 4-B
- 1-B, 2-D, 3-A, 4-C
- 1-D, 2-B, 3-C, 4-A

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**ANSWER KEY:** 1-d, 2-b, 3-d, 4-c, 5-d, 6-b, 7-b, 8-b, 9-c, 10-d