

Scientists on Life and Learning:

What does independence mean to you as a scientist?

Independence to me implies intellectual independence, a professional freedom that allows choosing research of my choice, and the ability to collaborate without losing sight of my research interests. It means working in an atmosphere of autonomy, where I can think and act freely, while also being accountable for my work. Staying ethically grounded, maintaining scientific integrity, and being actively engaged with the larger scientific community are also key aspects of what independence means to me.



Dr. G. C. Anupama

INSA Senior Scientist;
Former Dean & Senior Professor (Retd),
Indian Institute of Astrophysics

Today's Attraction

South Mumbai and TIFR

Today, leaders will explore South Mumbai, the city's historic and cultural heart. Known for its stunning Victorian-Gothic architecture, this area blends colonial past with modern energy. You'll spot landmarks like the Reserve Bank of India and Bombay Stock Exchange, browse vibrant street shops, and see the Gateway of India—a majestic monument built in 1924 to commemorate the visit of King George V and Queen Mary. Later, you'll visit the Tata Institute of Fundamental Research (TIFR), a premier research institution under India's Department of Atomic Energy. Set along the Arabian Sea, TIFR's serene campus hosts world-class facilities supporting research in physics, chemistry, mathematics, biology, astronomy and computer science. You'll get a peek into cutting-edge research and the tools scientists use to explore the frontiers of science.



View of TIFR campus

Image Credit: TIFR Website/ TIFR Staff Photographers

Indian Space Missions

Several Indian space missions have contributed significantly to planetary sciences and astrophysics. Launched in 2008, India's first lunar mission, *Chandrayaan-1* found water molecules on Moon. India became world's fourth and Asia's first country to reach Martian orbit with the Mars Orbiter Mission (MOM), *Mangalyaan*. Launched in 2013 with an indigenous propulsion system, it aimed to develop interplanetary mission technologies and study Mars with Indian instruments. India's first dedicated multi-wavelength space observatory, AstroSat launched in 2015 to study X-ray binaries, active galactic nuclei (AGN), supernova remnants etc. in X-ray, UV and optical bands.

Chandrayaan-2 successfully reached lunar orbit in 2019, though its lander component crash landed. *Chandrayaan-3* overcame this setback in 2023 by successfully landing near the Moon's South Pole, making India globally the first to do so. *Aditya-L1*, India's first dedicated space-based solar mission, was launched in 2023 to study the sun and space weather. These missions by ISRO mark India's rise in the space sector, planetary sciences, astronomy and contribute valuable data to the global scientific community.

Weather Forecast

Max: **28°C / 82.4°F**
MIN: **24°C / 75.2°F**
Mumbai

Generally cloudy sky with moderate rain

Source: India Meteorological Department

Today's Programme

Students

08:00 hrs - 12:30 hrs

Observation Examination (in batches)

Venue: Grand & Powai Ballrooms

18:30 hrs onwards

Group Competition Briefing

Venue: Powai Ballrooms



Leaders

08:30 hrs - 15:30 hrs

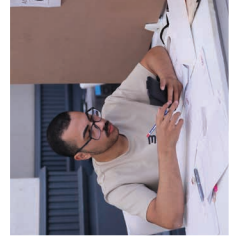
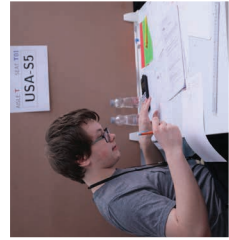
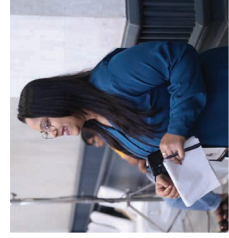
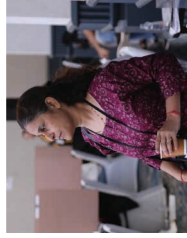
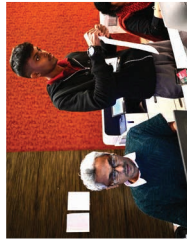
Excursion to

South Mumbai & TIFR

Feature



Image Credit: Wikimedia Commons/ Truck Junction/ CC4



Theory Exam Moods

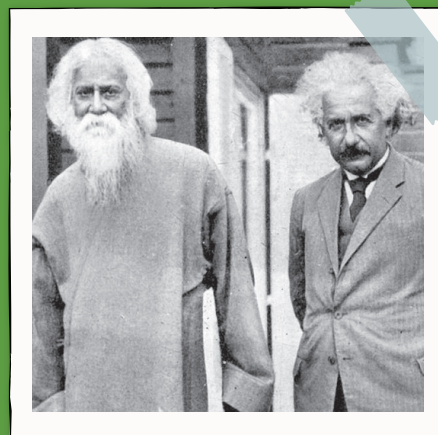


Tagore—The Philosopher–Poet of India

Have you heard the national anthem of India—*Jana Gana Mana*? It was composed by Rabindranath Tagore, one of India's most celebrated figures. His thought and philosophy are best characterised as a form of spiritual humanism, emphasising ideas such as the unity of all existence, inner freedom, moral action, and global citizenship. For *Gitanjali* (a collection of poetry, originally written in Bengali and later translated as Song Offerings), Tagore was awarded the Nobel Prize in Literature in 1913, becoming the first non-European to receive the honour. *Gitanjali* also features in the UNESCO Collection of Representative Works—a project that translated masterpieces of world literature.

No words, however elegantly written, can better convey the spirit and essence of a poet than his own. Let us end with a few lines from the master himself:

*Where the mind is without fear and the head is held high;
Where knowledge is free;
Where the world has not been broken up into fragments by narrow domestic walls;
Where words come out from the depth of truth;.....
Into that heaven of freedom, my Father, let my country awake.*



Rabindranath Tagore met Albert Einstein in 1930 during a visit to Germany, where the two towering intellectuals engaged in a thoughtful and philosophical conversation.

Image Credit: Wikimedia Commons/ Public Domain

In Their Own Words



Scientists that you admire

Nikola Tesla is a scientist who inspires me!

Pavle Ignjatovic
(Contestant, Serbia)

We admire Margherita Hack, the renowned Italian astronomer.

Ilenia Trunfio and Gabriele Lambertini
(Contestants, Italy)

I would say my favourite scientist is Einstein. I find his work and the theories he put forward truly fascinating.

Charlène Lana Eloy
(Contestant, France)

One of the things I really like about mentoring is seeing students have an 'Aha!' moment when they solve a problem after brainstorming hard over it!

Samed Alhajajla
(Leader, Palestine)

I'm looking forward to the Cultural Night, where I can get familiar with the cultures of all the countries. This is exciting because IOAA is not just about education—it's also about a culturally diverse scientific community coming together.

Bernard Annan
(Observer, Ghana)

HAPPY BIRTHDAY!

Vahe Mkrtchyan
Contestant, Armenia



Thoughts on the theory exam

The exam was tough, with some really strange problems that were even harder than in previous years. Some questions I didn't even attempt, while others required a lot of thinking—which I couldn't afford to spend time on. However, the Saha equation was familiar to me, and as soon as I saw it, I was able to grasp it.

Ara Mahdessian
(Contestant, Cyprus)

The questions were interesting and covered different topics, requiring a lot of work, effort, and time. The 11th question required more thinking!

Lora Lukmanova
(Contestant, Bulgaria)

The exam was quite different from previous years, and time management was a major issue. Most questions were time-consuming, and unfortunately, the last two were doable but I ran out of time to attempt them. The middle section was the most challenging.

Pranavendra Tammireddy
(Contestant, Switzerland)

It is my first time at IOAA, and I'm really excited to see how the Planetarium round works, because that is sort of like applied astronomy—which I think is fun!

Milles Åhman
(Leader, Sweden)



Image Credit: Wikimedia Commons/
Biswarup Ganguly / CC BY 3.0

Nandivada Rathnasree

(26 November, 1963 – 9 May, 2021)

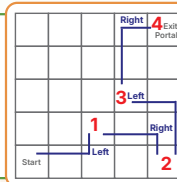
Rathnasree was an Indian astrophysicist and science communicator who made it her mission to share the wonders of the universe with everyone! Rathnasree earned her Ph.D. studying binary star systems—pairs of stars that dance around each other, sometimes swapping mass like a cosmic game of catch. Her research helped us understand how these star pairs evolve, including the life cycles of neutron stars and white dwarfs. But Rathnasree didn't just study the stars, she wanted the whole world to love them too! As Director of the Nehru Planetarium in New Delhi (1999-2021), she transformed it into a space where students, teachers, and curious minds of all age groups and trainings could explore the cosmos. She organised sky-watching nights, workshops, and shows that made astronomy exciting. She created resources in many languages so that even kids in rural areas could explore the stars. She also loved sharing India's rich astronomical history, showing how observatories like Jantar Mantar worked. She played a great role in restoration of Jantar Mantar instruments and related educational resources for continued use by future generations. Rathnasree was a superhero of science for the society. Her legacy shines on—reminding us that the sky belongs to everyone!

Hot Takes for a Hotter Earth

Environmental justice is social justice.



Solution to yesterday's Space Rover Pathfinder



This is **not** the only solution. Can you figure out another solution?

Jupiter Jumble

Find 10 words hidden in this grid related to JUPITER!

T	T	T	E	P	A	K	U	L	G	B	E	E	O	I	S	A	T	M	L	G	T
A	T	D	S	D	H	E	W	U	V	T	W	A	N	N	T	T	E	S	J	T	Y
L	O	R	G	I	Z	M	H	G	R	O	T	E	A	R	U	S	A	T	F	D	A
Y	R	M	A	G	N	E	T	O	S	P	H	E	R	E	N	J	T	N	S	H	O
E	R	I	S	C	N	E	U	I	E	S	S	E	E	T	S	C	U	M	O	W	T
C	B	C	G	S	D	H	O	S	T	D	E	A	T	H	A	N	I	O	M	I	R
I	N	E	I	N	A	I	D	P	G	E	M	D	E	T	O	R	G	N	L	G	I
N	S	C	A	S	S	O	D	R	O	R	F	R	T	A	A	B	E	E	T	O	R
R	N	A	N	O	C	M	C	L	N	T	L	E	T	T	W	G	O	T	A	E	T
I	C	L	T	T	E	I	A	E	Y	A	D	C	T	A	O	W	E	A	K	E	N
E	P	L	B	N	M	R	U	T	L	E	W	M	E	R	O	T	D	O	I	A	E
Y	E	I	W	E	T	R	E	A	M	R	S	R	D	A	E	C	L	O	O	I	E
E	H	S	D	N	O	N	D	Y	P	G	N	Y	D	E	E	T	E	F	T	B	B
S	W	T	T	P	O	E	N	A	D	N	H	A	I	E	B	T	U	T	A	D	A
E	I	O	A	E	S	A	L	E	O	E	L	R	T	Q	E	H	D	S	A	A	K
C	G	T	H	F	G	A	N	T	N	B	I	O	E	E	C	H	T	I	A	E	I

Hint: Think of Jupiter's features, moons, Roman mythology...



Astronomers make great friends—they're always down to Earth.



Image by: Dev Verma

Happy Independence Day India

15 August is India's Independence Day, a celebration of the nation's hard-won freedom and the birth of a sovereign, democratic republic in 1947. It's a day of pride and unity—marked by flag hoisting, parades, and reflection. For Indians, it symbolises self-determination, resilience, and the enduring spirit of the nation. In this issue, we've embraced the colours of the Indian tricolour to honour that spirit.

