# Sir C.V. Raman – the Raman effect and Asia's first Nobel Prize in science

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**Why in news:** 7 November 2026 is the 138th birth anniversary of Sir Chandrasekhara Venkata Raman (born 7 November 1888 at Thiruvanaikaval, Tiruchirappalli), whose discovery of the Raman effect brought India its first Nobel Prize in science.

## Key points

- Early life: born at Thiruvanaikaval near Tiruchirappalli, he studied at Presidency College, Madras (B.A. 1904, M.A. 1907). He joined the Indian Finance Department in Calcutta in 1907 and did research in his spare hours at the Indian Association for the Cultivation of Science (IACS); in 1917 he became Palit Professor of Physics at the University of Calcutta.
- Discovery: on 28 February 1928, with his student K.S. Krishnan, he showed that when light passes through a transparent substance, a tiny part of the scattered light comes out with a changed wavelength – the 'Raman effect'. 28 February is observed as National Science Day (first observed in 1987).
- The science: most scattered light keeps its wavelength (Rayleigh scattering); in Raman scattering the light exchanges energy with the vibrating molecules, so new lines appear on either side of the original (Stokes and anti-Stokes lines). Each substance gives its own 'fingerprint', so Raman spectroscopy is used to identify materials – in chemistry, medicine, gem testing and forensics.
- Honours and institutions: knighted (1929); Nobel Prize in Physics (1930) – the first Asian to win a Nobel Prize in science, for work done in India; Bharat Ratna (1954, in the first batch); Lenin Peace Prize (1957). He became the first Indian Director of the Indian Institute of Science, Bengaluru (1933), founded the Indian Academy of Sciences (1934) and the Raman Research Institute, Bengaluru (1948), and died in Bengaluru on 21 November 1970.
- Other work and Tamil Nadu link: after a sea voyage to England in 1921 he argued that the blue of the sea comes mainly from the scattering of light by water molecules, not merely from reflecting the sky; he also studied the acoustics of the violin and of Indian drums such as the tabla and mridangam. Tamil Nadu link – his co-worker K.S. Krishnan was born at Watrap, and his nephew S. Chandrasekhar won the Physics Nobel in 1983.

**In the exam:** TNPSC – birthplace, the years of the discovery and of the Nobel Prize, Bharat Ratna 1954, National Science Day (it marks the discovery, not Raman's birthday) and the institutions he founded; UPSC Prelims – how Raman scattering differs from Rayleigh scattering and where Raman spectroscopy is used.

## Questions

**1. After his sea voyage of 1921, C.V. Raman argued that the blue colour of the sea is caused mainly by**

A. reflection of the blue sky by the water surface
B. absorption of light by dissolved salts
C. refraction of light at the water surface
D. scattering of light by water molecules

**2. Consider the following statements about the first Bharat Ratna awards (1954):**
**1. All three awardees were born in the Madras Presidency.**
**2. C.V. Raman was the only scientist among them.**
**3. One of the three was honoured posthumously.**
**Which of the statements given above is/are correct?**

A. 1 only
B. 2 only
C. 1 and 2 only
D. 1, 2 and 3

## Answers with explanations

1. **D) scattering of light by water molecules** – Raman argued that the sea's blue comes mainly from the molecular scattering of light in water, not merely from reflecting the sky – the start of the light-scattering studies that led to the Raman effect (1928).

2. **C) 1 and 2 only** – The first Bharat Ratna awards (1954) went to C. Rajagopalachari, S. Radhakrishnan and C.V. Raman – all born in the Madras Presidency; Raman was the only scientist. Statement 3 is wrong: the award could not then be given posthumously (that provision came in 1955).


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