UPSC Mains Science & Technology PYQs (2025-2013), Year-wise Questions

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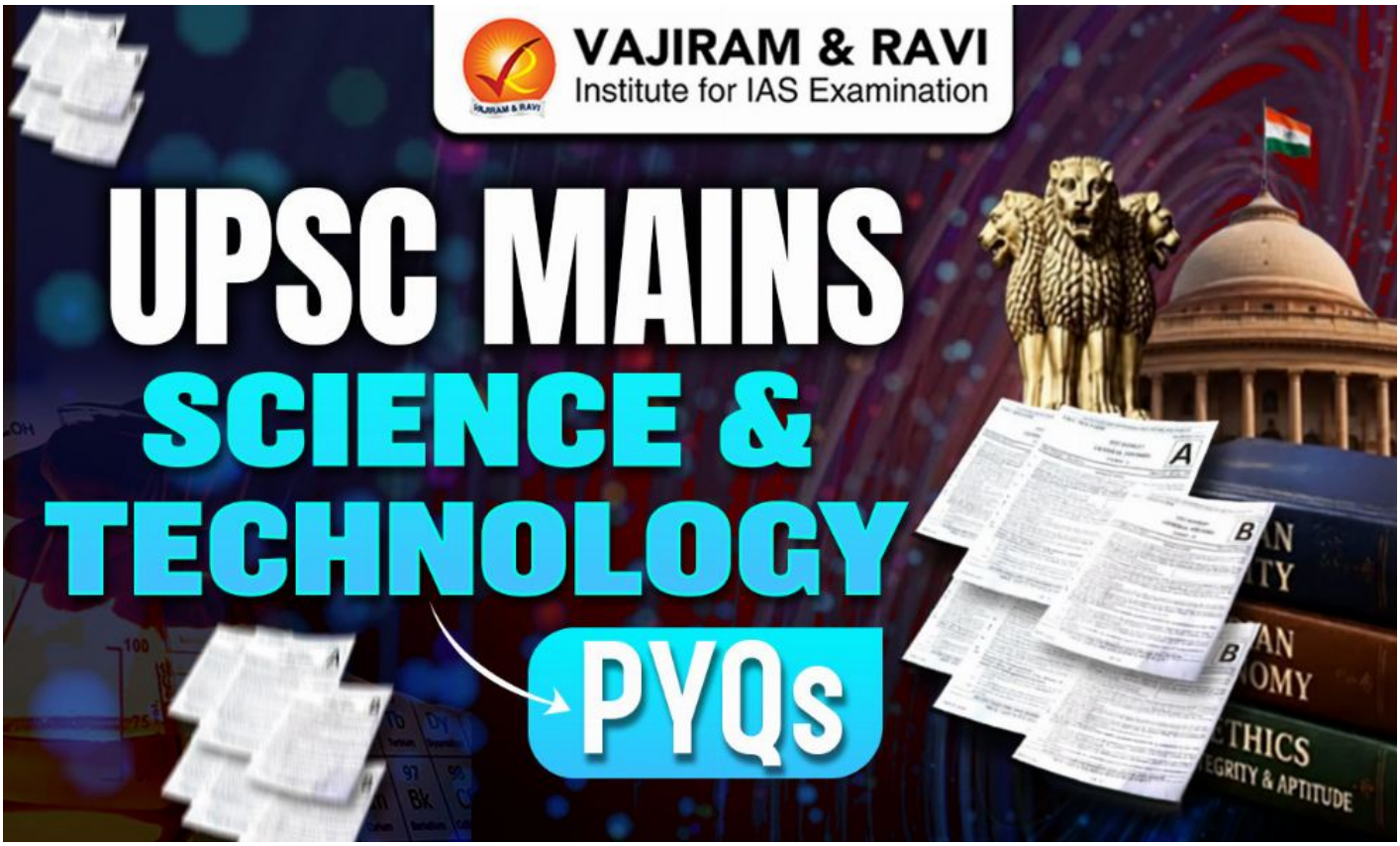

UPSC Mains Science & Technology PYQs (2025-2013) help candidates understand the pattern and trend of questions asked in the Science & Technology section of GS Paper III. Practising these year-wise questions enhances conceptual clarity, analytical ability, and answer-writing skills. They cover key areas such as emerging technologies, space, biotechnology, IT, artificial intelligence, and innovations in science. Regular practice of PYQs enables candidates to prepare in a structured manner and approach the UPSC Mains examination with greater confidence.

UPSC Mains Science & Technology PYQs (2025-2013)

1. 1. The fusion energy programme in India has steadily evolved over the past few decades. Mention India's contributions to the international fusion energy project International Thermonuclear Experimental Reactor (ITER). What will be the implications of the success of this project for the future of global energy? **(Answer in 150 words) 2025**
2. How can India achieve energy independence through clean technology by 2047? How can biotechnology can play a crucial role in this endeavour? **(Answer in 150 words) 2025**

3. How does nanotechnology offer significant advancements in the field of agriculture? How can this technology help to uplift the socio-economic status of farmers? **(Answer in 250 words) 2025**
4. India aims to become a semiconductor manufacturing hub. What are the challenges faced by the semiconductor industry in India? Mention the salient features of the India Semiconductor Mission. **(250 words) 2025**
5. What is the technology being employed for electronic toll collection on highways. What are its advantages and limitations? What are the proposed changes that will make this process seamless? Would this transition carry any potential hazard? **2024**
6. Describe the context and salient features of the Digital Personal Data Protection Act, 2023. **2024**
7. What are asteroids? How real is the threat of them causing extinction of life? What strategies have been developed to prevent such a catastrophe? **2024**
8. Social media and encrypting messaging services pose a serious security challenge. What measures have been adopted at various levels to address the security implications of social media? Also suggest any other remedies to address the problem. **2024**
9. Introduce the concept of Artificial Intelligence (AI). How does AI help clinical diagnosis? Do you perceive any threat to privacy of the individual in the use of AI in healthcare? **2023**
10. Discuss several ways in which microorganisms can help in meeting the current fuel shortage. **2023**
11. What is the main task of India's third moon mission which could not be achieved in its earlier mission? List the countries that have achieved this task. Introduce the subsystems in the spacecraft launched and explain the role of the Virtual Launch Control Centre' at the Vikram Sarabhai Space Centre which contributed to the successful launch from Sriharikota. **2023**
12. Launched on 25th December, 2021, James Webb Space Telescope has been much in the news since then. What are its unique features which make it superior to its predecessor Space Telescopes? What are the key goals of this mission? What potential benefits does it hold for the human race? **2022**
13. What is the basic principle behind vaccine development? How do vaccines work? What approaches were adopted by the Indian vaccine manufacturers to produce **COVID-19** vaccines? **2022**
14. Each year a large amount of plant material, cellulose, is deposited on the surface of Planet Earth. What are the natural processes this cellulose undergoes before yielding carbon dioxide, water and other end products ? **2022**
15. How is S-400 air defence system technically superior to any other system presently available in the world? **2021**
16. What are the research and developmental achievements in applied biotechnology? How will these achievements help to uplift the poorer sections of the society? **2021**
17. The Nobel Prize in Physics of 2014 was jointly awarded to Akasaki, Amano and Nakamura for the invention of Blue LEDs in 1990s. How has this invention impacted the everyday life of human beings? **2021**
18. What do you understand by nanotechnology and how is it helping in the health sector? **2020**
19. COVID-19 pandemic has caused unprecedented devastation worldwide. However, technological advancements are being availed readily to win over the crisis. Give an account of how technology was sought to aid management of the pandemic. **2020**
20. What is India’s plan to have its own space station and how will it benefit our space programme? **2019**

21. How is the government of India protecting traditional knowledge of medicine from patenting by pharmaceutical companies? **2019**
22. Discuss the work of ‘Bose-Einstein Statistics’ done by Prof. Satyendra Nath Bose and show how it revolutionized the field of Physics. **2018**
23. Why is there so much activity in the field of biotechnology in our country? How has this activity benefitted the field of biopharma? **2018**
24. With growing energy needs should India keep on expanding its nuclear energy programme? Discuss the facts and fears associated with nuclear energy? **2018**
25. Stem cell therapy is gaining popularity in India to treat a wide variety of medical conditions including Leukaemia, Thalassemia, damaged cornea and several burns. Describe briefly what stem cell therapy is and what advantages it has over other treatments? **2017**
26. India has achieved remarkable successes in unmanned space missions including the Chandrayaan and Mars Orbiter Mission, but has not ventured into manned space mission. What are the main obstacles to launching a manned space mission, both in terms of technology and logistics? Examine critically. **2017**
27. Give an account of the growth and development of nuclear science and technology in India. What is the advantage of fast breeder reactor programme in India? **2017**
28. Discuss India’s achievements in the field of Space Science and Technology. How the application of this technology has helped India in its socio-economic development? **2016**
29. Why is nanotechnology one of the key technologies of the 21st century? Describe the salient features of Indian Government’s Mission on Nanoscience and Technology and the scope of its application in the development process of the country. **2016**
30. What do you understand by ‘Standard Positioning System’ and ‘Precision Positioning System’ in the GPS era? Discuss the advantages India perceives from its ambitious IRNSS programme employing just seven satellites. **2015**
31. What are the areas of prohibitive labour that can be sustainably managed by robots? Discuss the initiatives that can propel research in premier research institutes for substantive and gainful innovation. **2015**
32. India’s Traditional Knowledge Digital Library (TKDL), which has a database containing formatted information on more than 2 million medicinal formulations is proving a powerful weapon in country’s fight against erroneous patents. Discuss the pros and cons of making this database publicly available under open-source licensing. **2015**
33. Scientific research in Indian universities is declining, because a career in science is not as attractive as are business professions, engineering or administration, and the universities are becoming consumer-oriented. Critically comment. **2014**
34. Can overuse and free availability of antibiotics without Doctor’s prescription, be contributors to the emergence of drug-resistant diseases in India? What are the available mechanisms for monitoring and control? Critically discuss the various issues involved. **2014**
35. In a globalized world, Intellectual Property Rights assume significance and are a source of litigation. Broadly distinguish between the terms - Copyrights, Patents and Trade Secrets. **2014**
36. Bringing out the circumstances in 2005 which forced amendment to the section 3(d) in Indian Patent Law, 1970, discuss how it has been utilized by the Supreme Court in its judgement in rejecting Novratis’ patent application for ‘Glivec’. Discuss briefly the pros and cons of the decision. 2013

37. What do you understand by Fixed Dose Drug Combinations (FDCs)? Discuss their merits and demerits. **2013**
38. What do you understand by Umpire Decision Review System in Cricket? Discuss its various components. Explain how silicone tape on the edge of a bat may fool the system? **2013**
39. (a) What is a digital signature ? What does its authentication mean? Give various salient built-in features of a digital signature. (b) How does the 3D printing technology work? List out the advantages and disadvantages of the technology. **2013**
40. (a) What is an FRP composite material ? How are they manufactured? Discuss their applications in aviation and automobile industries. (b) What do you understand by Run-of-river hydroelectricity project? How is it different from any other hydroelectricity project? **2013**

Benefits of Practicing UPSC Mains Science & Technology Previous Year Questions

Practising UPSC Mains **Science & Technology Previous Year Questions (PYQs)** helps candidates understand the exam pattern, strengthen core concepts, and improve answer-writing skills for **GS Paper III**.

- **Understand the UPSC Exam Pattern** and the nature of **Science & Technology questions** asked by UPSC.
- **Identify Important Topics** such as **emerging technologies, space technology, biotechnology, artificial intelligence (AI), robotics, nanotechnology, and IT developments**.
- **Improve Answer Writing Skills** by practising **structured, analytical, and application-based responses**.
- **Strengthen Conceptual Clarity** on key **scientific developments, technological advancements, and their applications**.
- **Recognise Recurring Themes** to focus on **high-weightage areas** like **AI, cybersecurity, space missions, and biotech innovations**.
- **Integrate Current Affairs** with static topics using **recent innovations, government initiatives, and technological missions**.
- **Develop Analytical Thinking** by evaluating the **impact of technology on society, economy, environment, and security**.
- **Enhance Time Management** through regular **timed practice of PYQs**.
- **Boost Confidence** by becoming familiar with the **UPSC Mains question pattern**.
- **Revise Effectively** using PYQs as a reliable tool for **quick and focused revision** before the examination.
