



VISION IAS

SCIENCE & TECHNOLOGY PREVIOUS YEAR QUESTIONS 2013-2024 (SYLLABUS-WISE)

GS-III: Technology

Developments and their applications and effects in everyday life

- 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 hazards? **(2024 10 marks)**
- The world is facing an acute shortage of clean and safe freshwater. What are the alternative technologies which can solve this crisis? Briefly discuss any three such technologies citing their key merits and demerits. **(2024 15 marks)**
- How does e-Technology help farmers in production and marketing of agricultural produce? Explain it. **(2023 10 Marks)**
- Discuss several ways in which microorganisms can help in meeting the current fuel shortage. **(2023, 10 Marks)**
- 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, 15 Marks)**
- Elucidate the relationship between globalization and new technology in a world of scarce resources, with special reference to India. **(2022, 15 Marks)**
- What is cryptocurrency? How does it affect global society? Has it been affecting Indian Society also? **(2021, 15 Marks)**
- How is science interwoven deeply with our lives? What are the striking changes in agriculture triggered off by the science-based technologies? **(2020, 10 Marks)**
- 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 to the pandemic. **(2020, 15 Marks)**
- Describe the benefits of deriving electric energy from sunlight in contrast to the conventional energy generation? What are the initiatives offered by our government for this purpose? **(2020, 15 Marks)**
- What are the areas of prohibitive labour (whereby law prohibited ex manual scavenging) that can be sustainably managed by robots? Discuss the initiatives that can propel research in premier research institutes for substantive and gainful innovation. **(2015 15 Marks)**
- Can overuse and the availability of antibiotics without doctor's prescription, the 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 12.5 Marks)**
- What do you understand by Fixed Dose Drug Combinations (FDCs)? Discuss their merits and demerits. **(2013 10 Marks)**
- What do you understand by Umpire decision review in cricket? Discuss its various components. Explain how silicon tape on the edge of a bat may fool the system? **(2013 10 Marks)**

Achievements of Indians in science & technology

- Discuss the work of 'Bose-Einstein Statistics' done by Prof. Satyendra Nath Bose and show how it revolutionized the field of Physics. **(2018, 10 Marks)**
- 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 12.5 Marks)**



Indigenization of technology and developing new technology

- 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, 15 marks)**
- How is S-400 air defence system technically superior to any other system presently available in the world? **(2021 10 Marks)**
- How have digital initiatives in India contributed to functioning of education system in country? Elaborate your answer **(2020 15 Marks)**
- What is India's plan to have its own space station and how will it benefit our space programme? **(2019 10 Marks)**
- With growing energy needs should India keep on expanding its nuclear energy programme? Discuss the facts and fears associated with nuclear energy. **(2018, 15 Marks)**
- Why is IRNSS needed? How does it help in navigation? **(2018, 15 Marks)**
- India has achieved remarkable successes in unmanned space missions including the Chandrayaan and Mars Orbiter Mission, but has not ventured into manned space mission, both in terms of technology and logistics? Explain critically. **(2017, 10 Marks)**
- 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 15 Marks)**
- What do you understand by 'Standard Positioning Systems' and 'Protection Positioning Systems' in the GPS era? Discuss the advantages India perceives from its ambitious IRNSS programme employing just seven satellites. **(2015 12.5 Marks)**

Awareness in the fields of IT, Space, Computers, robotics, nanotechnology, bio-technology

- 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 15 Marks)**
- Describe the context and salient features of the Digital Personal Data Protection Act, 2023 **(2024 10 Marks)**
- 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 Marks)**
- 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 15 Marks)**
- What are the research and development achievements in applied biotechnology? How will these achievements help to uplift poorer section of the society? **(2021 15 Marks)**
- 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 15 Marks)**
- What do you understand by nanotechnology and how is it helping in health sector? **(2020, 10 Marks)**
- How can biotechnology help to improve the living standards of farmers? **(2019, 15 Marks)**
- Why is there so much activity in the field of biotechnology in our country? How has this activity benefitted the field of biopharma? **(2018 15 Marks)**
- 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 10 Marks)**
- How does the JUNO mission of NASA help to understand the origin and evolution of earth? **(2017 10 Marks)**
- 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 12.5 Marks)**
- Scientific research in Indian universities is declining, because a career in science is not as attractive as our business operations, engineering or administration, and the universities are becoming consumer oriented. Critically comment. **(2014 12.5 Marks)**

- How does the 3D printing technology work? List out the advantages and disadvantages of the technology. **(2013 5 Marks)**
- What is an FRP (fiber reinforced plastic) composite material? How are they manufactured? Discuss their applications in aviation and automobile industries. **(2013 5 marks)**

Issues relating to intellectual property rights

- How is the Government of India protecting traditional knowledge of medicine from patenting by pharmaceutical companies? **(2019, 15 Marks)**
- 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 12.5 Marks)**
- 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 12.5 Marks)**
- 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 Novartis' patent application for 'Glivec'. Discuss briefly the pros and cons of the decision. **(2013 10 Marks)**

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