

## SCIENCE AND TECHNOLOGY

**2015**

1. 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.
2. 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.
3. Discuss the advantage and security implications of cloud hosting of servers vis-a-vis in-house machine-based hosting for government businesses.
4. 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 the country's fight against erroneous patents. Discuss the pros and cons making this database publicly available under open-source licensing.

**2014**

5. 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.
6. 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.
7. In a globalised world, intellectual property rights assume significance and are a source of litigation. Broadly distinguish between the terms - copyrights, patents and trade secrets.

**2013**

8. Bring out the circumstances in 2005 which forced amendment to section 3(d) in the Indian Patent Law, 1970. Discuss how it has been utilized by Supreme court in its judgment rejecting Novartis patent application for "Glivec". Discuss briefly the pros and cons of the decision.
9. What do you understand by fixed dose drug combinations (FDCs)? Discuss their merits and demerits.
10. 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?
11. What is digital signature? What does its authentication mean? Giver various salient built in features of a digital signature.
12. How does the 3D printing technology work? List out the advantages and disadvantages of the technology.
13. What is an FRP composite material? How are they manufactured? Discuss their applications in aviation and automobile industry.

**2012**

14. The safe landing of the "Curiosity" Rover under NASA's space programme has sparked many possibilities. What are those and how could humankind benefit from them?
15. Significance of the SPOT-6 rocket launch for ISRO.
16. The Sequoia supercomputer was launched this year. What are its specific features and what is its purpose?
17. The human population is slated to grow to 9 billion by 2050. In this context, many scientists predict that plant genomics would play a critical role in keeping out hunger and preserving the environment. Explain.

**2011**

18. Comment on any thirteen of the following in about 50 words each:
  - (a) International Year of Chemistry
  - (b) The scourge of e-waste
  - (c) 'Designer' poultry eggs
  - (d) INSPIRE programme of the Department of Science and Technology
  - (e) The 'Kessler syndrome' with reference to space debris
  - (f) Omega-3 fatty acids in our food
  - (g) Difference between 'spin-drying' and 'tumble-drying' technology with reference to drying of washed clothes
  - (h) The diminishing population of vultures 'Arensic-bug' and the significance of its discovery
  - (i) F ? 22 'Raptor' aircraft
  - (j) 'Concentrated' solar energy and 'photovoltaic' solar energy
  - (k) Analog, hybrid and IP systems in CCTV technology
  - (l) Various applications of Kevlar
  - (m) Differences between Compact Disc (CD), Digital Versatile Disc (DVD) and Blu-ray Disc

