

## ANSWERS TEST: 9 – SCIENCE & TECHNOLOGY - I

1. Solution: D

Wind Machines ranging from 50 W to 100 kW are categorized as small wind generators suitable in low wind speed regions (between 4 to 4.5 m/sec).

- Suitable for off-grid power applications, i.e. decentralized systems such as streetlights, standby power application, etc.
- These systems are essentially battery based.
- Installed on open windy spaces and rooftops.

2. Solution: D

3. Solution: A

4. Solution: D

5. Solution: A

6. Solution: A

- Muntra is an unmanned, remotely operated tank developed by Defence Research and Development Organisation (DRDO).
- It has three variants - surveillance, mine detection and reconnaissance in areas with nuclear and bio threats.

7. Solution: A

### Mission 41K:

- Through this initiative, Indian Railways plans to save Rs 41,000 crore expenditure on energy consumption over the next 10 years. The ministry plans to achieve this target by doubling the, current pace of electrification.
- The railways also aim to procure more and more electricity at cheaper rates through open market instead of sourcing it through DISCOMS and thereby hopes to save as much as 25 per cent on its energy expenses.
- New technologies are also being explored to bring down electricity consumption.
- This mission also aims at saving electrical energy and spending on electricity by shifting to solar energy.

### Mission Raftar:

- Under this project measures are being taken to raise average speed of both passenger carrying trains and freight carrying trains.
- The mission envisages the target of doubling of average speed of freight trains and increasing

the average speed of all passenger trains by 25 kmph.

8. Solution: B

The 2017 United Nations Ocean Conference was a United Nations conference that took place on June 5th-9th 2017 which sought to mobilize action for the conservation and sustainable use of the oceans, seas and marine resources.

- The conference sought to find ways and urge for the implementation of Sustainable Development Goal 14.
- Theme of the Conference: "Our oceans, our future: partnering for the implementation of Sustainable Development Goal 14".
- Participation: Participants include heads of State and Government, civil society representatives, business people, actors, academics and scientists and ocean and marine life advocates from around 200 countries.
- The Governments of Fiji and Sweden have the co-hosting responsibilities of the Conference.
- The Conference shall:
  - Identify ways and means to support the implementation of Sustainable Development Goal 14;
  - Involve all relevant stakeholders and share the experiences gained at the national, regional and international levels in the implementation of Goal 14.

9. Solution: A

- As part of the ongoing Indo-US defence cooperation, a joint military training, Exercise Yudh Abhyas - 2017 is conducted at Joint Base Lewis McChord, Washington, and USA in September 2017. Exercise Yudh Abhyas is one of the largest joint running military training and defence corporation endeavors between India and USA. This was the 13th edition of the joint exercise hosted alternately between the two countries. Experts from both sides will also hold expert academic and military discussions to share each other's experiences on varied topics for mutual benefit.
- India –France- Shakti-2016 joint exercise aims at conducting infantry tactical operations, combating conditioning in a counter-terrorism

environment under the United Nations mandate.

- India-Russia- Indra is a tri-lateral services joint exercise between the India and Russia.
- Exercise Malabar is a trilateral naval exercise involving the United States, Japan and India as permanent partners.

**10. Solution: D**

- The International Campaign to Abolish Nuclear Weapons (ICAN) is a coalition of nongovernment organizations in one hundred countries advocating for a strong and effective nuclear weapon ban treaty.
- ICAN operates on a partnership model. Any organization that agrees with the campaign's aims and does not use or advocate violence may become an ICAN partner organization. Partners pledge to promote the objective of a nuclear weapon ban treaty and to identify publicly with the campaign.
- On 7 July 2017 – following a decade of advocacy by ICAN and its partners – an overwhelming majority of the world's nations adopted a landmark global agreement to ban nuclear weapons, known officially as the Treaty on the Prohibition of Nuclear Weapons. It will enter into legal force once 50 nations have signed and ratified it.
- It prohibits nations from developing, testing, producing, manufacturing, transferring, possessing, stockpiling, using or threatening to use nuclear weapons, or allowing nuclear weapons to be stationed on their territory. It also prohibits them from assisting, encouraging or inducing anyone to engage in any of these activities.
- A nation that possesses nuclear weapons may join the treaty, so long as it agrees to destroy them in accordance with a legally binding, time-bound plan. Similarly, a nation that hosts another nation's nuclear weapons on its territory may join, so long as it agrees to remove them by a specified deadline.
- The campaign received the 2017 Nobel Peace Prize for its work to draw attention to the humanitarian consequences of any use of nuclear weapons and for its efforts to achieve a treaty-based prohibition of such weapons.

**11. Solution: C**

- Owned and controlled by the International Atomic Energy Agency (IAEA), the Low Enriched

Uranium (LEU) Bank will host a reserve of LEU, and act as a supplier of last resort for Member States in case the supply of LEU to a nuclear power plant is disrupted due to exceptional circumstances and the Member State is unable to secure LEU from the commercial market or by any other means.

- The IAEA LEU Bank will be a physical reserve of up to 90 metric tons of low enriched uranium suitable to make fuel for a typical light water reactor, the most widely used type of nuclear power reactor worldwide. The LEU can be used to make enough nuclear fuel to power a large city for three years.
- The IAEA LEU Bank will be located at the Ulba Metallurgical Plant in Oskemen, Kazakhstan.
- The Bank is part of global efforts to create an assured supply of nuclear fuel to countries in case of disruption of the open market or of other existing supply arrangements for LEU.

**12. Solution: C**

**The India Innovation Growth Programme (IIGP):**

- Launched in 2007, is a public-private partnership between Government of India's Department of Science & Technology (DST) and Lockheed Martin Corporation.
- The goal of the Programme is to build an innovation pipeline in India.
- The Programme successfully completed its 10th year in 2016 and has been one of India's longest standing public-private partnerships.
- In line with Government of India's push towards start-ups, the program has been revamped to address specific challenges faced by innovators and entrepreneurs in terms of scaling their innovations.

**Atal Innovation Mission:**

The Government has set up Atal Innovation Mission (AIM) in NITI Aayog with a view to strengthen the country's innovation and entrepreneurship ecosystem by creating institutions and programs that spur innovation in schools, colleges, and entrepreneurs in general.

In 2016-17, the following major schemes were rolled out:

- (a) Atal Tinkering Labs (ATLs): To foster creativity and scientific temper in students, AIM is helping to establish 500 ATLs in schools across India, where

students can design and make small prototypes to solve challenges they see around them, using rapid prototyping technologies that have emerged in recent years.

- (b) Atal Incubation Centres (AICs): AIM will provide financial support of Rs.10 crore and capacity building for setting AICs across India, which will help start-ups expand quicker and enable innovation-entrepreneurship, in core sectors such as manufacturing, transport, energy, education, agriculture, water and sanitation, etc.

**13. Solution: D**

**14. Solution: C**

**15. Solution: C**

**16. Solution: A**

**17. Solution: B**

**18. Solution: D**

**19. Solution: D**

**20. Solution: C**

**21. Solution: C**

**22. Solution: A**

- The GRAPES-3 experiment located at Ooty in India started as a collaboration of the Tata Institute of Fundamental Research, Mumbai, India and the Osaka City University, Osaka, Japan. At present many institutions from India and Japan are in collaboration.
- GRAPES-3 (Gamma Ray Astronomy PeV Energies phase-3) is designed to study cosmic rays with an array of air shower detectors and a large area muon detector. It aims to probe acceleration of cosmic rays in the following four astrophysical settings.
- The GRAPES-3 experiment is getting upgraded. The upgrade will play a major role in getting precise information about the propagation of solar storms in 'the last million miles' (from the L-1 point) of their journey from the Sun to the earth.

**23. Solution: D**

- US Environmental Protection Agency (EPA) defines biocides as "a diverse group of poisonous substances including preservatives, insecticides, disinfectants, and pesticides used for the control of organisms that are harmful to human or animal health or that cause damage to natural or manufactured products".

- A biocide can be: i.e Pesticide: this includes fungicides, herbicides, insecticides, algicides, molluscicides, miticides and rodenticides. ii. Antimicrobial: this includes germicides, antibiotics, antibacterials, antivirals, antifungals, antiprotozoals and antiparasites.

**24. Solution: B**

Statements 1 and 3 are incorrect:

- Transpiration level is the transfer of moisture from the fruit/produce into the atmosphere.
- Respiration is the chemical process by which fruits and vegetables convert sugars and oxygen into carbon dioxide, water, and heat.
- Both processes increase with rise in temperature. Thus Cold storage reduces rate of both these processes.

**25. Solution: A**

Statements 1 and 2 are correct:

- The National Biopharma Mission or Innovate in India is the first ever Industry-Academia mission to accelerate biopharmaceutical development in India.
- The Mission will provide a holistic and integrated approach to strengthen and support the entire product development value chain for accelerating the research that leads to product development. This will help not only in immediate product development addressing public health needs, but will also help to create an ecosystem which will facilitate development of a continuous pipeline of products.
- It aims to promote entrepreneurship and new ventures under the spirit of 'Make in India'.

**26. Solution: D**

**27. Solution: B**

- GSAT-7 (Rukmini) is the first military communication satellite developed by Indian Space Research Organisation (ISRO) for the defence forces. The Indian Navy will be the primary user of this satellite.
- It weighs around 2650 kg and is the fourth generation of satellites developed by ISRO.
- With the help of this multi-band military communication satellite the Indian Navy can virtually expand its blue water capabilities and minimise reliance on other foreign satellites which provide intel regarding movement of

vessels and submarines in Indian Ocean Region (IOR).

**28. Solution: C**

Statements 1 and 2 are Correct:

- The Technology and Innovation Support Center (TISC) program provides innovators in developing countries with access to locally based, high quality technology information and related services, helping them to exploit their innovative potential and to create, protect, and manage their intellectual property (IP) rights.
- It function under the aegis of the World Intellectual Property Organization (WIPO).
- The Cell for IPR Promotion and Management (CIPAM) is designated as the National Focal Point for the TISC national network.
- Recently the Department of Industrial Policy and Promotion (DIPP) and Punjab State Govt decided to establish a TISC centre in Punjab.

**29. Solution: C**

**30. Solution: D**

**31. Solution: B**

SAMPADA is Scheme for Agro-Marine Processing and Development of Agro Processing clusters.

**The objective of SAMPADA is:**

- To supplement agriculture
- Modernize Processing
- Decrease agri-waste

SAMPADA is an umbrella scheme incorporating ongoing schemes of the Ministry like Mega Food Parks, Integrated Cold Chain and Value Addition Infrastructure, Food Safety and Quality Assurance Infrastructure, etc. and also new schemes like Infrastructure for Agro-processing Clusters, Creation of Backward and Forward Linkages etc. The implementation of SAMPADA will result in creation of modern infrastructure with efficient supply chain management from farm gate to retail outlet.

**32. Solution: C**

Statements 1 and 2 are Correct:

- eVIN (Electronic Vaccine Intelligence Network) is an indigenously developed technology system in India that digitizes vaccine stocks and monitors the temperature of the cold chain through a smartphone application.

- The innovative eVIN is presently being implemented called across twelve states in India.
- It aims to support the Government of India's Universal Immunization Programme by providing real-time information on vaccine stocks and flows, and storage temperatures across all cold chain points in these states.
- eVIN aims:
  - (i). To strengthen the evidence base for improved policy-making in vaccine delivery, procurement and planning for new antigens in India.
  - (ii). (ii) Provides an integrated solution to address widespread inequities in vaccine coverage by supporting state governments in overcoming constraints of infrastructure, monitoring and management information systems and human resources, often resulting in overstocking and stockouts of vaccines in storage centres.

**33. Solution: B**

Statement 1 is Incorrect:

Air-independent propulsion (AIP) is any marine propulsion technology that allows a non-nuclear submarine to operate without access to atmospheric oxygen.

- AIP can augment or replace the diesel-electric propulsion system of nonnuclear vessels.
- AIP is usually implemented as an auxiliary source, with the traditional diesel engine handling surface propulsion.
- The DRDO is currently trying to integrate AIP in some of the Scorpene submarines which are currently being manufactured in the Madzgaon dock.

Statement 2 is Correct:

- A scramjet is a variant of a ramjet air breathing jet engine in which combustion takes place in supersonic airflow.
- A scramjet relies on high vehicle speed to compress the incoming air forcefully before combustion (hence ramjet), but whilst a ramjet decelerates the air to subsonic velocities before combustion, the airflow in a scramjet is supersonic throughout the entire engine. That allows the scramjet to operate efficiently at extremely high speeds. India has already undertaken experimental flights by using scramjet technology. The recent Scramjet

Engine Technological Demonstrator was an experimental flight.

**34. Solution: A**

- The South Asia Satellite, also known as GSAT-9, is a geostationary communications and meteorology satellite operated by the Indian Space Research Organisation.
- India financed the project cost entirely and has gifted it to the developing nations of South Asia who are part of Saarc.
- During the 18th SAARC summit held in Nepal in 2014, Indian Prime Minister Narendra Modi mooted the idea of a satellite serving the needs of SAARC member nations as a part of his Neighbourhood first policy. Afghanistan, Bangladesh, Bhutan, Maldives, Nepal and Sri Lanka are the users of the multi-dimensional facilities provided by the satellite. Pakistan did not join the project, stating that it was working on its own satellite, but did offer "monetary and technical support".
- GSAT-9 is the first Indian satellite to use electric propulsion albeit partially. It carries only 25% of the normal chemical fuel package compared to other Indian satellites, a xenon based electric propulsion system is used for orbital functions of the spacecraft. GSAT-20 is expected to be the first fully electric propulsion system enabled satellite.

**35. Solution: B**

- Phased Manufacturing Programme has been notified to boost indigenous production of mobile phones.
- Phased Manufacturing Programme (PMP) has been notified with the objective of substantially increasing the domestic value addition for establishment of a robust mobile handsets manufacturing eco-system in India.
- It aims to provide tax relief to boost the sector.
- With the implementation of the programme, the value addition or share of indigenously procured components in manufacturing of feature phones will go up from about 15 to 37 per cent and the same for smartphones will move up from about 10 to 26 per cent.
- The scheme is being run by the Ministry of Electronics and Information Technology.

**36. Solution: D**

- The Global Innovation Index (GII) is an annual ranking of countries by their capacity for, and success in, innovation.
- It is published by Cornell University, INSEAD, and the World Intellectual Property Organization, in partnership with other organisations and institutions.
- It takes into account numerous indicators some of which are Rule of Law, Ease of starting a Business, Ease of Getting Credit., Ease of paying taxes Regulatory Quality, Expenditure on Education, School Life Expectancy, Political Instability and Absence of Violence/Extremism, ICT Use and Access etc.

**37. Solution: C**

A cloud induced and formed by human activity is known as an artificial or anthropogenic cloud. Although generally clouds covering the sky have only a natural origin, from the beginning of the Industrial Revolution, the use of fossil fuels and water vapor and other gases emitted by nuclear, thermal and geothermal power plants yield significant alterations of the local weather conditions. These new atmospheric conditions can thus enhance cloud formation.

**38. Solution: D**

Statement 1 is Incorrect:

- Deep sea trawling severely damages the sea floor ecosystem
- The UN Secretary General reported that 95 percent of damage to seamount ecosystems worldwide is caused by deep sea bottom trawling.
- A study published in Current Biology suggests a cutoff of 600 meters is a point which ecological damage increases significantly.

Statement 2 is Incorrect:

- Deep sea trawling is highly unselective and is harmful to marine diversity in tropical waters.
- It is more suitable in temperate seas, where the fish species are homogeneously distributed.

**39. Solution: A**

- Huiyan or Hard X-ray Modulation Telescope (HXMT) also known as Insight is a Chinese X-ray space observatory, launched in June 2017.
- It is China's first astronomy satellite

- It is a low earth observation satellite.
- It was launched to observe black holes, neutron stars, active galactic nuclei and other phenomena based on their X-ray and gamma-ray emissions.
- It specifically detects Gravitational waves.

**40. Solution: A**

Statement 1 is Correct:

- Palm oil based biodiesel production has gained popularity as an alternative to fossil fuel. But large number of nations have banned this due to the adverse impacts to the environment due to deforestation. Large tracts of forest lands have been cleared for cultivation of palm trees causing negative consequences to the environment.

Statement 2 is Incorrect:

- Many developed nations like UK, France, Germany etc have already banned biodiesel production via exploiting palm trees. India is yet to ban the practice.

**41. Solution: B**

**42. Solution: B**

**43. Solution: C**

Statement 1 is Correct:

- Extra Neutral Alcohol (ENA) is a highly distilled alcohol without any impurities
- It is colourless, has neutral smell and taste.

Statement 2 is Correct:

- It is generally used in cosmetics and perfumeries as a solvent.
- It can also be used for making alcoholic beverages, fruit beverages and aperitifs.
- It is also used as a solvent and reactant in pharmaceutical industry.

**44. Solution: D**

Statement 2 is Incorrect:

- Its marks authenticity and ensures that authorised registered users are only allowed to use the tag name. However GI products can be used by anyone.
- A GI tag certifies the origin of a product or produce from a particular region as the quality

or other features of the product is attributable only to the place of its origin.

**45. Solution: A**

**Option:**

- NASA's Parker Probe is mission to study the outer atmosphere of the sun known as the corona.
- Parker Solar Probe will employ a combination of in situ measurements and imaging to revolutionize our understanding of the corona and expand our knowledge of the origin and evolution of the solar wind.
- It was earlier known as Solar Probe Plus, later named as Parker Solar Probe in honour of astrophysicist Eugene Parker.

**46. Solution: A**

**47. Solution: B**

Statement 1 is Incorrect:

- Neutron star Interior Composition Explorer or NICER is a first ever mission by NASA to study the neutron stars.
- The Mission will focus on Pulsars (A pulsar is a highly magnetized, rotating neutron star or white dwarf, that emits a beam of electromagnetic radiation).
- It will be the first demonstration of X-ray navigation in space.
- Pulsars remain accessible virtually everywhere in space making them an apt navigational solution for deep-space exploration. NICER will perform tests for the first time in a space technology that relies on pulsars as navigation beacons.

**48. Solution: B**

Statement 1 is Incorrect:

- Digi Yatra is an initiative of Ministry of Civil Aviation.
- It plans to make boarding pass and security check-ins at airports digital using Aadhaar and mobile phones.
- The move is aimed to ease the security and boarding procedure, in turn make the process paperless.

Statement 2 is Correct:

- 'Air Sewa portal' is a web portal that provides an integrated common platform on which air

passengers can lodge their grievances against all major stakeholders in aviation sector including airlines.

**49. Solution: A**

Statement 1 is Correct:

- The Indian Bureau of Mines (IBM) is a multi-disciplinary organisation under aegis of Department of Mines, Ministry of Mines.
- The objective of the IBM is to promote systematic and scientific development and optimum utilisation of mineral resources of the country (both on-shore and off-shore).
- Some of its functions are - To collect, collate and organise into a database, function as the National Technical Regulator in respect of the mining sector, to establish institutional mechanisms of coordination between the Centre, the States, mineral industry, research and academic institutions, and all stake holders.

Statement 2 is Incorrect:

- It does not perform auctioning and allocation of the mines.
- It is done by Ministry of Coal.

**50. Solution: C**

Statement 1 is Correct:

- Jute-ICARE stands for Improved Cultivation and Advanced Retting Exercise for Jute.
- It is undertaken by Ministry of Textiles.

Statement 2 is Correct:

- It aims to popularize/introduce some of the better agronomic practices and recently developed microbial assisted retting among farmers.
- It was initially done on pilot basis in West Bengal and Assam.

Statement 3 is Correct:

- The improved agronomic practices include: line sowing of jute using seed drill to increase yield; weed management in jute by wheel hoeing/nail weeder instead of hand weeding for reducing the cost of weeding; and distribution of quality certified seeds at 50% subsidy.

**51. Solution: D**

- The Ministry of Earth Science has launched 'Sagar Vani' app on the occasion of its foundation Day.

- It is a software platform where various dissemination modes will be integrated on a single central server.
- It aims to provide ocean information services for the benefit of various user communities in the country
- It will serve the coastal community, especially the fishermen community with the advisories and alerts towards their livelihood as well as their safety at Sea.

**52. Solution: C**

**53. Solution: D**

- The Codex Alimentarius (Latin for "Food Code") is a collection of internationally recognized standards, codes of practice, guidelines, and other recommendations relating food production, and food safety.
- Its texts are developed and maintained by the Codex Alimentarius Commission, a body that was established in 1961 by the Food and Agriculture Organization of the United Nations (FAO), was joined by the World Health Organization (WHO) in 1962.
- The Commission's main goals are to protect the health of consumers and ensure fair practices in the international food trade.

**54. Solution: C**

- Combustible ice is a frozen mixture of water and concentrated natural gas.
- Technically known as methane hydrate, it can be lit on fire in its frozen state and is believed to comprise one of the world's most abundant fossil fuels.
- Originally thought to occur only in the outer regions of the Solar System, where temperatures are low and water ice is common, significant deposits of methane clathrate have been found under sediments on the ocean floors of the Earth.
- Methane hydrate is formed within marine sediments where methane is generated by chemical reactions or by microbes breaking down organic matter.
- The gas moves up to the sea bed where the temperature is much low. It causes the gas to cool, due to this cooling methane molecules form weak chemical bond with surrounding water molecules, producing solid methane hydrate.

55. Solution: C

Statement 1 is Incorrect:

- CIPAM aims for implementation of the National IPR Policy 2016.

Statement 2 is Incorrect:

- Office of the Controller General of Patents, Designs and Trade Marks (CGPDTM) is the authority that processes, examines and accords Intellectual Property Rights in India.

**Functions of CIPAM:**

1. Public awareness about IPRs in the country,
2. Promoting the filing of IPRs through facilitation,
3. Providing inventors with a platform to commercialize their IP assets and coordinating the implementation of the National IPR Policy in collaboration with government ministries/ departments and other stakeholders

Statement 3 is correct:

- Cell for IPR Promotion and Management (CIPAM) has been created as a professional body under the guidance of Department of Industrial Policy and Promotion (DIPP).
- Slogan – “Creative India; Innovative India”.

56. Solution: D

- SHAKTI (Scheme for Harnessing and Allocating Koyala (Coal) Transparently in India) aims to auction long-term coal linkages to power companies.
- Under the policy, coal linkages would be awarded to designated state-owned power distribution companies (discoms).
- These, in turn, would assign linkages to state or central power generation companies via allocation, and through auction to private units.
- The independent power producers (IPPs) participating in the auction will bid for discounts on the existing tariff and this would be adjusted from the gross coal bills.

57. Solution: D

Statements 1, 2 and 3 are Correct:

- World Organisation for Animal Health is the intergovernmental organisation for animal health.
- It was known as Office International des Epizooties (OIE) when formed. And it still known as OIE.

- It is recognized as a reference organisation by the World Trade Organisation (WTO).
- The organisation is placed under the authority and control of World Assembly of delegates – consisting of delegates designated by the government of all member countries.
- It gathers and disseminate information about animal diseases around the world and to create health standards to protect international trade in animals and their products.
- It performs some other functions like - promoting veterinary services, disseminating scientific information, monitoring food safety and animal welfare.

58. Solution: A

59. Solution: D

60. Solution: B

61. Solution: D

62. Solution: A

63. Solution: B

64. Solution: C

65. Solution: B

66. Solution: A

67. Solution: D

68. Solution: A

69. Solution: C

70. Solution: C

71. Solution: C

72. Solution: B

73. Solution: A

74. Solution: D

75. Solution: D

76. Solution: C

77. Solution: B

**Gaofen** (GF, “High Resolution”) is a series of Chinese civilian Earth observation satellites developed and launched for the China High-definition Earth Observation System (CHEOS), a state-sponsored programme aimed to develop a near-real time, all-weather and global surveillance network consisting of satellite.

78. Solution: D

**79.** Solution: B

GSLV D1 is MARK III version.

**80.** Solution: B

**81.** Solution: B

Ocean Wind Energy is off-shore wind Power generation which has not been commercialized.

**82.** Solution: D

**83.** Solution: C

It has already been developed and used by Microsoft. It uses unused spectrum.

**84.** Solution: D

Astro-H is Japanese Astronomical satellite to study stars.

**85.** Solution: D

**86.** Solution: A

**87.** Solution: A

**88.** Solution: A

**89.** Solution: A

**90.** Solution: D

**91.** Solution: C

**92.** Solution: D

**93.** Solution: D

**94.** Solution: D

**95.** Solution: B

Solan district is in Himachal Pradesh.

**96.** Solution: C

Li-Fi uses visible Light and is bi-directional.

**97.** Solution: D

**98.** Solution: C

**99.** Solution: C

**100.** Solution: D