

SERIES – 4 : SOLUTIONS (Days 13-16)

1. **Solution: b**

Environmental Information System (ENVIS)

- The Environmental Information System (ENVIS) was implemented by the Ministry by end of 6th Five Year Plan (1982) as a Plan Scheme for environmental information collection, collation, storage, retrieval and dissemination to policy planners, decision makers, scientists and environmentalists, researchers, academicians and other stakeholders.
- ENVIS is a decentralized computerized network database system consisting of the focal point located in the Ministry and a chain of network partners, known as ENVIS Centres located in the potential organizations/institutions throughout the country.
- In order to develop ENVIS network as a comprehensive distributed environmental information network system, the ambit of ENVIS was extended to cover all the States/UTs of the country.

Hence **statement 1 is incorrect.**

- The National Museum of Natural History (**NMNH**) was established as one of the national level institutions set up during the Silver Jubilee celebrations of India's Independence, to portray and promote awareness on the Natural Heritage of the country.

Hence **statement 2 is correct.**

2. **Solution: d**

- **National Green Corps** is a major initiative of **MOEFCC** for creating environmental awareness launched in 2001-02 which aims at building cadres of young children working towards environmental conservation and sustainable development. The phenomenal response that NGC has received and has made the network more than 100000 Eco clubs across the country. It is one of the largest conservation networks that indicates its importance at grass root level in taking the environment awareness at mass.

Hence **statement 1 is incorrect.**

- It is operated through **Eco-clubs** set up in **schools** registered as members of NGC, this programme exposes school children to in-depth field experiences, and provides opportunities to convert their ideas into creative action.

Hence **statement 2 is incorrect.**

3. **Solution: d**

Prithvi-II missile

- Prithvi-II is **indigenously** developed **nuclear-capable surface-to-surface** ballistic missile (Hence **statement 3 is correct**).
- The missile is capable of carrying warheads weighing **500 kg to 1,000 kg**.
- With a strike range of 350 km, Prithvi-II is powered by twin-engines which use liquid propulsion (Hence **statement 1 is correct**).
- It also uses advanced inertial guidance system with manoeuvring trajectory to hit its target (Hence **statement 2 is correct**).
- Prithvi II is the first missile to be developed by **DRDO** under India's IGMDP (Integrated Guided Missile Development Programme).

4. **Solution: d**

- Stealth technology works on the principle of eliminating radar reflections. This can be done by either

Absorbing radio waves (RAM coatings):

- **Radar Absorbent Material (RAM)** coatings involve application of materials which can **absorb electromagnetic waves on the object**. It will enhance **stealth** capabilities. (Hence **statement 1 is correct**).
- USA has been the pioneer in this technology from the past 40 years. These are specially designed materials made from dielectrics, composites which absorb the radio waves which fall on them.

Deflecting radio waves (Shaping of the surfaces):

- Shaping involves designing the object in such a way that the Radio waves the radio waves, instead of being reflected back along the same path are deflected and scattered in different directions. This is achieved by using **sharply angled flat surfaces** or special curved surfaces which conduct the radio wave along its surface and thus does not give back a reflection. (Hence **statement 2 is incorrect**).

Reducing infrared signatures:

- Infrared stealth is an area of stealth technology aimed at **reducing infrared signatures**. This reduces a platform's susceptibility to infrared guided weapons and infrared surveillance sensors. (Hence **statement 3 is correct**).

Source: <https://defencyclopedia.com/2015/01/11/explained-how-stealth-technology-works/>

5. Solution: b

- **Nag** is a third-generation, **fire-and-forget**, **anti-tank** guided missile developed by India's state-owned Defence Research and Development Organisation (DRDO) to support both mechanised infantry and airborne forces of the Indian Army.
- The missile incorporates an advanced passive homing guidance system and possesses high single-shot kill probability. It is designed to destroy modern main battle tanks and other heavily armoured targets.
- Nag can be launched from land and air-based platforms. The land version is currently available for integration on the Nag missile carrier (NAMICA), which is derived from a BMP-2 tracked infantry combat vehicle.

Hence statement 1 is incorrect.

- The helicopter-launched configuration, designated as helicopter-launched NAG (HELINA), can be fired from Dhruv advanced light helicopter (ALH) and HAL Rudra (ALH WSI) attack helicopter.

Hence statement 3 is incorrect.

- A passive imaging infrared (IIR) homing seeker guides the missile to the target after its launch in all lighting conditions. The missile can be optionally offered with a millimetre wave active radar seeker.

Hence Statement 2 is correct.

Source: <https://www.army-technology.com/projects/nag-anti-tank-guided-missile/>

6. Solution: a

Refer Insights Exclusive Science and Technology Revision Module.

Correct pairs:

Missile Names Features

- | | |
|------------|--|
| 1. NIRBHAY | Sub-Sonic Cruise Missile |
| 2. ASTRA | Air to Air Beyond Visual range Missile |
| 3. AKASH | Supersonic surface-to-air missile |

7. **Solution: d**

- CARTOSATs are used for Cartographic applications.
- RESOURCESATs are Remote Sensing satellites intended for resource monitoring.
- The Satellite with ARGOS and ALTIKA (SARAL) is a joint Indo-French satellite mission for oceanographic studies.
- RISATs are used in imaging of the surface features during both day and night under all weather conditions.
- Megha-Tropiques is an Indo-French Joint Satellite Mission for studying the water cycle and energy exchanges in the tropics.
- IRS-P4 (OCEANSAT) is the first satellite primarily built for Ocean applications.

Source: <https://www.isro.gov.in/applications/satellites-earth-observation>

8. **Solution: c**

Factual information:

- **Asteroid:** A relatively small, inactive, rocky body orbiting the Sun.
- **Comet:** A relatively small object whose ices can vaporize in sunlight forming an atmosphere (coma) of dust and gas and, sometimes, a tail of dust and/or gas.
- **Meteoroid:** A small particle from a comet or asteroid orbiting the Sun. (**Hence statement 1 is correct**).
- **Meteor:** The light phenomena which results when a meteoroid enters the Earth's atmosphere and vaporizes; a shooting star. (**Hence statement 2 is correct**).
- **Meteorite:** A meteoroid that survives its passage through the Earth's atmosphere and lands upon the Earth's surface. (**Hence statement 3 is correct**).

Refer Insights Exclusive Science and Technology Revision module.

9. **Solution: d**

Factual information:

- NASA has authorized a second extension of the **Dawn mission** at Ceres, the largest object in the asteroid belt between Mars and Jupiter.
- NASA's flying observatory **Sofia** is preparing for its 2018 campaign, which will include observations of celestial magnetic fields, star-forming regions, comets and Saturn's giant moon Titan. This will be the fourth year of full operations for Sofia, short for Stratospheric Observatory for Infrared Astronomy.
- NASA has announced new tests are underway for the **Kilopower project**, a program designed to create small nuclear power sources to fuel further space exploration.
- **NASA's Orion spacecraft** – designed to take astronauts to deep space destinations such as the Moon and Mars – has successfully completed a series of tests for its critical safety systems.

All statements are correct.

10. **Solution: b**

- Besides leaves, photosynthesis also takes place in other green parts of the plant — in green stems and green branches. The desert plants have scale- or spine-like leaves to reduce loss of water by transpiration. These plants have green stems which carry out photosynthesis.

Hence statement 1 is incorrect.

- The leaves other than green also have chlorophyll. The large amount of red, brown and other pigments mask the green colour. Photosynthesis takes place in these leaves also.

Hence statement 2 is correct.

- There are some plants which do not have chlorophyll. They cannot synthesise their food. Like humans and animals such plants depend on the food produced by other plants. They use the heterotrophic mode of nutrition.
- The plant *Cuscuta* (Amarbel) does not have chlorophyll. It takes readymade food from the plant on which it is climbing. The plant on which it climbs is called a host. Since it deprives the host of valuable nutrients, it is called a parasite.

Hence statement 3 is incorrect.

11. Solution: a

- The digested food pass into the blood vessels in the wall of the intestine. The inner walls of the small intestine have thousands of finger-like outgrowths. These are called villi (singular villus). The villi increase the surface area for absorption of the digested food. Each villus has a network of thin and small blood vessels close to its surface. The surface of the villi absorbs the digested food materials.

Hence, Statement 1 is correct.

- The function of large intestine is to absorb water and some salts from the undigested food material. The remaining waste passes into the rectum and remains there as semi-solid faeces. The faecal matter is removed through the anus from time-to-time. This is called egestion.

Hence, Statement 2 is incorrect.

12. Solution: d

- The rain becomes acidic because carbon dioxide, sulphur dioxide and nitrogen dioxide (which are released into the air as pollutants) dissolve in rain drops to form carbonic acid, sulphuric acid and nitric acid respectively.
- Acid rain can cause damage to buildings, historical monuments, plants and animals.

13. Solution: d

- The mixture of rock particles and humus is called the soil. Living organisms, such as bacteria, plant roots and earthworm are also important parts of any soil.
- The soil is classified on the basis of the proportion of particles of various sizes. If soil contains greater proportion of big particles it is called sandy soil. If the proportion of fine particles is relatively higher, then it is called clayey soil. If the amount of large and fine particles is about the same, then the soil is called loamy. Thus, the soil can be classified as sandy, clayey and loamy.
- The sizes of the particles in a soil have a very important influence on its properties. Sand particles are quite large. They cannot fit closely together, so there are large spaces between them. These spaces are filled with air. We say that the sand is well aerated. Water can drain quickly through the spaces between the sand particles. So, sandy soils tend to be light, well aerated and rather dry.

- Clay particles, being much smaller, pack tightly together, leaving little space for air. Unlike sandy soil, water can be held in the tiny gaps between the particles of clay. So clay soils have little air. But they are heavy as they hold more water than the sandy soils.
- The best topsoil for growing plants is loam. (**Hence statement 1 is incorrect**).
- Loamy soil is a mixture of sand, clay and another type of soil particle known as silt. Silt occurs as a deposit in river beds. The size of the silt particles is between those of sand and clay. The loamy soil also has humus in it. It has the right water holding capacity for the growth of plants. (**Hence statement 2 is incorrect**).

14. Solution: c

- Breathing is only a physical process which includes only inhale and exhale. Breathing is a part of the process of respiration during which an organism takes in the oxygen-rich air and gives out air rich in carbon dioxide.

Hence statement 2 is correct.

Hence statement 1 is correct.

- Respiration involves oxidation of food ultimately releasing energy. Respiration is essential for survival of living organisms.
- The first step in both anaerobic and aerobic respiration is called glycolysis. This is the process of taking one glucose (sugar) molecule and breaking it down into pyruvate and energy (2 ATP).

Hence statement 3 is correct.

Source: NCERT class VII chapter 10; Wikipedia.

15. Solution: b

- The International Space Station (ISS) is a space station, or a habitable artificial satellite, in low Earth orbit. (**Hence statement 1 is incorrect**).
- The ISS programme is a joint project among five participating space agencies: NASA (US), Roscosmos (Russia), JAXA (Japan), ESA (Europe), and CSA (Canada). (**Hence statement 2 is correct**).
- The ISS serves as a microgravity and space environment research laboratory in which crew members conduct experiments in biology, human biology, physics, astronomy, meteorology and other fields. (**Hence statements 3 are correct**.)

Source: https://www.nasa.gov/mission_pages/station/main/index.html

16. Solution: d

<https://exoplanets.nasa.gov/>

https://en.wikipedia.org/wiki/List_of_exoplanets

17. Solution: c

- ADITYA is the first indigenously designed and built tokamak of India. Plasma discharges at toroidal field of 8.0 kG for nearly 100ms time with 80 – 100kA current, are being regularly studied in this little replica of SUN. To increase the plasma energy content during the discharge, auxiliary heating systems have been integrated. A 20 – 40 MHz, 200 KW Ion Cyclotron Resonance Heating (ICRH) system has been integrated to ADITYA vacuum vessel and successfully operated in the last campaign. A 28 GHz, 200 KW gyrotron based electron cyclotron resonance heating (ECRH) system has also been successfully commissioned on ADITYA tokamak. Some neural network analysis to predict disruptions and density limit on ADITYA have also been performed. This machine, an air-core, mid-sized (R=75 cm, a=25

cm) ohmically heated circular limiter tokamak, is engaged in carrying out several dedicated experiments on runaway mitigation, disruption control etc. which are of utmost importance for the successful operation of large size tokamaks, such as ITER.

Hence Statement 1 is correct.

- Source: <http://www.ipr.res.in/documents/264.html>

Aditya – L1 First Indian mission to study the Sun

- The Aditya-1 mission was conceived as a 400kg class satellite carrying one payload, the Visible Emission Line Coronagraph (VELC) and was planned to launch in a 800 km low earth orbit. A Satellite placed in the halo orbit around the Lagrangian point 1 (L1) of the Sun-Earth system has the major advantage of continuously viewing the Sun without any occultation/ eclipses. Therefore, the Aditya-1 mission has now been revised to “Aditya-L1 mission” and will be inserted in a halo orbit around the L1, which is 1.5 million km from the Earth. The satellite carries additional six payloads with enhanced science scope and objectives.

Hence Statement 2 is correct.

Source: <https://www.isro.gov.in/aditya-l1-first-indian-mission-to-study-sun>

18. Solution: d

Source: Table 7.3 in Indian State of Forest Report

http://fsi.nic.in/details.php?pgID=sb_64

19. Solution: a

Source: Section 8.2 of Indian State of Forest Report 2017.

http://fsi.nic.in/details.php?pgID=sb_64

20. Solution: c

- The ranking is in order that is given in the statement.
- In all three states mentioned in the question have carried out plantation and conservation activities to achieve net positive change in forest cover. In Kerala, even commercial plantations have contributed.

Source: Table 2.9 of Indian State of Forest Report 2017.

http://fsi.nic.in/details.php?pgID=sb_64

21. Solution: b

<https://www.insightsonindia.com/2017/09/01/insights-daily-current-affairs-01-september-2017/>

The green box is defined in Annex 2 of the Agriculture Agreement.

- In order to qualify, green box subsidies must not distort trade, or at most cause minimal distortion (paragraph 1). They have to be government-funded (not by charging consumers higher prices) and must not involve price support.
- They tend to be programmes that are not targeted at particular products, and include direct income supports for farmers that are not related to (are “decoupled” from) current production levels or prices. They also include environmental protection and regional development programmes. “Green box” subsidies are therefore allowed without limits, provided they comply with the policy-specific criteria set out in Annex 2.

https://www.wto.org/english/tratop_e/agric_e/agboxes_e.htm

22. **Solution: c**

<https://www.insightsonindia.com/2017/09/02/insights-daily-current-affairs-02-september-2017/>

- All Pregnant Women and Lactating Mothers, excluding PW&LM who are in regular employment with the Central Government or the State Governments or PSUs or those who are in receipt of similar benefits under any law for the time being in force.
- All eligible Pregnant Women and Lactating Mothers who have their pregnancy on or after 01.01.2017 for first child in family.
- The date and stage of pregnancy for a beneficiary would be counted with respect to her LMP date as mentioned in the MCP card.

Case of Miscarriage/StillBirth :

- A beneficiary is eligible to receive benefits under the scheme only once.
- In case of miscarriage/stillbirth, the beneficiary would be eligible to claim the remaining instalment(s) in event of any future pregnancy.
- Thus, after receiving the 1st instalment, if the beneficiary has a miscarriage, she would only be eligible for receiving 2nd and 3rd instalment in event of future pregnancy subject to fulfilment of eligibility criterion and conditionalities of the scheme. Similarly, if the beneficiary has a miscarriage or still birth after receiving 1 st and 2nd instalments, she would only be eligible for receiving 3rd instalment in event of future pregnancy subject to fulfilment of eligibility criterion and conditionalities of the scheme.
- **Case of Infant Mortality:** A beneficiary is eligible to receive benefits under the scheme only once. That is, in case of infant mortality, she will not be eligible for claiming benefits under the scheme, if she has already received all the instalments of the maternity benefit under PMMVY earlier.
- Pregnant and Lactating AWWs/ AWHs/ ASHA may also avail the benefits under the PMMVY subject to fulfilment of scheme conditionalitie

23. **Solution: c**

<https://www.insightsonindia.com/2017/09/04/insights-daily-current-affairs-04-september-2017/>

- The commercial capital of Gujarat, Ahmedabad, has been formally accorded the status of India's first World Heritage City by UNESCO. In July, the UN agency had inscribed Ahmedabad as India's first World Heritage City at a meeting held in Poland.
- The World Heritage Cities Programme is one of six thematic programmes formally approved and monitored by the World Heritage Committee. It aims to assist States Parties in the challenges of protecting and managing their urban heritage.
- The programme is structured along a two-way process, with 1) the development of a theoretical framework for urban heritage conservation, and 2) the provision of technical assistance to States Parties for the implementation of new approaches and schemes.

24. **Solution: b**

<https://www.insightsonindia.com/2017/09/04/insights-daily-current-affairs-04-september-2017/>

Statement-1 is incorrect because there is no formal agreement with the AU.

However, this agreement involves all the African governments

- The Asia-Africa Growth Corridor or AAGC is an economic cooperation agreement between the governments of India, Japan and the all the governments of African countries.

- India on 25 May 2017 launched a vision document for Asia-Africa Growth Corridor or AAGC at the African Development Bank meeting in Gujarat. The Research and Information System for Developing Countries (RIS), New Delhi, the Economic Research Institute for ASEAN and East Asia (ERIA), Jakarta, and Institute of Developing Economies (IDE-JETRO), Tokyo, have developed the Vision Document based on consultations with Asian and African think-tanks.
- It aims for Indo-Japanese collaboration to develop quality infrastructure in Africa, complemented by digital connectivity, which would undertake the realization of the idea of creating free and open Indo-Pacific Region. The AAGC will give priority to development projects in health and pharmaceuticals, agriculture and agro-processing, disaster management and skill enhancement. The connectivity aspects of the AAGC will be supplemented with quality infrastructure.

25. Solution: a

<https://www.insightsonindia.com/2017/09/05/insights-daily-current-affairs-05-september-2017/>

- The APA provisions were introduced in the Income-tax Act in 2012 and the “Rollback” provisions were introduced in 2014. The APA scheme endeavours to provide certainty to taxpayers in the domain of transfer pricing by specifying the methods of pricing and setting the prices of international transactions in advance. Since its inception, the APA scheme has been well-accepted by taxpayers and that has resulted in more than 800 applications (both Unilateral and Bilateral) being filed so far in five years.
- The progress of the APA scheme strengthens the Government’s resolve of fostering a non-adversarial tax regime. The Indian APA programme has been appreciated nationally and internationally for being able to address complex transfer pricing issues in a fair and transparent manner.

26. Solution: d

- Viruses reproduce only inside the cells of the host organism, which may be a bacterium, plant or animal (**Hence statement 1 is correct**). Common ailments like cold, influenza (flu) and most coughs are caused by viruses. Serious diseases like polio and chicken pox are also caused by viruses.
- When a disease-carrying microbe enters our body, the body produces antibodies to fight the invader. The body also remembers how to fight the microbe if it enters again. So, if dead or weakened microbes are introduced in a healthy body, the body fights and kills them by producing suitable antibodies. The antibodies remain in the body and we are protected from the disease-causing microbes. This is how a vaccine works.

Hence statement 2 is correct.

- Yeast reproduces rapidly and produces carbon dioxide during respiration (**Hence statement 3 is correct**). Bubbles of the gas fill the dough and increase its volume. This is the basis of the use of yeast in the baking industry for making breads, pastries and cakes.

Source: NCERT Class VIII Chapter 2

27. Solution: d

- The nucleus of the bacterial cell is not well-organised like the cells of multicellular organisms. There is no nuclear membrane. The cells having nuclear material without nuclear membrane are termed prokaryotic cells. The organisms with these kinds of cells are called prokaryotes (pro:primitive; karyon: nucleus). Examples are bacteria and blue green algae (**Hence statement 1 is incorrect**).

- The cells, like **onion cells** and **cheek cells** having well-organised nucleus with a nuclear membrane are designated as eukaryotic cells. All organisms other than bacteria and blue green algae are called eukaryotes. (eu: true; karyon: nucleus). (**Hence statement 2 is incorrect**).

Source: NCERT Class VIII Chapter 8

28. Solution: b

- Adrenalin helps the body to adjust to stress when one is very angry, embarrassed or worried. (**Hence statement 3 is correctly** matched).
- Vasopressin helps in water and electrolyte balance. (**Hence statement 1 is wrongly** matched).
- Oxytocin helps in ejection of milk during lactation. (Hence **statement 2 is wrongly** matched).
- Thyroxin regulates Carbohydrate, fats and Protein metabolism. (Hence **statement 4 is wrongly** matched).

Source: NCERT Class VIII Chapter 10; Wikipedia.

29. Solution: a

- The retina contains several nerve cells. Sensations felt by the nerve cells are then transmitted to the brain through the optic nerve.
- There are two kinds of cells– rods and cones.
- Both rods and cones are photoreceptor cells of the eye. (Hence **statement 1 is correct**).
- Rod cells are located at the peripheral portion of the retina. Rods are sensitive to dim light.
- Cone cells are located at the central part (fovea) of the retina. Cones are sensitive to bright light. (Hence **statement 4 is correct** and **statement 2 is incorrect**).
- Cones sense colour. (Hence **statement 3 is correct**).
- Source: NCERT Class VIII Chapter 16

<http://www.easybiologyclass.com/difference-between-rod-cells-and-cone-cells-comparison-table/>

30. Solution: d

- **GeneXpert**, the test device platform, was launched by Cepheid in 2004 and simplifies molecular testing by fully integrating and automating the three processes (sample preparation, amplification and detection) required for real-time PCR-based molecular testing.
- The Xpert MTB/RIF test is currently the only molecular test of its kind and uses a cartridge containing all elements necessary for the reaction, including lyophilized reagents, liquid buffers and wash solutions. Target detection and characterization is performed in real time using a six-colour laser detection device.
- It is a device released by the WHO which can be used to diagnose TB and HIV infections, and quantitatively measure HIV and hepatitis C viral loads. (**Hence statement 2 is correct**)
- The technology allows for the rapid detection of TB and resistance to rifampicin in a single test. (**Hence statement 1 is correct**). It has a sensitivity superior to that of conventional microscopy or culture on solid media, and is therefore useful in the diagnosis of TB in HIV co-infected persons where the sensitivity of microscopy alone is low. The system simultaneously detects resistance to rifampicin, which is a good and reliable proxy for MDR-TB.
- Culture and conventional drug susceptibility testing against second-line anti-TB drugs is still necessary to confirm or exclude XDR-TB and to monitor response to MDR-TB treatment. (**Hence Statement 3 is correct**).

Source: http://www.who.int/tb/laboratory/xpert_faqs.pdf

31. Solution: b

- **Quantum computing** is computing using quantum-mechanical phenomena, such as superposition and entanglement. A quantum computer is a device that performs quantum computing. They are different from binary digital electronic computers based on transistors. Whereas common digital computing requires that the data be encoded into binary digits (bits), each of which is always in one of two definite states (0 or 1), quantum computation uses quantum bits, which can be in superposition of states.
- **Quantum superposition** is a fundamental principle of quantum mechanics. It states that, much like waves in classical physics, any two (or more) quantum states can be added together (“superposed”) and the result will be another valid quantum state; and conversely, that every quantum state can be represented as a sum of two or more other distinct states. Mathematically, it refers to a property of solutions to the Schrödinger equation; since the Schrödinger equation is linear, any linear combination of solutions will also be a solution.
- **Quantum entanglement** is a physical phenomenon which occurs when pairs or groups of particles are generated or interact in ways such that the quantum state of each particle cannot be described independently of the state of the other(s), even when the particles are separated by a large distance—instead, a quantum state must be described for the system as a whole separated by a large distance—instead, a quantum state must be described for the system as a whole.

32. Solution: b

- The scientists of IISER, Tiruvananthapuram have developed gelator that can suck up oil and congeal it. (**Hence statement 2 is incorrect**).
- The gelator is hydrophobic material that has property of oleophilic (oil-loving) and takes up oil when it comes in contact with it. (**Hence statement 1 is incorrect**).
- Gelation turns the liquid oil into semi-solid and this allows congealed oil to be simply scooped out using a scoop or a sieve.
- It can be used to recover marine oil spills with a simple, efficient and cost effective method. (**Hence statement 3 is correct**).

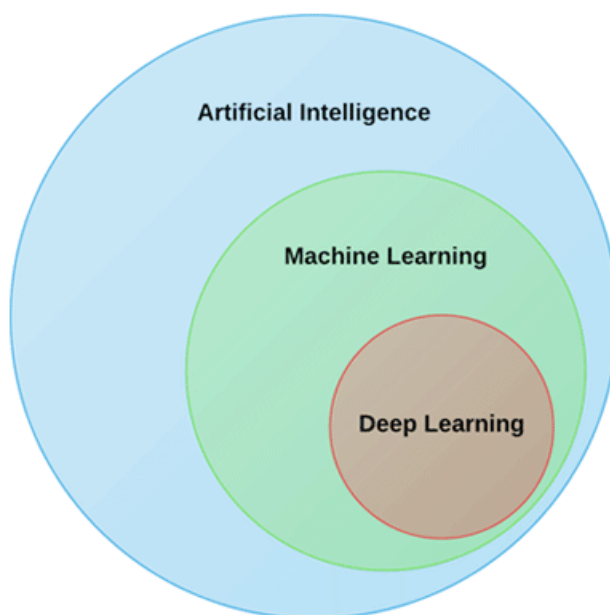
Source: Refer Insights Exclusive Science and Technology Revision Module.

33. Solution: a

- While Machine Learning is often described as a sub-discipline of AI, it’s better to think of it as the current state-of-the-art – it’s the field of AI which today is showing the most promise at providing tools that industry and society can use to drive change.
- In turn, it’s probably most helpful to think of Deep Learning as the cutting-edge of the cutting-edge. ML takes some of the core ideas of AI and focuses them on solving real-world problems with neural networks designed to mimic our own decision-making. Deep Learning focuses even more narrowly on a subset of ML tools and techniques, and applies them to solving just about any problem which requires “thought” – human or artificial.
- Essentially **Deep Learning** involves feeding a computer system a lot of data, which it can use to make decisions about other data. This data is fed through neural networks, as is the case in machine learning. These networks – logical constructions which ask a series of binary true/false questions, or extract a numerical value, of every bit of data which pass through them, and classify it according to the answers received.

Hence, **statement 1 can be inferred but not Statement 2**.

- Deep Learning is used by Google in its voice and image recognition algorithms, by Netflix and Amazon to decide what you want to watch or buy next, and by researchers at MIT to predict the future. (Hence, **statement 3 is correct**).



34. Solution: a

- A **cobot** or **co-robo** (from collaborative robot) is a robot intended to physically interact with humans in a shared workspace. This is in contrast with other robots, designed to operate autonomously or with limited guidance, which is what most industrial robots were up until the decade of the 2010s. (Hence, **statement 1 is correct**).
- Unlike industrial robots, cobots don't need fencing for the protection of workers in the shop floor. (Hence, **statement 2 is incorrect**).
- Kirobo is the first companion robot in space. The robot's capabilities include voice and speech recognition, natural language processing, speech synthesis and telecommunications, as well as facial recognition and video recording. Kirobo is specially designed to navigate zero-gravity environments and will assist Commander Wakata in various experiments. Its main goal is to see how well robots and humans can interact, hopefully leading the way to robots taking more active roles in assisting astronauts on missions.

Hence, **statement 3 is incorrect**.

35. Solution: b

	LTE	VoLTE
Stands for	Long-Term Evolution	Voice Over LTE (Long-Term Evolution)
Type	Type of Network	Type of Service provided on the network
Description	The next type of cellular network. Faster than 4G.	Phone Calls over the LTE Network
Definition (Wikipedia)	In telecommunication, Long-Term Evolution (LTE) is a standard for high-speed wireless communication for	Voice over Long-Term Evolution (Volte) is a standard for high-speed wireless communication for

	mobile phones and data terminals, based on the GSM/EDGE and UMTS/HSPA technologies.	mobile phones and data terminals.
Data	May or may not support data usage and voice call together.	Supports data usage and voice call together.
Effect on Voice Call	Using data and voice at the same time, may or may not affect the quality of the voice call.	Using data and voice at the same time does not affect the quality of the voice call.

Hence, **statement 1 is incorrect** and other **2 statements are correct**.

Source: <http://www.differencebetween.info/difference-between-lte-and-volte>

36. Solution: a

- Free Space Optical Communications (FSOC) technology is similar to the technology that is used in Project Loon which will be applied in the space closer to earth (not stratosphere) to solve connectivity challenges. (**Hence, statement 2 is incorrect.**)
- FSOC links use beams of light to deliver high-speed, high-capacity connectivity over long distances — just like fibre optic cable, but without the cable. And because there's no cable, this means there's none of the time, cost, and hassle involved in digging trenches or stringing cable along poles. FSOC boxes can simply be placed kilometres apart on roofs or towers, with the signal beamed directly between the boxes to easily traverse common obstacles like rivers, roads and railways. (**Hence, statement 1 is correct**).

Source: <https://blog.x.company/exploring-a-new-approach-to-connectivity-861a0159f63e>

37. Solution: b

- India has unveiled **Pratyush** – India's fastest supercomputer and '**Mihir**' – high performance computer system (HPC).
- Ministry of Earth Science (MoES) has acquired HPC facility (Hence **statement 1 is incorrect**) total of 6.8 Peta Flops (PF) which has been installed at two of its constituent units:
- 0 PF HPC facility named 'Pratyush' at Indian Institute of Tropical Meteorology (IITM), Pune.
- 8 PF HPC facility named 'Mihir' at National Centre for Medium Range Weather Forecast (NCMRWF), Noida.
- India will now occupy the fourth position, next only to United Kingdom, Japan and USA in terms of dedicated capacity for HPC resources for weather and climate proposes. (Hence **statement 2 is correct**)

Source: <http://pib.nic.in/newsite/PrintRelease.aspx?relid=176000>

38. Solution: d

- Climate change refers to a statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer). Climate change may be due to natural internal processes or external forces, or to persistent anthropogenic changes in the composition of the atmosphere or in land use.
- Note that United Nations Framework Convention on Climate Change, in its Article 1, defines "climate change" as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods". United Nations Framework Convention on Climate Change thus makes a distinction between

“climate change” attributable to human activities altering the atmospheric composition, and “climate variability” attributable to natural causes.

All 3 statements are correct.

Source: <http://envfor.nic.in/sites/default/files/cc/what.htm>

39. Solution: a

India’s Intended Nationally Determined Contribution:

- India has submitted its Intended Nationally Determined Contribution (INDC) to the United Nations Framework Convention on Climate Change. Some of the salient points of the INDC are:
- To reduce the emissions intensity of its GDP by 33 to 35 per cent by 2030 from 2005 level. (Hence **statement 3 is incorrect**).
- To achieve about 40 per cent cumulative electric power installed capacity from non-fossil fuel based energy resources by 2030, (Hence **statement 1 is incorrect**) with the help of transfer of technology and low cost international finance, including from Green Climate Fund.
- To create an additional carbon sink of 2.5 to 3 billion tonnes of CO₂ equivalent through additional forest and tree cover by 2030.

Hence, **statement 2 is correct**.

Source: <http://pib.nic.in/newsite/PrintRelease.aspx?relid=128403>

40. Solution: d

- CFCs that destroy ozone are also potent greenhouse gases, (**Hence statement 2 is correct**) though they are present in such small concentrations in the atmosphere (several hundred parts per trillion, compared to several hundred parts per million for carbon dioxide) that they are considered a minor player in greenhouse warming. CFCs account for about 13% of the total energy absorbed by human-produced greenhouse gases.
- The ozone hole itself has a minor cooling effect (about 2 percent of the warming effect of greenhouse gases) because ozone in the stratosphere absorbs heat radiated to space by gases in a lower layer of Earth’s atmosphere (the upper troposphere). The loss of ozone means slightly more heat can escape into space from that region. (**Hence statement 1 is correct**)
- Global warming is also predicted to have a modest impact on the Antarctic ozone hole. (Hence statement 3 is correct) The chlorine gases in the lower stratosphere interact with tiny cloud particles that form at extremely cold temperatures — below -80 degrees Celsius (-112 degrees Fahrenheit). While greenhouse gases absorb heat at a relatively low altitudes and warm the surface, they actually cool the stratosphere. Near the South Pole, this cooling of the stratosphere results in an increase in polar stratospheric clouds, increasing the efficiency of chlorine release into reactive forms that can rapidly deplete ozone.

Source: <https://earthobservatory.nasa.gov/blogs/climateqa/are-the-ozone-hole-and-global-warming-related/>

41. Solution: c

- HFC-23 or Fluoroform or CHF₃ is produced as a by-product of HCFC-22 manufacturing. (Hence statement 1 is correct)
- HFC-23 is used in the semiconductor industry in plasma etching of silicon oxide and silicon nitride. (Hence statement 2 is correct)

- HCFC-22, or R-22 or Chlorodifluoromethane or difluoromonochloromethane is a colourless gas. It is commonly used as a propellant and refrigerant.

Hence both the statements are correct

Source: <https://en.wikipedia.org/wiki/Fluoroform>

42. **Solution: c**

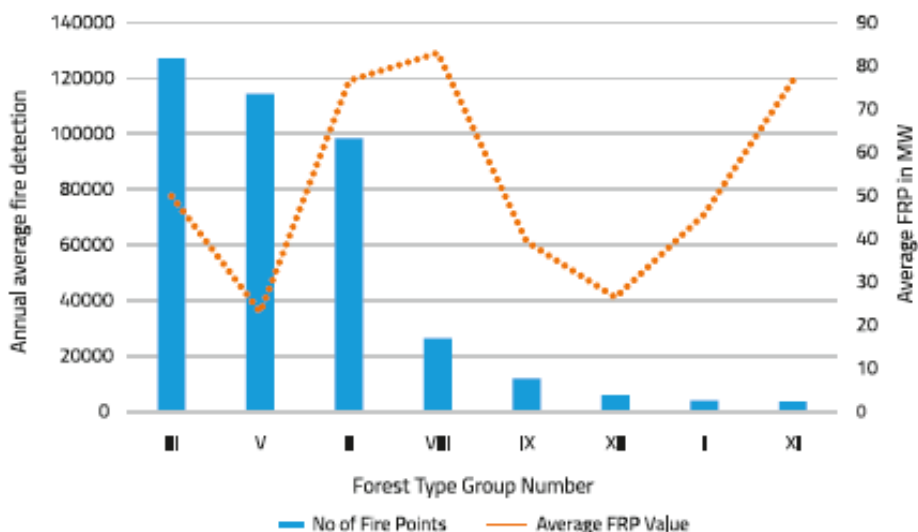
UNCCD and India

- Desertification, along with climate change and the loss of biodiversity were identified as the greatest challenges to sustainable development during the 1992 Rio Earth Summit. Adopted in 1994, United Nations Convention to Combat Desertification (UNCCD) entered into force in 1996 and became a legally binding international agreement linking environment and development to sustainable land management.
- The Convention addresses specifically the issue of Desertification, Land Degradation and Drought (DLDD) in arid, semi-arid and dry sub-humid areas of dry lands, (Hence statement 1 is correct) which are home to some of the most vulnerable people and ecosystems in the world. The Convention's 195 parties work together to improve the living conditions for people in dry lands, to maintain and restore land and soil productivity, and to mitigate the effects of drought.
- Though India does not have a specific policy or legislative framework for combating desertification (Hence statement 2 is correct) as such, the concern for arresting and reversing land degradation and desertification gets reflected in many of our national policies for e.g.,
 - National Water Policy 2012
 - National Forest Policy 1988
 - National Agricultural Policy 2000
 - Forest (Conservation) Act 1980
 - Environment (Protection) Act 1986
 - National Environmental Policy 2006
 - National Policy for Farmers 2007
 - National Rain-fed Area Authority (NRAA)- 2007)

These acts and policies have enabling provisions for addressing these problems.

Source: <http://envfor.nic.in/division/unccd-india>

43. **Solution: c**



- III Tropical Moist Deciduous
- V Tropical Dry Deciduous Forests
- II Tropical Semi-Evergreen Forests
- VIII Subtropical Broadleaved Hill Forests
- IX Subtropical Pine Forests
- XII Tropical Dry Evergreen Forests
- I Tropical Wet Evergreen Forests
- XI Montane Wet Temperate Forests

Source: <http://fsi.nic.in/isfr2017/isfr-forest-fire-2017.pdf>

44. **Solution: d**

Forest cover includes all areas more than 1 ha in extent and having tree canopy density of 10% and above irrespective of land use and legal status. However, there are many small patches of trees less than 1.0 ha in extent, such as trees in small scale plantations, compact blocks, woodlots, or trees along linear features, such as roads, canals, bunds etc and scattered trees which are not being captured by satellite sensors used for forest cover mapping due to technological limitations. These patches of trees, though small, play a significant role in socio-economic and ecological status of the country. The contribution of such trees are captured in the form of tree cover with the help of high resolution remote sensing data and supplemented by field inventory data of TOF. Thus information on tree cover along with forest cover of the country gives a complete picture of tree resources of the country.

Source: <http://fsi.nic.in/isfr2017/isfr-tree-cover-2017.pdf>

45. **Solution: c**

- **Growing Stock** is the sum-total of all trees, by number or volume or biomass, growing within a particular area of interest.
- **Explanation:** Volume of all living trees more than 10 cm in diameter at breast height (or above buttress if these are higher) measured over bark from ground or stump height to a top stem diameter of 10 cm, excluding or including branches to a minimum diameter of 5 cm. Excludes: smaller branches, twigs, foliage, flowers, seeds, stump and roots

Source: Table 6.6 of <http://fsi.nic.in/isfr2017/isfr-growing-stock-2017.pdf>

Table 6.5: State/UT wise Growing Stock

State/UT	Geographical Area (sq km)	RFA (sq km)	Growing Stock (million cum)		
			In Forest	In TOF	Total
Andhra Pradesh	162,968	37,258	156.038	62.348	218.386
Arunachal Pradesh	83,743	51,407	420.793	90.695	511.488
Assam	78,438	26,832	133.128	30.195	163.323
Bihar	94,163	6,877	28.500	37.471	65.991
Chhattisgarh	135,192	59,772	323.660	86.348	410.008
Delhi	1,483	102	0.510	1.274	1.784
Goa	3,702	1,225	9.516	3.832	13.348
Gujarat	196,244	21,647	52.030	113.992	166.022
Haryana	44,212	1,559	5.405	15.490	20.895
Himachal Pradesh	55,673	37,033	315.580	23.199	338.779
Jammu & Kashmir*	222,236	20,230	232.837	146.082	378.919
Jharkhand	79,716	23,605	117.085	64.391	181.476
Karnataka	191,791	38,284	327.660	89.585	417.245
Kerala	38,852	11,309	167.085	51.898	218.983
Madhya Pradesh	308,252	94,689	285.611	97.474	383.085
Maharashtra	307,713	61,579	252.572	164.546	417.118
Manipur	22,327	17,418	53.200	7.750	60.950
Meghalaya	22,429	9,496	38.720	17.254	55.974
Mizoram	21,081	5,641	19.052	42.762	61.814
Nagaland	16,579	8,623	36.899	11.425	48.324
Odisha	155,707	61,204	258.013	81.503	339.516
Punjab	50,362	3,084	12.941	20.012	32.953
Rajasthan	342,239	32,737	46.274	81.865	128.139
Sikkim	7,096	5,841	26.280	1.951	28.231
Tamil Nadu	130,060	22,877	127.810	66.257	194.067
Telangana	112,077	26,904	60.462	39.660	100.122
Tripura	10,486	6,294	21.740	6.498	28.238
Uttar Pradesh	240,928	16,582	135.848	88.340	224.188
Uttarakhand	53,483	38,000	418.332	19.855	438.187
West Bengal	88,752	11,879	76.634	38.100	114.734
Andaman & Nicobar Islands	8,249	7,171	55.928	0.584	56.512
Chandigarh	114	35	0.321	0.103	0.424
Dadra & Nagar Haveli	491	204	1.850	0.785	2.635
Daman & Diu	111	8	0.001	0.115	0.116
Lakshadweep	30	0	0.000	0.060	0.060
Puducherry	490	13	0.065	0.298	0.363
Total	3,287,469	767,419	4218.380	1603.997	5822.377

* Includes Jammu & Kashmir area outside LoC that is under illegal occupation of Pakistan and China.

46. **Solution: d**

<http://pib.nic.in/newsite/PrintRelease.aspx?relid=146238>

- As per the Policy, India can enter into 'Open Sky' ASA on a reciprocal basis only with SAARC countries and countries located beyond 5000 km from Delhi.

From 2016: <http://pib.nic.in/newsite/PrintRelease.aspx?relid=146238>;

Improvisation: <http://www.thehindu.com/todays-paper/tp-national/indo-japan-open-sky/article19687123.ece>;

47. **Solution: a**

- Inclusive India Initiative** is a mass awareness campaign of the National Trust aimed at reducing the barriers for persons with intellectual and developmental disabilities, by making the workplaces, public zones and educational institutes more inclusive and accessible.

- Aligned with the goals of the United Nations Convention for the Rights of People with Disabilities (UNCRPD), this initiative aims at full participation by persons with intellectual and developmental disabilities (PwIDDs) in their schools, colleges, communities and workplaces.

From June: <http://pib.nic.in/newsite/PrintRelease.aspx?relid=164434>;

<http://pib.nic.in/newsite/PrintRelease.aspx?relid=170686>;

48. Solution: d

Insights Quiz : <https://www.insightsonindia.com/2017/09/18/quiz-2017-insights-current-affairs-quiz-18-september-2017/>

- Non-tax revenue (receipts) of the central government mainly consists of interest receipts on account of loans by the central government, dividends (this will include RBI's annual dividend payout) and profits on investments made by the government, fees (this will include spectrum charges) and other receipts for services rendered by the government.
- Cash grants-in-aid from foreign countries and international organisations are also included.

49. Solution: b

<https://www.insightsonindia.com/2017/09/19/quiz-2017-insights-current-affairs-quiz-19-september-2017/>

- Whether the interpretation that legislators withdrawing support to their own party's government amounts to them voluntarily giving up their membership (and thus being subject to provisions of the tenth schedule) is acceptable, will have to be decided by the courts if the decision of the Speaker of the TN Assembly is challenged.

A member incurs disqualification under the defection law (tenth schedule):

- if he voluntary gives up the membership of the political party on whose ticket he is elected to
- if he votes or abstains from voting in the House contrary to any direction given by his political
- if any independently elected member joins any political party; and
- if any nominated member joins any political party after the expiry of six months.

Chapter 'Parliament'; Indian Polity by M Laxmikanth;

Source/Improvisation: <http://www.thehindu.com/opinion/editorial/a-partisan-ruling/article19710531.ece>;

50. Solution: b

<https://www.insightsonindia.com/2017/09/12/quiz-2017-insights-current-affairs-quiz-12-september-2017/>

- A Bengaluru firm has become India's first to receive the international CARB-X grant to develop antibiotics to treat hospital-acquired infections.
- **CARB-X, or Combating Antibiotic Resistant Bacteria Biopharmaceutical Accelerator**, is a public-private international partnership (US Dept. of Health and Human Services, and London-based biomedical research charity Wellcome Trust), which was set up in 2016 to focus on innovations to improve diagnosis and treatment of drug-resistant infections. It grew out of President Barack Obama's 2015 Combating Antibiotic Resistant Bacteria (CARB) initiative.

- Bacteria are classified as Gram-positive and Gram-negative. Gram-negative bacteria are responsible for 20-25% of infections, and are multi drug resistant. All CARB-X funding so far is focused on projects to address the most resistant “Gram-negative” bacteria.
- **Additional Information:** Technically, antibiotic resistance is a subset of antimicrobial resistance (AMR), which is a wider category that covers resistance in all microorganisms — bacteria, parasites, viruses and fungi — to drugs. But as antibiotics (drugs against bacteria) are the commonest antimicrobials, the two terms are often used interchangeably.

Read more (ESKAPE pathogens, Delhi Declaration etc.) at

[http://indianexpress.com/article/explained/why-infections-picked-up-in-hospitals-are-the-big-threat-today-how-world-is-trying-to-cope-4837567/;](http://indianexpress.com/article/explained/why-infections-picked-up-in-hospitals-are-the-big-threat-today-how-world-is-trying-to-cope-4837567/)

51. Solution: c

Evaporation increases with – An increase of surface area:

- Evaporation is a surface phenomenon. If the surface area is increased, the rate of evaporation increases. For example, while putting clothes for drying up we spread them out.

Hence, **statement 1 is correct.**

An increase of temperature:

- With the increase of temperature, more number of particles get enough kinetic energy to go into the vapour state.

Hence, **statement 2 is correct.**

A decrease in humidity:

- Humidity is the amount of water vapour present in air.
- The air around us cannot hold more than a definite amount of water vapour at a given temperature. If the amount of water in air is already high, the rate of evaporation decreases.

Hence, **statement 3 is incorrect.**

An increase in wind speed:

- It is a common observation that clothes dry faster on a windy day. With the increase in wind speed, the particles of water vapour move away with the wind, decreasing the amount of water vapour in the surrounding.

Hence, **statement 4 is correct.**

Source: NCERT Class IX Science Chapter 1.

52. Solution: d

- A molecule is in general a group of two or more atoms that are chemically bonded together that is, tightly held together by attractive forces. Atoms of the same element or of different elements can join together to form molecules. (Hence, **statement 2 is correct.**)
- A molecule can be defined as the smallest particle of an element or a compound that is capable of an independent existence and shows all the properties of that substance. (Hence, **statement 1 and 3 are correct.**)

Source: NCERT Class IX Science Chapter 3.

53. Solution: c

- Isotopes are defined as the atoms of the same element, having the same atomic number but different mass numbers. The atomic number is nothing but the number of protons. The difference in the mass numbers is due to the different number of neutrons.

Hence, statement 1 is incorrect.

- In the equation $Z = A - N$, since A is constant, Z will vary with respect to only N .
- Many elements consist of a mixture of isotopes. (Hence, statement 3 is correct.)
- Of the 80 elements with a stable isotope, the largest number of stable isotopes observed for any element is ten (for the element tin). No element has nine stable isotopes. Xenon is the only element with eight stable isotopes. Four elements have seven stable isotopes, eight have six stable isotopes, ten have five stable isotopes, nine have four stable isotopes, five have three stable isotopes, 16 have two stable isotope and 26 elements have only a single stable isotope.
- Each isotope of an element is a pure substance. The chemical properties of isotopes are similar but their physical properties are different. (Hence, statement 4 is correct.)
- Atoms of different elements with different atomic numbers, which have the same mass number, are known as isobars. (Hence, statement 2 is correct.)
- Along with different atomic numbers, the isobars have different number of neutrons to match the mass numbers.
- In the equation, $Z = A - N$, for different values of A , we get different values of N to get constant Z .

Hence, statement 2 is correct.

Source: NCERT Class IX Science Chapter 4

54. Solution: d

- **Lysosomes** are a kind of waste disposal system of the cell. Lysosomes help to keep the cell clean by digesting any foreign material as well as worn-out cell organelles. Foreign materials entering the cell, such as bacteria or food, as well as old organelles end up in the lysosomes, which break them up into small pieces. (Hence, **statement 1 is correct.**)
- Lysosomes are able to do this because they contain powerful digestive enzymes capable of breaking down all organic material. (Hence, **statement 2 is correct.**)
- During the disturbance in cellular metabolism, for example, when the cell gets damaged, lysosomes may burst and the enzymes digest their own cell. Therefore, lysosomes are also known as the 'suicide bags' of a cell. Structurally, lysosomes are membrane-bound sacs filled with digestive enzymes.
- **Autophagy** (a Greek word that means "self-eating") is a catabolic process in eukaryotic cells that delivers cytoplasmic components and organelles to the lysosomes for digestion. (Hence, **statement 3 is correct.**)
- Disruption of autophagy processes of the cell has been linked to Parkinson's disease, type 2 diabetes.
- **Yoshinori Ohsumi's** work on mechanisms underlying autophagy has won Nobel Prize in Medicine in **2016**.

Source: NCERT Class IX Science Chapter 5 section 5.2.5(iii).

55. Solution: b

- Plants have two different types of transport tissue xylem and phloem. They are both conducting tissues and constitute a vascular bundle. (Hence, **statement 1 is correct.**)
- Vascular or conductive tissue is a distinctive feature of the complex plants, one that has made possible their survival in the terrestrial environment. (Hence, **statement 3 is correct.**)

Xylem

- Xylem vessels are involved in the movement of water through a plant from its roots to its leaves. Water is absorbed from the soil through root hair cells and transported through the xylem vessels up the stem to the leaves. Finally, water evaporates from the leaves (transpiration).

Phloem

- Phloem vessels are involved in translocation. This is the movement of food substances from the stems to growing tissues and storage tissues (Hence, **statement 2 is incorrect.**)

Source: NCERT Class IX Science Chapter 6, section 6.2.2 (ii)

56. Solution: a

THALLOPHYTA

- Plants that do not have well-differentiated body design fall in this group. The plants in this group are commonly called algae. These plants are predominantly aquatic. Examples are Spirogyra, Ulothrix, Cladophora and Chara.

Hence, **statement 1 is correct.**

BRYOPHYTA

- These are called the amphibians of the plant kingdom. The plant body is commonly differentiated to form stem and leaf-like structures. However, there is no specialised tissue for the conduction of water and other substances from one part of the plant body to another. Examples are moss (Funaria) and Marchantia.

Hence, **statement 2 is incorrect.**

PTERIDOPHYTA

- In this group, the plant body is differentiated into roots, stem and leaves and has specialised tissue for the conduction of water and other substances from one part of the plant body to another. Some examples are Marsilea, ferns and horse-tails.

Hence, **statement 3 is incorrect.**

- The thallophytes, the bryophytes and the pteridophytes have naked embryos that are called spores. The reproductive organs of plants in all these three groups are very inconspicuous, and they are therefore called 'cryptogamae', or 'those with hidden reproductive organs'.

Source: NCERT Class IX Science Chapter 7.

57. Solution: a

- While catching a fast moving cricket ball, a fielder in the ground gradually pulls his hands backwards with the moving ball. In doing so, the fielder increases the time during which the high velocity of the moving ball decreases to zero.
- Thus, the acceleration of the ball is decreased and therefore the impact of catching the fast moving ball is also reduced. If the ball is stopped suddenly then its high velocity decreases to zero in a very short interval of time.
- Thus, the rate of change of momentum of the ball will be large. Therefore, a large force would have to be applied for holding the catch that may hurt the palm of the fielder.

Source: NCERT Class IX Science Chapter 9.

58. Solution: c

- If we shout or clap near a suitable reflecting object such as a tall building or a mountain, we will hear the same sound again a little later. This sound which we hear is called an echo. The sensation of sound persists in our brain for about 0.1 s. To hear a distinct echo the time interval between the original sound and the reflected one must be at least 0.1s.

Hence, **statement 1 is incorrect.**

- If we take the speed of sound to be 344 m/s at a given temperature, say at 22 °C in air, the sound must go to the obstacle and reach back the ear of the listener on reflection after 0.1s. Hence, the total distance covered by the sound from the point of generation to the reflecting surface and back should be at least $(344 \text{ m/s}) \times 0.1 \text{ s} = 34.4 \text{ m}$. Thus, for hearing distinct echoes, the minimum distance of the obstacle from the source of sound must be half of this distance, that is, 17.2 m.

Hence, **statement 2 is incorrect.**

- In the Earth's atmosphere, the chief factor affecting the speed of sound is the temperature. For a given ideal gas with constant heat capacity and composition, the speed of sound is dependent solely upon temperature. Even the minimum distance of the obstacle from the source of sound must be half of this distance will change with the temperature of air.

Hence, **statement 3 is correct.**

- In the Earth's atmosphere, the chief factor affecting the speed of sound is the temperature. For a given ideal gas with constant heat capacity and composition, the speed of sound is dependent solely upon temperature.
- Echoes may be heard more than once due to successive or multiple reflections. The rolling of thunder is due to the successive reflections of the sound from a number of reflecting surfaces, such as the clouds and the land.

Source: NCERT Class IX Science Chapter 12, section 12.3.1.

https://en.wikipedia.org/wiki/Speed_of_sound

59. **Solution: a**

- Antibiotics commonly block biochemical pathways important for bacteria. (Hence, **statement 1 is correct.**)
- Many bacteria, for example, make a cell-wall to protect themselves. The antibiotic penicillin blocks the bacterial processes that build the cell wall. (Hence, **statement 2 is correct.**) As a result, the growing bacteria become unable to make cell-walls, and die easily.
- Human cells don't make a cell-wall anyway, so penicillin cannot have such an effect on us. Penicillin will have this effect on any bacteria that use such processes for making cell-walls. Similarly, many antibiotics work against many species of bacteria rather than simply working against one.

(Hence, **statement 3 is incorrect.**)

Source: NCERT Class IX Science Chapter 12, section 13.3.1.

60. **Solution: c**

- Hemagglutinin (HA) and neuraminidase (NA) are the two large glycoproteins on the outside of the viral particles. HA is a lectin that mediates binding of the virus to target cells and entry of the viral genome into the target cell, while NA is involved in the release of progeny virus from infected cells, by cleaving sugars that bind the mature viral particles. Thus, these proteins are targets for antiviral drugs. Furthermore, they are antigens to which antibodies can be raised.

Hence, **statement 1 is correct.**

- Influenza A viruses are classified into subtypes based on antibody responses to HA and NA. These different types of HA and NA form the basis of the H and N distinctions in, for example, H5N1. There are 16 H and 9 N subtypes known, but only H 1, 2 and 3, and N 1 and 2 are commonly found in humans.
- Influenza B viruses are not divided into subtypes, but can be further broken down into lineages and strains. Currently circulating influenza B viruses belong to one of two lineages: B/Yamagata and B/Victoria.

Hence, **statement 2 is correct.**

Source: <https://en.wikipedia.org/wiki/Influenza>

<https://www.cdc.gov/flu/about/viruses/types.htm>

61. Solution: b

- The vaccine being given in the Measles-Rubella campaign is produced in India and is WHO prequalified. The same vaccine is being given in the routine immunisation programme of India and in many countries, including neighbouring countries like Bangladesh, Sri Lanka, Nepal and Myanmar.

Hence, **statement 1 is incorrect**

- Under the measles-rubella (MR) vaccination campaign, all children in the age group of 9 months to less than 15 years will be vaccinated in a phased manner across the nation.
- Measles-Rubella vaccination campaign dose is in addition to routine measles immunization dose. (**Hence, statement 2 is correct.**)
- Following the campaign, MR vaccine will become a part of routine immunization and will replace measles vaccine, currently given at 9-12 months and 16-24 months of age of child. (**Hence, statement 3 is correct.**)

Source:

http://www.searo.who.int/india/topics/measles/faqs_measles_rubella_vaccine_english.pdf

62. Solution: a

- Transmission of Animal tuberculosis (bovine TB) to humans is referred to as zoonotic TB.

Hence, **statement 1 is incorrect.**

- Bovine TB is most often communicated to humans through food consumption, usually non-heat-treated dairy products or raw, or improperly cooked meat from diseased animals.
- Direct transmission from infected animals or animal products to people can also occur.

Hence, **statements 2, 3 and 4 are correct.**

- There is no cure for bovine TB and it threatens animal welfare and those with livelihoods based on livestock.
- Refer Insights Exclusive Science and Technology Revision Module.

Source: <http://www.who.int/tb/areas-of-work/zoonotic-tb/en/>

63. Solution: c

There are two types of vaccine that protect against polio:

- Inactivated poliovirus vaccine (IPV)

- Oral poliovirus vaccine (OPV).

IPV contains killed virus and OPV contains live weakened virus.

Hence, **statement 1 is incorrect.**

- OPV is made up of attenuated or weakened poliovirus and there is a risk of vaccine derived polio.
- Hence statement 2 is correct.
- IPV is made up of inactivated (killed) polio virus and will provide immunity from all three strains of polio.
- On November 30, 2015 India introduced an IPV in its routine immunisation programme, stating that it “will be an important step in the Polio Endgame Strategy”, a case of Vaccine Derived Polio Virus (VDPV) was reported from New Delhi. This was the second such case to be reported that year.
- India received a polio-free certificate from the World Health Organisation (WHO) in 2014.

Hence, **statement 3 is correct.**

Refer Insights Exclusive Science and Technology Revision Module.

Source:

<http://www.thehindu.com/opinion/op-ed/is-india-actually-free-of-polio/article7945687.ece>

64. **Solution: b**

- The Science and Engineering Research Board (SERB), a statutory body of the Department of Science and Technology (DST) has recently launched a ‘Visiting Advanced Joint Research (VAJRA) Faculty Scheme’ to connect the Indian academic and research and development (R&D) systems to the best of global science and scientists for a sustained international collaborative research.
- The scheme offers adjunct / visiting faculty assignments to overseas scientists, faculty members and R&D professionals including Non-resident Indians (NRI) and Overseas Citizen of India (OCI) (Hence, **statement 1 is incorrect**) to undertake high quality collaborative research in cutting edge areas of science and technology including interdisciplinary areas of priority such as energy, water, health, security, nutrition, materials and manufacturing, etc. with one or more Indian collaborators of public funded academic and research institutions of India.
- The VAJRA Faculty should be an active researcher working in an overseas leading academic / research / industrial organization with significant accomplishments in R&D. The initial Faculty assignment is given for a period of one year (Hence, **statement 2 is correct**).
- extendable to subsequent years based on the collaborative outcome and interest. The residency period of VAJRA Faculty in the host institution would be for a minimum of 1 month and a maximum of 3 months every year. VAJRA Faculty is provided US Dollars 15000 in the first month of residence and US Dollars 10000 in each of the subsequent month. Presently, call for applications is made open for prospective researchers.

Source: <http://pib.nic.in/newsite/PrintRelease.aspx?relid=169081>

65. **Solution: b**

- Jigyasa, a student- scientist connect programme was officially launched in the national capital today. Council of Scientific and Industrial Research (CSIR), has joined hands with Kendriya Vidyalaya Sangathan (KVS) to implement this programme. The focus is on connecting school students and scientists so as to extend student’s classroom learning with that of a very well planned research laboratory based learning.

Hence, statement 1 is incorrect.

- The program will also enable the students and teachers to practically live the theoretical concepts taught in science by visiting CSIR laboratories and by participating in mini-science projects. The model of engagement includes:
 - Student Residential Programmes;
 - Scientists as Teachers and Teachers as Scientists;
 - Lab specific activities / Onsite Experiments;
 - Visits of Scientists to Schools/Outreach Programmes;
 - Science and Maths Clubs;
 - Popular Lecture Series/ demonstration programme at Schools;
 - Student Apprenticeship Programmes;
 - Science Exhibitions;
 - Projects of National Children's Science Congress;
 - Teacher Workshops; and
 - Tinkering Laboratories.

Hence, statement 2 is correct.

Source: <http://pib.nic.in/newsite/PrintRelease.aspx?relid=167194>

66. Solution: a

- In mammals, there are two broad types of stem cells: embryonic stem cells and adult stem cells.
- Both are generally characterized by their potential to differentiate into different cell types. For eg: Pluripotent stem cells have the ability to differentiate into almost all cell types.

Hence, **statements 1 and 2 are correct.**

- Adult stem cells are reprogrammed into induced pluripotent cells to function like embryonic stem cells.
- Although the methods pioneered by Yamanaka and others have demonstrated that adult cells can be reprogrammed to iPS cells, there are still challenges associated with this technology.

Statement 3 is incorrect.

Refer Insights Exclusive Science and Technology Revision Module.

Source: https://en.wikipedia.org/wiki/Induced_pluripotent_stem_cell

67. Solution: a

- An atomic clock is a clock device that uses an electron transition frequency of the electromagnetic spectrum of atoms as a frequency standard for its timekeeping element.

(Hence, **statement 2 is incorrect**).

- Atomic clocks are designed to measure the precise length of a second, the base unit of modern timekeeping. The International System of Units (SI) defines the second as the time it takes a caesium-133 atom in a precisely defined state to oscillate exactly.
- An atomic clock is a clock device that uses an electron transition frequency of the electromagnetic spectrum of atoms as a frequency standard for its timekeeping element.
- Scientists are currently developing a device that is even more accurate than the current atomic clocks.
- The optical atomic clock uses light in the visible spectrum to measure atomic oscillations. The resonance frequency of the light rays is about 50,000 times higher than that of

microwave radiation, allowing for a more precise measurement. The expected deviation of the new optical clock is 1 second in 15 billion years.

(Hence, **statement 1 is correct**)

Refer Insights Exclusive Science and Technology Revision Module.

Source: <https://www.timeanddate.com/time/how-do-atomic-clocks-work.html>

68. Solution: d

What is Recorded Forest Area?

- It refers to all the geographic areas recorded as 'Forests' in government records. (Hence, **statement 1 is correct**).
- It mainly consists of Reserved Forests (RF) and Protected Forests (PF), which have been notified under the provisions of Indian Forests Act, 1927 or State acts. (Hence, **statement 2 and 3 are correct**).
- Besides RFs and PFs, the recorded forest area may also include all such areas, which have been recorded as forests in the revenue records or have been constituted so under any state act or local laws. (Hence, **statement 4 is correct**).

Source: http://fsi.nic.in/details.php?pgID=sb_64

69. Solution: a

- The report for the first time contains:
 - Information on decadal change in water bodies in forest during 2005-2015
 - Forest fire
 - Production of timber from outside forest
 - State wise carbon stock in different forest types and density classes(Earlier reports also covered country's carbon stock but not state-wise carbon stock)

Hence, **statement 1 is incorrect**.

All other statements are correct.

Source: http://fsi.nic.in/details.php?pgID=sb_64

70. Solution: b

Top 5 states where forest cover has decreased are:

- Mizoram (531 sq.km)
- Nagaland (450 sq.km)
- Arunachal Pradesh (190 sq.km)
- Tripura (164 sq.km)
- Meghalaya (116 sq.km)

Source: http://fsi.nic.in/details.php?pgID=sb_64

71. Solution: b

<http://www.insightsonindia.com/2018/04/05/insights-daily-current-affairs-05-april-2018/>

- The Paris Principles were defined at the first International Workshop on National Institutions for the Promotion and Protection of Human Rights held in Paris on 7–9 October 1991.
- They were adopted by the United Nations Human Rights Commission by Resolution 1992/54 of 1992, and by the UN General Assembly in its Resolution 48/134 of 1993. The Paris Principles relate to the status and functioning of national institutions for the protection and promotion of human rights. In addition to exchanging views on existing

arrangements, the workshop participants drew up a comprehensive series of recommendations on the role, composition, status and also functions of national human rights institutions (NHRIs).

72. **Solution: c**



<http://www.insightsonindia.com/2018/04/05/insights-daily-current-affairs-05-april-2018/>

- The Chota Char Dham is an important Hindu pilgrimage circuit on the under upgradation Chardham Road Highway and under construction Chota Char Dham Railway in the Indian Himalayas. Located in the Garhwal region of the state of Uttarakhand (formerly the northwestern section of Uttar Pradesh), the circuit consists of four sites—Yamunotri (Hindi: यमनोत्री), Gangotri (Hindi: गंगोत्री), Kedarnath (Hindi: केदारनाथ), and Badrinath (Hindi: बद्रीनाथ).
- Badrinath is also one of the four destinations (with each destination being in different corners of the country) of the longer Char Dham from which the Chota Char Dham likely draws its name.

73. **Solution: a**

<http://www.insightsonindia.com/2017/09/21/insights-daily-current-affairs-21-september-2017/>

- The Treaty on the Prohibition of Nuclear Weapons, or the Nuclear Weapon Ban Treaty, is the first legally binding international agreement to comprehensively prohibit nuclear weapons, with the goal of leading towards their total elimination. It was passed on 7 July 2017. In order to come into effect, signature and ratification by at least 50 countries is required. For those nations that are party to it, the treaty prohibits the development, testing, production, stockpiling, stationing, transfer, use and threat of use of nuclear weapons, as well as assistance and encouragement to the prohibited activities. For nuclear armed states joining the treaty, it provides for a time-bound framework for negotiations leading to the verified and irreversible elimination of its nuclear weapons programme.
- According to a mandate adopted by the United Nations General Assembly in December 2016, negotiations on the treaty began in the United Nations in March 2017 and continued from 15 June to 7 July 2017. In the vote on the treaty text, 122 were in favour, 1 voted against (Netherlands), and 1 abstained (Singapore). 69 nations did not vote, among them all of the nuclear weapon states and all NATO members except the Netherlands.

74. **Solution: b**

<http://www.insightsonindia.com/2017/09/23/insights-daily-current-affairs-23-september-2017/>

- Furthering the agenda for cooperative federalism, NITI Aayog has launched SATH, a program providing 'Sustainable Action for Transforming Human capital' with the State Governments. The vision of the program is to initiate transformation in the education and health sectors. The program addresses the need expressed by many states for technical support from NITI .
- SATH aims to identify and build three future 'role model' states for health systems. NITI will work in close collaboration with their state machinery to design a robust roadmap of intervention, develop a program governance structure, set up monitoring and tracking mechanisms, hand-hold state institutions through the execution stage and provide support on a range of institutional measures to achieve the end objectives. The program will be implemented by NITI along with McKinsey & Company and IPE Global consortium, who were selected through a competitive bidding process.

<http://pib.nic.in/newsite/PrintRelease.aspx?relid=165545>

75. **Solution: c**

<http://www.insightsonindia.com/2017/09/22/insights-daily-current-affairs-22-september-2017/>

- The International Road Federation is a global not-for-profit organization, headquartered in Washington, DC since 1948 and supported by regional offices throughout the world. IRF serves a network of public and private sector members in more than 70 countries by providing world-class knowledge resources, advocacy services, and continuing education programs which together offer a global marketplace for best practices and industry solutions. The organization is funded primarily through member fees.
- The IRF seeks to promote the benefits of a sustainable road transport infrastructure at all levels of society. It organizes seminars, workshops and events for a broad range of audiences throughout the world. IRF has a number of publications and a transport knowledge library.

76. **Solution: c**

- Mosses and lichens are both simple organisms seen growing on trees and rocks. (Hence **Statement 3 is correct**)
- Mosses are defined as simple plants with the most basic of root structures, leaves, and stems. (Hence **Statement 2 is incorrect**)
- Lichens are a very different type of creature, called a composite organism. Not just a plant, lichens are actually a single entity created from a joining of algae and fungus. (Hence **Statement 1 is correct**)
- **Mosses** are one of the most primitive types of plants, and their simple structures have remained largely unchanged over the course of millions of years. Thought to have evolved from green algae, mosses are characterized by their simple, basic root structures, stems and leaves. There are around 14,500 different types of mosses, and because of their simple structure and low nutrient requirements, they will often be found thriving in places that other plants can't grow.
- **Lichens** can very easily be mistaken for mosses, but lack the stems and leaves of the moss. (Some lichens have even been given confusing names, such as reindeer moss.) Made up of a symbiotic combination of algae and fungi, lichen can be divided into four main groups based on their appearance.

Source:

<http://knowledgenuts.com/2014/01/13/the-difference-between-moss-and-lichen/>

77. **Solution: a**

- Black carbon (BC) is the result of incomplete combustion of fossil fuels, biofuel, and biomass. (Hence, **statement 1 is correct**)
- It consists of elemental carbon in several forms.
- Black carbon warms the atmosphere due to its absorption and by reducing albedo when deposited on snow and ice. (Hence, **statement 2 is correct**)
- Life time of black carbon in the atmosphere is only a few days to weeks compared to CO₂, which has an atmospheric lifetime of more than 100 years. (Hence, **statement 3 is incorrect**)

Source:

<http://www.moef.nic.in/downloads/public-information/Black%20Carbon%20Research%20Initiative.pdf>

78. **Solution: d**

- The Union Cabinet has approved the proposal for ratification of Minamata Convention on Mercury and depositing the instrument of ratification enabling India to become a Party of the Convention.
- The approval entails Ratification of the Minamata Convention on Mercury along with flexibility for continued use of mercury-based products and processes involving mercury compound up to 2025. (Hence, **statement 1 is correct**)
- The Minamata Convention on Mercury will be implemented in the context of sustainable development with the objective to protect human health and environment from the anthropogenic emissions and releases of mercury and mercury compounds. (Hence, **statement 2 is correct**)
- The work to prepare the Minamata Convention on Mercury was undertaken by an intergovernmental negotiating committee supported by the Chemicals Branch of the UNEP.
- The first meeting of the Conference of the Parties to the Minamata Convention on Mercury (COP1) took place from 24 to 29 September 2017 at the International Conference Centre in Geneva, Switzerland. (Hence, **statement 3 is correct**)

Source:

<http://www.mercuryconvention.org/>

<http://pib.nic.in/newsite/PrintRelease.aspx?relid=176356>

79. **Solution: c**

- The forests of north-east India are well known for the rich biodiversity they support, both faunal and floral. These forests also support the highest diversity of primates in India, including the only apes found in the country, the western hoolock gibbon (Hoolock hoolock) and the eastern hoolock gibbon (Hoolock leuconedys). (Hence, **statement 1 is correct**)
- Often confused as one species, both the gibbons inhabit different ranges in India.
- The western hoolock gibbon has a much wider range, as it is found in all the states of the north-east, restricted between the south of the Brahmaputra river and east of the Dibang river. Outside India, it is found in eastern Bangladesh and north-west Myanmar.
- The eastern hoolock gibbon inhabits specific pockets of Arunachal Pradesh and Assam in India, and southern China and north-east Myanmar.

- Of the two, the western hoolock is listed as **Endangered** in the IUCN Redlist, while the eastern hoolock is listed as **Vulnerable**. (Hence, **statement 2 is incorrect**)
- Both species' populations have been declining due to habitat destruction of various forms and hunting for meat. (Hence, **statement 3 is correct**)

Source:

https://www.wwfindia.org/about_wwf/priority_species/lesser_known_species/hoolock_gibbons/

80. Solution: b

- A new Indo-German Technical Cooperation project on 'Human-Wildlife Conflict Mitigation in India' was conceptualized on 5th February, 2018 at New Delhi.
- The project is being commissioned by Federal Ministry for Economic Cooperation and Development (BMZ) and is being implemented by MoEF&CC, State Forest Departments of Karnataka, Uttarakhand, West Bengal and Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ) GmbH.
- The Project aims at providing technical support at the National level and in selected partner states of Karnataka, West Bengal and Uttarakhand for effective implementation of Human Wildlife Conflict mitigation measures.

(Hence only 2, 3 and 4 are correct)

Source: <http://envfor.nic.in/sites/default/files/march2018.PDF>

81. Solution: a

- **Biodiversity Finance (BIOFIN)** is the practice of raising and managing capital and using financial incentives to support **sustainable biodiversity management**. It includes private and public financial resources used to conserve biodiversity, investments in commercial activities that produce positive biodiversity outcomes and the value of the transactions in biodiversity-related markets such as habitat banking. (Hence, **statements 1 and 2 are correct**)
- The United Nations Development Programme (**UNDP**) is implementing a global multi country project on Biodiversity Finance Initiative (BIOFIN). (Hence, **statement 3 is incorrect**.)
- BIOFIN is a country-wide programme, it is being piloted in two states – **Maharashtra** and **Uttarakhand** through the two State Biodiversity Boards. The project in the earlier stage has been supported by technical assistance from the National Institute for Public Finance and Policy and Wildlife Institute of India. UNDP India manages the BIOFIN programme. The programme is guided by a Technical Advisory Group. BIOFIN in India is a country-driven process and builds on the activities undertaken for assessing funding for Biodiversity as part of preparing NBAP Addendum 2014.

Source: <http://www.biodiversityfinance.net/>

http://envfor.nic.in/sites/default/files/press-releases/Press%20Release_BIOFIN.pdf

82. Solution: c

- The draft National Forest Policy (NFP) proposes the levy of a green tax for facilitating ecologically responsible behaviour and supplementing financial resources essential to address forestry woes. (Hence, **statement 1 is correct**). "The budget of the forestry sector should be appropriately enhanced so that the objectives enshrined in this policy can be achieved. Environmental cess, green tax, carbon tax may be levied on certain products and services for facilitating ecologically responsible behaviour, garnering citizen's contribution and supplementing financial resources," the draft policy says.

- The policy recommends contracts between forest-dependent industries and farmers to fix price and quantity to ensure supply for the wood industry. (Hence, **statement 2 is incorrect**).
- The draft policy indicates that CAMPA funds from diversion of forest land by industry are to be used for purchasing wildlife corridors from people. (Hence, **statement 3 is correct**).

Source:

<http://www.downtoearth.org.in/factsheet/10-highlights-of-the-new-draft-national-forest-policy-54521>

83. Solution: c

- The snow leopard's habitat extends through twelve countries: Afghanistan, Bhutan, China, India, Kazakhstan, Kyrgyzstan, Mongolia, Nepal, Pakistan, Russia, Tajikistan, and Uzbekistan.
- China is one of the most influential countries for our conservation efforts, as it contains as much as 60% of all snow leopard habitat areas.
- In the Himalayas, snow leopards are usually found between 3,000 and 5,400 meters above sea level. In Mongolia and Russia, these cats are found at lower altitudes of 1000 meters.
- At the snow leopard's typical elevation, the climate is cold and dry, and only grasses and small shrubs can grow on the steep mountain slopes.
- Snow leopards prefer the broken terrain of cliffs, rocky outcrops, and ravines. This type of habitat provides good cover and clear views to help them find prey, and sneak up on it.
- Hence, Myanmar and Bangladesh are not among Snow Leopard range countries.

Source: <http://www.globalsnowleopard.org/who-we-are/range-countries/>

84. Solution: a

Ramsar Convention on Wetlands

- The Convention on Wetlands, signed in Ramsar, Iran, in 1971, is an intergovernmental treaty which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.
- Ramsar Convention is the only global environment treaty dealing with a particular ecosystem. (Hence, **statement 1 is correct**)
- **Nal sarovar** is the latest Ramsar site in India which entered the list in 2012. (Hence, **statement 2 is correct**)
- **Jammu and Kashmir** has the highest number of Ramsar sites i.e. 4 whereas Kerala has 3. (Hence, **statement 3 is incorrect**)

Source: <http://www.moef.nic.in/division/ramsar-convention-wetland>

85. Solution: A

- **Kanchenjunga National Park** also Kanchenjunga Biosphere Reserve is a National Park and a Biosphere reserve located in Sikkim, India. It was inscribed to the UNESCO World Heritage Sites list on July 17, 2016, becoming the first "**Mixed Heritage**" site of India. The park gets its name from the mountain Kangchenjunga (alternative spelling Khangchendzonga). (Hence, **statement 1 is correct**)
- It does not come under World Network of Biosphere Reserves in India. (Hence, **statement 3 is incorrect**)

Refer Insights MoEF report highlights.

- It qualifies as heritage under 4 Criteria: (iii),(vi),(vii) and (x). (Hence, **statement 2 is correct**)

- Khangchendzonga National Park** Located at the heart of the Himalayan range in northern India (State of Sikkim), the Khangchendzonga National Park includes a unique diversity of plains, valleys, lakes, glaciers and spectacular, snow-capped mountains covered with ancient forests, including the world's third highest peak, Mount Khangchendzonga. Mythological stories are associated with this mountain and with a great number of natural elements (caves, rivers, lakes, etc.) that are the object of worship by the indigenous people of Sikkim. The sacred meanings of these stories and practices have been integrated with Buddhist beliefs and constitute the basis for Sikkimese identity.

Source: <http://whc.unesco.org/en/criteria/> ; <http://whc.unesco.org/en/statesparties/IN>

86. **Solution: c**

Class	Area (sq km)	Percent of Geographic Area
Very Dense Forest	98,158	2.99
Moderately Dense Forest	3,08,318	9.38
Open Forest	3,01,797	9.18
Total Forest Cover *	7,08,273	21.54
Scrub	45,979	1.40
Non-Forest	25,33,217	77.06
Total Geographic Area	32,87,469	100.00

*Includes 4,921 sq km under Mangrove Cover
Percentage rounded off

Source: http://fsi.nic.in/details.php?pgID=sb_64

87. **Solution: b**

- CHESSE** — short for the Colorado High-resolution Echelle Stellar Spectrograph — is a sounding rocket payload that will fly on a Black Brant IX suborbital sounding rocket early in the morning of June 27, 2017. CHESSE measures light filtering through the interstellar medium to study the atoms and molecules within, which provides crucial information for understanding the lifecycle of stars.

Source:

<https://www.nasa.gov/feature/goddard/2017/nasa-funded-chess-mission-will-check-out-the-space-between-stars>

- AZURE** is the first of eight sounding rocket missions as part of an international collaboration of scientists known as The Grand Challenge Initiative – Cusp. These missions study the processes occurring inside the Earth's polar cusp — where the planet's magnetic field lines bend down into the atmosphere and allow particles from space to intermingle with those of Earthly origin — and nearby auroral oval, which AZURE will focus on.

Source:

<https://www.nasa.gov/feature/goddard/2018/sounding-rocket-mission-will-trace-auroral-winds>

- NASA's Transiting Exoplanet Survey Satellite (**TESS**) is an all-sky survey mission that will discover thousands of exoplanets around nearby bright stars. TESS is scheduled for launch aboard a SpaceX Falcon 9 rocket no earlier than April 16, 2018, and no later than June 2018.

Source:

<https://www.nasa.gov/tess-transiting-exoplanet-survey-satellite>

- **Only 2nd pair is correctly** matched.

88. **Solution: d**

- **Irradiation** works by disrupting the biological processes that lead to decay. (Hence, **statement 1 is correct**). In their interaction with water and other molecules that make up food and living organisms, radiation energy is absorbed by the molecules they contact. The reactions with the DNA cause the death of microorganisms and insects and impair the ability of potato and onion to sprout. (Hence, **statement 2 is correct**)
- Irradiation is a cold process and can be used to pasteurize and sterilize foods without causing changes in freshness and texture of food unlike heat. Unlike chemical fumigants, irradiation does not leave any harmful toxic residues in food and is more effective. It is efficient and can be used to treat pre-packed commodities. (Hence, **statement 3 is correct**)

Source: <http://www.barc.gov.in/bsg/ftd/faq2.html>

89. **Solution: a**

- **Health ministers, NGOs, and private sector representatives** from 120 countries adopted the **Moscow Declaration** at the recently held **first WHO Global Ministerial Conference**. (Hence, **statement 1 is correct**)
- The declaration calls for eliminating additional deaths from **HIV** co-infection by **2030** and achieving synergy in coordinated action against **Tuberculosis**.
- **India** is among signatories to the declaration. (Hence, **statement 2 is correct**)

Moscow declaration:

- Moscow declaration emphasis need for fixing multi sectoral responsibility towards ending **TB** by **2035**.
- Multi-drug resistant TB will be tackled as national public health crisis. (Hence, **statement 3 is incorrect**)
- National inter-ministerial commission will be set up by 2018 to achieve fast-tracking universal access to health care.

Source: http://www.who.int/tb/Moscow_Declaration_MinisterialConference_TB/en/

90. **Solution: a**

Red Blood cells

- Erythrocytes, leucocytes and platelets are collectively called formed elements and they constitute nearly 45 per cent of the blood.
- Erythrocytes or red blood cells (RBC) are the most abundant of all the cells in blood. RBCs are formed in the red bone marrow in the adults. (Hence, **statement 1 is correct**)
- RBCs are devoid of nucleus in most of the mammals and are biconcave in shape. They have a red coloured, iron containing complex protein called haemoglobin, hence the colour and name of these cells. (Hence, **statement 3 is incorrect**)
- These molecules play a significant role in transport of respiratory gases.

- RBCs have an average life span of 120 days after which they are destroyed in the spleen (graveyard of RBCs). (Hence, **statement 2 is correct**)

Source: NCERT Class XI Biology Chapter 18.

91. **Solution: d**

Biopesticides can be classified into these classes:

- **Microbial pesticides** which consist of bacteria, entomopathogenic fungi or viruses (and sometimes includes the metabolites that bacteria or fungi produce).
- **Bio-derived chemicals**. Four groups are in commercial use: pyrethrum, rotenone, neem oil, and various essential oils are naturally occurring substances that control (or monitor in the case of pheromones) pests and microbial diseases. Eg: Sandalwood oil.
- **Plant-incorporated protectants (PIPs)** have genetic material from other species incorporated into their genetic material (i.e. GM crops). Eg: Bacillus Thuringiensis

Hence, **all 3 statements are correct**.

Source: <https://en.wikipedia.org/wiki/Biopesticide>

92. **Solution: d**

- **Bio-informatics**: As an interdisciplinary field of science combines Computer Science, Biology, Mathematics, and Engineering to analyse and interpret biological data.
- Bioinformatics, a hybrid science that links biological data with techniques for information storage, distribution, and analysis to support multiple areas of scientific research, including biomedicine. Bioinformatics is fed by high-throughput data-generating experiments, including genomic sequence determinations and measurements of gene expression patterns.
- **Bionics**: Bionics, inter-science discipline of constructing artificial systems that have some of the characteristics of living systems. It is about application of biological methods/systems in the design of Engineering systems and modern technology.

(Hence, **statements 1 and 2 are incorrect**)

Source:

<https://www.britannica.com/science/bioinformatics>

<https://www.britannica.com/technology/bionics>

93. **Solution: a**

- Both COD and BOD test methods aim to give an indication of the amount of pollution in a water sample. COD is the amount of oxygen required to chemically breakdown the pollutants whereas BOD is the amount of oxygen required to do this biologically through micro-organisms.
- Since the pollutants can be both organic and inorganic, **statements 2 and 3 are incorrect**.
- There is a strong correlation between COD and BOD, however COD analysis is a much faster and more accurate method.
- BOD analysis is performed to determine what effect dirty water, containing bacteria and organic materials, will have on animal and plant life when released into a stream or lake. Bacteria will need to take in oxygen in order to break down the organic materials (pollution) in the water. The test measures the potential of the incoming water to deplete the oxygen of the receiving waters due to the bacterial activity.
- If there are high levels of organic waste and bacteria in the water it will have a detrimental effect on the surrounding ecosystem. Low levels of organic waste and fewer bacteria present mean the BOD will be lower and the dissolved oxygen levels higher. The BOD test

involves taking an initial dissolved oxygen (DO) reading and a second reading after five days of incubation at 20°C.

- COD analysis on the other hand is a measurement of the oxygen-depletion capacity of a water sample contaminated with organic waste matter. Specifically, it measures the equivalent amount of oxygen required to chemically oxidize organic compounds in water thus removing the pollution. COD is an integral part of all water quality management programmes.

Source:

<http://camblab.info/wp/index.php/what-are-the-differences-between-chemical-oxygen-demand-cod-and-biological-oxygen-demand-bod/>

94. Solution: a

- The Objectives of **Standards & Labelling Program** is to provide the consumer an informed choice about the energy saving and thereby the cost saving potential of the marketed household and other equipment. This is expected to impact the energy savings in the medium and long run while at the same time it will position domestic industry to compete in such markets where norms for energy efficiency are mandatory.
- For the labelling program, the Bureau works through technical committees of experts and stakeholders, comprising of representatives from industry, industry association, consumer organizations, academia, Non-Government Organizations (NGOs), Research & Development (R&D) institutions, testing laboratories, government organizations and regulatory bodies etc. The appliances covered under the S&L scheme are as follows:
 1. Mandatory scheme:
 - Frost Free and Direct cool Refrigerators, TFLs, Room ACs, Distribution Transformers, Electric geysers, Colour TV, LED etc.,
 2. Voluntary scheme:
 - Induction motors, Agricultural pump sets, Ceiling fans, Domestic LPG stove, washing machine, Computer etc.,

(Hence 1, 2 and 3 are correct)

Source: <https://www.beestarlabel.com/#>

95. Solution: c

- The three Rio Conventions—on Biodiversity, Climate Change and Desertification—derive directly from the **1992 Earth Summit**. Each instrument represents a way of contributing to the sustainable development goals of **Agenda 21**. The three conventions are intrinsically linked, operating in the same ecosystems and addressing interdependent issues.

Convention on Biological Diversity

- The objectives of the CBD are the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising from commercial and other utilization of genetic resources. The agreement covers all ecosystems, species, and genetic resources.

Nagoya Protocol

- The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (ABS) to the Convention on Biological Diversity

Cartegena Protocol on Biosafety

- The Cartagena Protocol on Biosafety to the Convention on Biological Diversity is an international treaty governing the movements of living modified organisms (LMOs) resulting from modern biotechnology from one country to another.

United Nations Convention to Combat Desertification

- The UNCCD aims to combat desertification and mitigate the effects of drought in countries experiencing serious drought and/or desertification, particularly in Africa, through effective actions at all levels, supported by international co-operation and partnership arrangements, in the framework of an integrated approach which is consistent with Agenda 21, with a view to contributing to the achievements of sustainable development in affected areas.

United Nations Framework Convention on Climate Change

- The UNFCCC sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change. Its objectives are to stabilize greenhouse-gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system, within a time-frame sufficient to allow ecosystems to adapt naturally to climate change; to ensure that food production is not threatened; to enable economic development to proceed in a sustainable manner.

Source: <https://www.cbd.int/rio/default.shtml>

<http://www.moef.nic.in/division/convention-biological-diversity-cbd>

96. **Solution: c**

<http://www.insightsonindia.com/2017/09/21/insights-daily-current-affairs-21-september-2017/>

- **Mājuli** or **Majoli** is the world's biggest river island in the **Brahmaputra River**, Assam and in 2016 became the first island to be made a district in India. It had an area of 880 square kilometres (340 sq mi) at the beginning of the 20th century, but having lost significantly to erosion it covers 352 square kilometres (136 sq mi) as at 2014. Majuli has shrunk as the river surrounding it has grown. It is recognised as the world's largest river island, although Ilha do Bananal meets the same qualifications and is much larger.
- The population of Majuli comprises the tribals, non-tribals and the scheduled castes. The tribal communities include the Misings, the Deoris and the Sonowal Kacharis. The scheduled castes include the Kaivartas, the Brittil Banias etc. The non-tribal communities includes Koch, Kalitas, Ahoms, Chutiyas, Keot, Yogis etc. The Mising community has the largest population in the island who immigrated from Arunachal Pradesh to Majuli centuries ago .

Third statement is wrong as Majuli is itself a District since 2016.

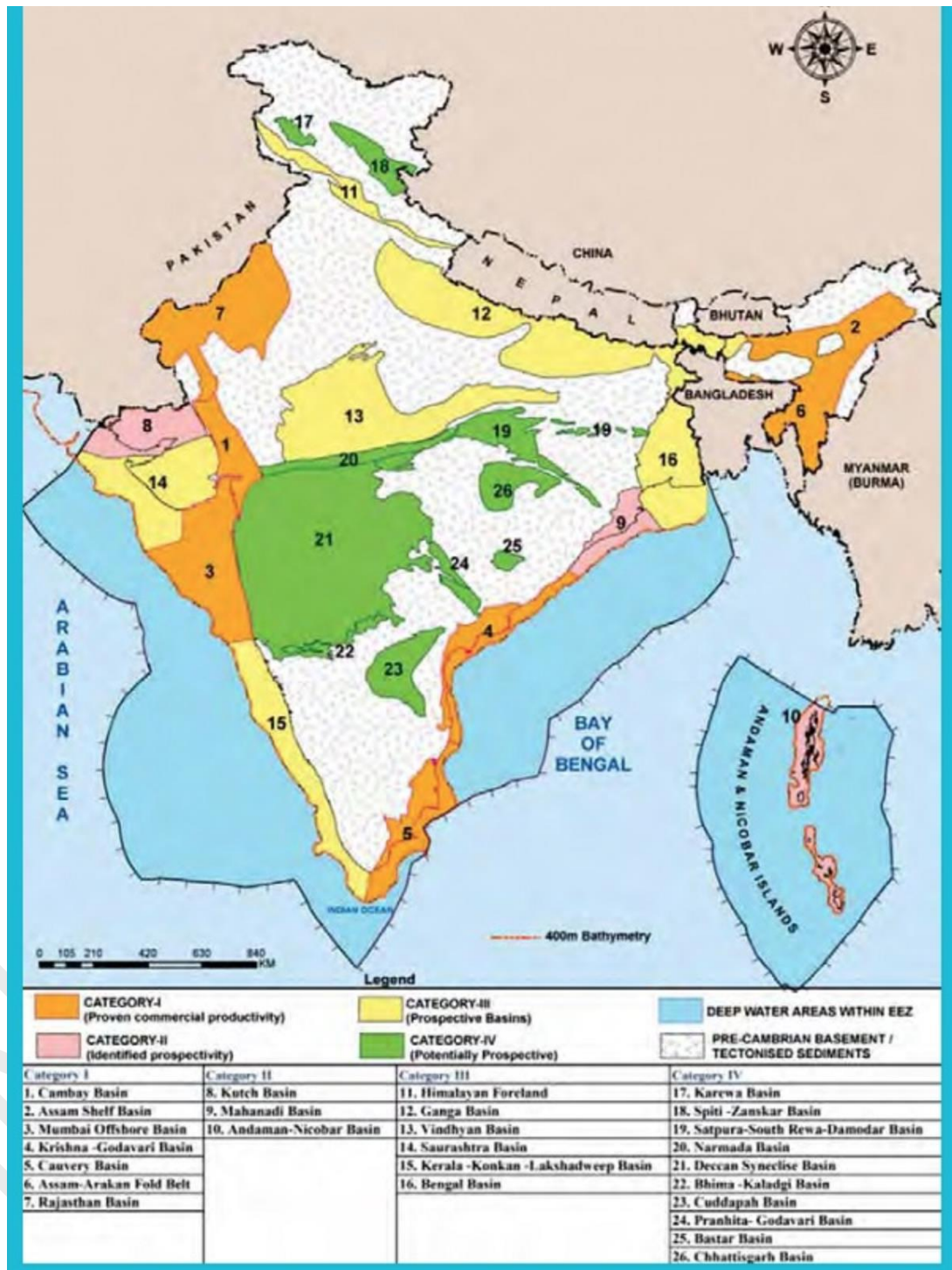
97. **Solution: c**

<http://www.insightsonindia.com/2017/09/13/insights-daily-current-affairs-13-september-2017/>

- Aiming to put in place a key maritime route connecting India with Northeast Asia and Western Pacific region Delhi is contemplating to put in place a major connectivity initiative — direct shipping link between Chennai and Vladivostok amid China's ambitious Maritime Silk Route (MSR) connecting Asia with Africa.
- **Banda Sea is located south of Indonesia.**

(Check world map on Google to see the route)

98. Solution: d



The existing 26 Sedimentary Basins have an area of approximately 3.14 million Sq. Kms.

The sedimentary basins of the country have been classified into four categories as below:

Category-I

- Basins with established commercial production. Cambay, Mumbai Offshore, Rajasthan, Krishna Godavari, Cauvery, Assam Shelf and Assam-Arakan Fold Belt

Category-II

- Basins with known accumulation of hydrocarbons but no. commercial production achieved so far
- Kutch, Mahanadi-NEC (North East Coast) Basin, Andaman-Nicobar, Kerala-Konkan-Lakshadweep Basin.

Category-III

- Basins having hydrocarbon shows that are considered geologically prospective Himalayan Foreland Basin, Ganga Basin, Vindhyan basin, Saurashtra Basin, Kerala Konkan Basin, Bengal Basin

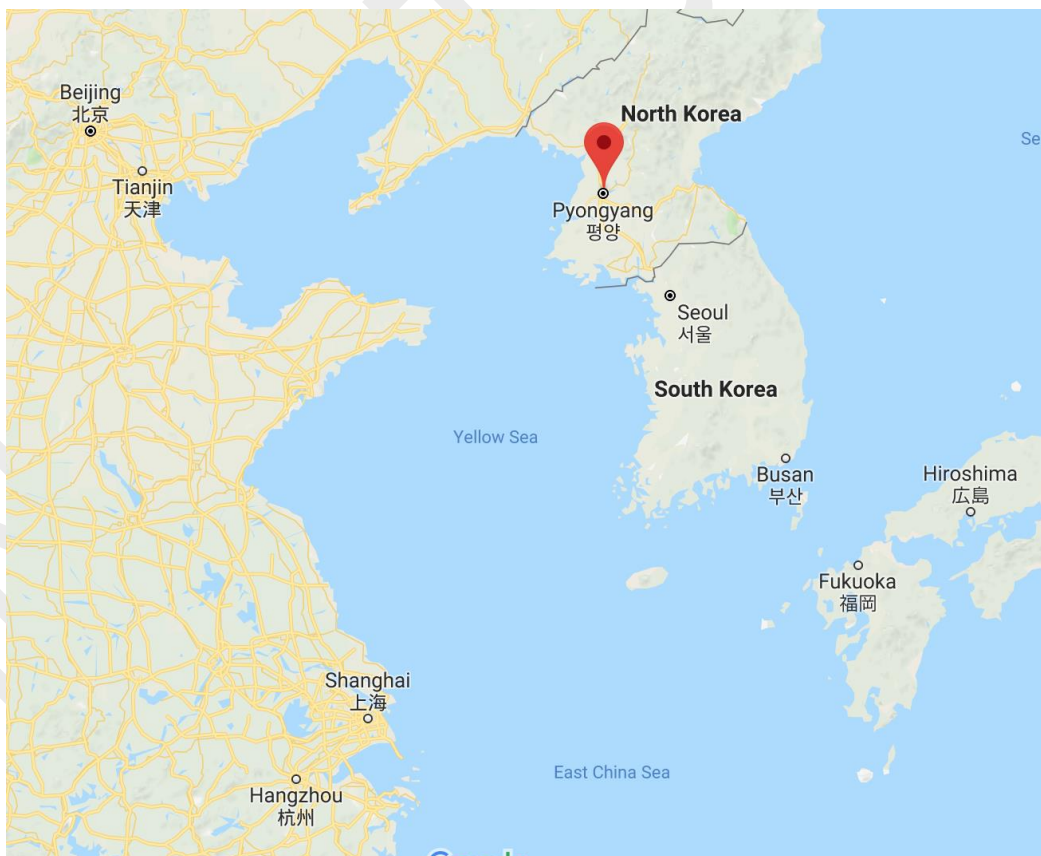
Category-IV

- Basins having uncertain potential which may be prospective by analogy with similar basins in the world. Karewa basin, Spiti-Zaskar basin, Satpura–South Rewa–Damodar basin, Chhattisgarh Basin, Narmada basin, Deccan Syncline, Bhima-Kaladgi, Bastar Basin, Pranhita-Godavari basin, Cuddapah basin.

99. **Solution: d**

<http://www.insightsonindia.com/2017/09/12/insights-daily-current-affairs-12-september-2017/>

As Pyongyang is in news all the time, we just made up a question.



100. **Solution: d**

<http://www.insightsonindia.com/2017/09/12/insights-daily-current-affairs-12-september-2017/>

About the UNSC:

- The United Nations Security Council (UNSC) is one of the six principal organs of the United Nations and is charged with the maintenance of international peace and security. Its powers include the establishment of peacekeeping operations, the establishment of international sanctions, and the authorization of military action through Security Council resolutions; it is the only UN body with the authority to issue binding resolutions to member states.
- The Security Council has 15 members, including **five permanent**. The five permanent members, each with the power of veto, are **China, France, Russia, the United Kingdom and the United States**.
- The Council's 10 non-permanent seats are allocated according to a rotation pattern set by the Assembly in 1963, to ensure a proportionate representation over time from the different parts of the world: five from African and Asian States; one from Eastern Europe; two from Latin American States; and two from Western European and Other States. The Security Council is also responsible for determining the existence of a threat against peace and to respond to an act of aggression. It is also responsible for finding peaceful means to settle a conflict or a dispute between States. In some cases, the Council can resort to sanctions or even authorize the use of force to maintain or restore international peace and security.
