# All India Civil Services Coaching Centre

**(Under the aegis of Government of Tamil Nadu)**

## Answer Key Explanation

### Test 9 – GS Paper I

**Maximum Questions: 100** **Maximum Marks: 200**

**1. Ans. C**

**Exp:** Statement 1 is incorrect: It is an initiative by the Ministry of Earth Sciences.

**SAFAR**

- The System of Air Quality and Weather Forecasting and Research (SAFAR) is a national initiative introduced by the Ministry of Earth Sciences (MoES) to measure the air quality of a metropolitan city, by measuring the overall pollution level and the location-specific air quality of the city.
- The SAFAR system is developed by Indian Institute of Tropical Meteorology, Pune, along with ESSO partner institutions namely India Meteorological Department (IMD) and National Centre for Medium Range Weather Forecasting (NCMRWF).
- It is operationalized by the India Meteorological Department (IMD).
- It is to provide location specific information on air quality in near real time and its forecast 1-3 days in advance for the first time in India. It has been combined with the early warning system on weather parameters.

**2. Ans. D**

**Exp:** Statement 1 is incorrect: The transfer of Judges from one High Court to another High Court is made by the President.

- Statement 2 is incorrect: The Supreme Court derives its power to select, appoint and transfer judges from its verdicts in Three Judges Cases.
- Statement 3 is incorrect: Judges of High Court are not subordinate to the CJI and the SC collegium judges.

**Judges of High Court and Supreme Court**

- **Constitutional provision:** The transfer of Judges from one High Court to another High Court is made by the President after consultations with the Chief Justice of India under Article 222 (1) of the Constitution.
- Art 217 (1) provides that the President shall hold consultation with the Chief Justice of India, the Governor of the State, and in case of appointment of a Judge other than the Chief Justice, the Chief Justice of the High Court.
- **Judicial Interpretation:** The Supreme Court derives its power to select, appoint and transfer judges from its verdicts in Three Judges Cases.
- From the SC decisions on the subject of judges' transfer, following points emerge:
- Transfer of a judge cannot be a punitive measure.
- Transfer can be ordered only on 'public interest' for the 'better administration of justice'.
- Transfer can be ordered by President only on the basis of concurrence of the CJI after effective consultation.
- Judges of High Court are not subordinate to the CJI and the SC collegium judges.
- They enjoy equal status as judges of Constitutional Courts.
- The Constitution has not given the CJI and collegium judges any powers to have administrative superintendence over judges of High Court. Therefore, consent of judge should be required before transfer.

3. **Ans. C**

**Exp:** Statement 1 is not correct: Kapila was the founder of the Samkhya School. Based on the Upanishads, two schools of philosophy developed in India:

1. The realistic (e.g. Samkhya).
2. The idealistic (e.g.Vedanta).

- The Samkhya philosophy combines the basic doctrines of Samkhya and Yoga. However, the Samkhya represents the theory and Yoga represents the application or the practical aspects.
- Statement 2 is correct: Samkhya system believes that the soul can attain liberation only through real knowledge. Real knowledge can be acquired through observation, inference, and words.
- Statement 3 is correct: Kapila's primary principle is that the world is material. Matter (Prakriti) is the basis of everything that is, it is omnipresent, eternal, and one.
- The motion of Prakriti is just as eternal as Prakriti itself. Primordially, Prakriti has no outside cause, for matter (Prakriti) has neither beginning nor end. Kapila wrote that the world was not created, and therefore there was no creator; the world itself was the cause of the world; the world developed gradually. Thus he rules out the existence of God.
- Samkhya argues that if God exists and if God is eternal and unchanging as is widely claimed, then he cannot be the cause of the world. A cause has to be active and changing.
- Charvaka propounded another materialistic philosophy known as Lokayata.

4. **Ans. C**

**Exp:** Statement 1 is correct: Shifting cultivation is an agricultural system in which plots of land are cultivated temporarily, then abandoned until the soil loses its fertility) and allowed to revert to their natural vegetation while the cultivator moves on to another plot.

- Statement 2 is correct: Equatorial regions are very sparsely populated and in the forests of this region, the primitive people/tribes are usually hunters and collectors.
- Primitive subsistence agriculture or shifting cultivation is widely practised by many tribes in the tropics, especially in Africa, south and central America and south east Asia.
- It is prevalent in tropical region in different names, e.g. Jhuming in North eastern states of India, Milpa in Central America and Mexico and Ladang in Indonesia and Malaysia.

5. **Ans. B**

**Exp:** Recently, Blackstone Group along with Embassy Office Parks has filed India's first and Asia's largest prospectus for Real Estate Investment Trust (REIT).

- Statement 1 is correct: A REIT works very much like a mutual fund. It pools funds from investors and invests them in rent-generating properties. REITs are investment vehicles that own, operate and manage a portfolio of income-generating properties for regular returns. These are usually commercial properties (offices, shopping centers, hotels etc.) that generate rental income.
- Statement 2 is correct: REITs are regulated by the securities market regulator in India- Securities and Exchange Board of India (SEBI). In September 2014, SEBI notified the SEBI (Real Estate Investment trusts) Regulations, 2014 for providing a framework for registration and regulation of REITs in India.
- Statement 3 is not correct: Markets regulator Securities and Exchange Board of India (SEBI) has been easing rules to make REITs more attractive to investors. In January 2017, the markets regulator permitted mutual funds to invest in REITs.
- The Reserve Bank of India (RBI) further allowed banks to invest in such

investment trusts following a request from the markets regulator. Another such trust for investment is InvITs (infrastructure investment trusts).

- InvITs are trusts that manage income-generating infrastructure assets, typically offering investors regular yield and a liquid method of investing in infrastructure projects.

**6. Ans. A**

**Exp:** Accelerating Growth of New India's Innovations or AGNIi is a national initiative under the guidance and support of the Principal Scientific Adviser to the Government of India. It is being handled by Invest in India.

- Invest India is the first port of call for potential investors. It is the official investment promotion and facilitation agency of the Government of India, mandated to facilitate investments into India.
- It aims to support the ongoing efforts to boost the innovation ecosystem in the country by connecting innovators across industry, individuals and the grassroots to the market and helping commercialize their innovative solutions thereby helping propel India into a new era of inclusive economic growth. Hence statement (a) is the correct answer.
- AGNIi provides a platform for innovators to scale up their market-ready products by creating pathways for licensing, technology transfer and market access. Further, AGNIi collaborates closely with other stakeholders in the innovation ecosystem to support and augment their innovation and technology commercialization initiatives. However, AGNIi is not a funding agency and does not provide direct financial support to innovators.

**7. Ans. D**

**Exp:** National Guidelines for Gene Therapy Product Development and Clinical Trials

- The apex health research body ICMR has released national guidelines regarding the procedures to be followed for developing and performing gene therapies to tackle inherited genetic or rare diseases in India. Hence, statement 1 is correct.
- The aim of the document is to ensure that gene therapies can be introduced in India and clinical trials for gene therapies can be performed in an ethical, scientific and safe manner.
- Cumulatively, approximately 70 million Indians suffer from some form of rare disease. These include hemophilia, thalassemia, sickle-cell anemia certain forms of muscular dystrophies, retinal dystrophies such as retinitis pigmentosa, corneal dystrophies, primary immunodeficiency (PID) in children, lysosomal storage disorders such as Pompe disease, Gaucher's disease, haemangioma, cystic fibrosis etc.
- These national guidelines provide the general principles for developing Gene Therapy Products (GTPs) for any human ailment and provides the framework for human clinical trials which must follow the established general principles of biomedical research for any human applications.
- The guidelines cover all areas of GTP production, pre-clinical testing and clinical administration, as well as long term, follow up.

**Mechanism for Review and Oversight:**

- Proposed establishment of Gene Therapy Advisory and Evaluation Committee (GTAEC)- an independent body with experts from diverse areas of biomedical research, government agencies and other stakeholders.
- It is mandatory for all institutions and entities engaged in development of GTPs to establish an Institutional Bio-safety Committee (IBSC). Hence, statement 3 is correct.

- Research involving development of new Gene Therapy Product (GTPs) needs to obtain approvals from IBSC and Ethics Committee (EC). Biological material from humans can be procured only from clinics/hospitals that have an Ethics Committee.
- All clinical trials are mandated to be registered with Clinical Trials Registry-India (CTRI). It is an online public record system for registration of clinical trials being conducted in India. Hence, statement 2 is correct.

**8. Ans. C**

**Exp:** Biopiracy is a situation where indigenous knowledge of nature, originating with indigenous people, is used by others for profit, without permission from and with little or no compensation or recognition to the indigenous people themselves. It seeks to establish exclusive monopoly control (patents or intellectual property) over these resources and knowledge.

- Developed countries are exploiting developing countries genetic resources and indigenous communities traditional knowledge in the name of patents on the inventions derived from those genetic resources. Hence statement 1 is correct. Example: use of indigenous knowledge of medicinal plants for patenting by medical companies without recognizing the fact that the knowledge is not new, or invented by the patentee.
- Biomining is the process of using microorganisms (microbes) to extract metals of economic interest from rock ores or mine waste. Biomining techniques may also be used to clean up sites that have been polluted with metals.
- Bioprospecting, also known as biodiversity prospecting, is the exploration of biological material for commercially valuable genetic and biochemical properties. In simple terms, this means the investigation of living things to see how they can be commercially useful to humans. Small samples of natural resources are collected for their potential value to the industry, particularly in the pharmaceutical, biotechnology and agri-business fields. Local communities close to where the material originates may have specialised knowledge on how the resources are used, which can also be collected, and this is known as traditional or indigenous knowledge (IK). Hence statement 2 is correct.

**9. Ans. B**

**Exp:**

- In Mughal India, pietra dura was known as Parchin kari, it literally means 'inlay' or 'driven-in' work. By the end of Jahangir's reign, the practice of constructing buildings entirely of marble and decorating the walls with floral designs made of semi-precious stones began.
- Moti Masjid or Pearl Fort, Diwan-i-aam, Diwan-i-khas, Jami Masjid in New Delhi, Mausoleum build by Jahangir are some of the other examples where this style ("pietra dura,") can be found.
- The stones used are usually silicates, including agates, alabaster, amethyst, jade, jasper, lapis lazuli, malachite, onyx, and topaz. The particular method of decoration, popular as "pietra dura," became more popular under Shah Jahan. Shah Jahan used this technique while constructing the Taj Mahal.
- Hence statement 1 is not correct, and statements 2 and 3 are correct.

**10. Ans. D**

**Exp:** Statement 1 is incorrect: The right to be forgotten is not well-established in India.

**Right to be Forgotten**

- At present, the right to be forgotten is not well-established in India.
- The draft Personal Data Protection Bill, 2018 provides a limited right to be forgotten.

- Unlike the GDPR, the Personal Data Protection Bill, 2018 only provides for prevention of continuing disclosure of personal data and not the deletion of personal data.
- The grounds for exercising this right include cases where the disclosure of the personal data has served the purpose for which it was made or is no longer necessary; this determination has to first be made by an Adjudicating Officer.
- The Adjudicating Officer also has to be satisfied that the right to be forgotten overrides the right to freedom of speech and expression, and the right to information of an citizen.

**Right to Privacy vs Right to be Forgotten vs Right to information**

- The biggest challenge in implementing this right is the trade-off between defamation and freedom of expression.
- The right to be forgotten cannot be an absolute right and would be objected to reasonable restrictions.
- The right to be forgotten comes within the purview of the right to privacy, which would be at odds with Article 19(1)(a) — freedom of speech and expression.
- If the information is of public interest, the right to information of the public prevails over privacy rights.
- While implementing the right to be forgotten, a very fi ne balance has to be struck between the right to freedom of speech and expression, public interest and personal privacy.
- To balance these conflicting rights, the judiciary may consider implementing a system where personal information like names, addresses etc. of the litigants are redacted from reportable judgments/ orders especially in personal disputes.
- The courts have, in the past, refrained from divulging the identities of parties in order to respect their privacy in many rape or medico-legal cases.

**11. Ans. D**

**Exp:** All statements are correct

**State Executives**

- The current Chief Minister of Maharashtra took the oath of his office on November 28, 2019 without being a member of either the State legislature or council.
- Article 164(4) of the Constitution allows a person to become a Minister without being a member of either House of State legislature for the period of six months from the date of oath.
- Therefore in this case, the last date to become a member of either House is May 24, 2020.
- Article 171 of the Constitution mandates the Governor to nominate members to the Legislative Council who have special knowledge or practical experience in literature, science, art, cooperative movement and social service.
- According to Section 151A of Representation of the People Act 1951, nomination to the post cannot be done if the remainder of the term of a member in relation to a vacancy is less than one year.
- The time limit for a bypoll to fill vacancies is six months from the date of occurrence of vacancy. Provided that nothing contained in this section shall apply if —
- The remainder of the term of a member in relation to a vacancy is less than one year; or
- The Election Commission in consultation with the Central Government certifies that it is difficult to hold the by-election within the said period.

**12. Ans. A**

**Exp:** Statement 1 is correct: GreenCo Rating is the "first of its kind in the World" holistic framework that evaluates companies on the environmental friendliness of their activities using a life cycle approach.

- Implementation of GreenCo rating provides leadership and guidance to companies on how to make products, services and operations greener. Industry

personnel are trained on the latest Green concepts and facilitated for implementing better systems and implementing global best practices in green.

- The life cycle approach involves an emphasis on product design, materials used, procurement, vendor management, logistics, packaging, manufacturing, distribution, product use, disposal and recycling.
- Statement 3 is not correct: It has been developed by the Confederation of Indian Industry.
- Statement 2 is correct: GreenCo rating is applicable to both manufacturing facilities and service sector units. The rating is implemented at the unit or facility level. The unit or facility has to be in operation for a minimum period of 3 years. In the case of new plants/ facilities minimum, 2 years operation is required.

**13. Ans. B**

**Exp:**The International Union for Conservation of Nature's (IUCN) 10th Asian Elephant Specialist Group (AsESG) Meeting was held recently at Kota Kinabalu in Sabah, Malaysia.

- Statement 1 is not correct: The IUCN Asian Elephant Specialist Group (AsESG) is a global network of specialists (both scientists and non-scientists) concerned with the study, monitoring, management, and conservation of Asian Elephants (Elephas maximus). AsESG is an integral part of the Species Survival Commission (SSC) of the International Union for Conservation of Nature (IUCN).
- It aims to promote the long-term conservation of Asia's elephants and, where possible, the recovery of their populations to viable levels.
- Statement 2 is correct: It shall provide the best available scientifically grounded evidence to the abundance, distribution, and demographic status of Asian elephant populations in all 13 range states.
- This is documented in 'Gajah', a bi-annual journal of the IUCN/SSC Asian Elephant Specialist Group (AsESG).

**14. Ans. A**

**Exp:** In India, settlements relating to the Chalcolithic phase are found in south-eastern Rajasthan, the western part of M.P., western Maharashtra, and in southern and eastern India.

- In south-eastern Rajasthan, two sites, one at Ahar and the other at Gilund, have been excavated. In western MP or Malwa, Kayatha and Eran have been excavated.
- Malwa-ware characteristic of the Malwa Chalcolithic culture of central and western India is considered the richest among Chalcolithic ceramics, and some of this pottery and other related cultural elements also appear in Maharashtra.
- However, the most extensive excavations have taken place in western Maharashtra. Several Chalcolithic sites, such as Jorwe, Nevasa, Daimabad in Ahmadanagar district; Chandoli, Songaon, and Inamgaon in Pune district; and also Prakash and Nasik have been excavated.
- They all relate to the Jorwe culture named after Jorwe, the type-site situated on the left bank of the Pravara river, a tributary of the Godavari, in Ahmadanagar district. The Jorwe culture owed much to the Malwa culture, but it also shared elements of the Neolithic culture of the south.

**15. Ans. A**

**Exp:**Women could attend assemblies and offer sacrifices along with their husbands. We have an instance of five women who composed hymns, although the later texts mention twenty such women. Evidently the hymns were composed orally, and nothing written relates to that period.

- The practice of levirate (levirate marriage is a type of marriage in which the brother of a deceased man is obliged to marry his brother's widow) and widow remarriage

existed in the Rig Vedic period. There are no examples of child marriage, and the marriageable age in the Rig Veda seems to have been 16 to 17.

- Hence only statement 1 is correct.

**16. Ans. D**

**Exp:**The air is set in motion due to the differences in atmospheric pressure. The air in motion is called wind. The wind blows from high pressure to low pressure. The wind at the surface experiences friction. In addition, rotation of the earth also affects the wind movement.

- The force exerted by the rotation of the earth is known as the Coriolis force. Thus, the horizontal winds near the earth surface respond to the combined effect of three forces – the pressure gradient force, the frictional force and the Coriolis force. In addition, the gravitational force acts downward.
- **Pressure Gradient Force:** The differences in atmospheric pressure produces a force. The rate of change of pressure with respect to distance is the pressure gradient. The pressure gradient is strong where the isobars are close to each other and is weak where the isobars are apart.
- **Frictional Force:** It affects the speed of the wind. It is greatest at the surface and its influence generally extends upto an elevation of 1 - 3 km. Over the sea surface the friction is minimal.
- **Coriolis Force:** The rotation of the earth about its axis affects the direction of the wind. This force is called the Coriolis force after the French physicist who described it in 1844. It deflects the wind to the right direction in the northern hemisphere and to the left in the southern hemisphere. The deflection is more when the wind velocity is high.
- The Coriolis force is directly proportional to the angle of latitude. It is maximum near the poles and is absent at the equator.
- The Coriolis force acts perpendicular to the pressure gradient force. The pressure gradient force is perpendicular to an isobar. The higher the pressure gradient force, the more is the velocity of the wind and the larger is the deflection in the direction of wind.
- As a result of these two forces operating perpendicular to each other, in the low-pressure areas the wind blows around it.
- At the equator, the Coriolis force is zero and the wind blows perpendicular to the isobars. The low pressure gets filled instead of getting intensified. That is the reason why tropical cyclones are not formed near the equator.

**17. Ans. D**

**Exp:** All the exogenic geomorphic processes are covered under a general term, denudation. The word 'denude' means to strip off or to uncover. Weathering, mass wasting/movements, erosion and transportation are included in denudation.

- **Weathering:** Weathering is the process of decomposition of rocks into smaller particles. This decomposition is done via three weathering means, physical, chemical and biological weathering.
- Decomposition and disintegration of rocks into fragments is done by physical weathering, in chemical weathering this decomposition is due to the chemical change in the rock formation, and in biological weathering animals and plants are responsible for decomposition of rocks.
- **Erosion:** Erosion is the movement of rocks and weathered materials due to natural agents like rivers and glaciers.
- **Transportation:** Transportation is the removal of eroded debris to new positions.
- **Deposition:** It is dumping of debris in certain parts of the earth, where it may accumulate to form new rocks.
- All the above denudation processes are taking in place simultaneously in different part of the world at different rates, much depending on the nature of

the relief, the structure of the rock, the local climate and interference by man.

**18. Ans. A**

**Exp:** The Medium-Term Fiscal Policy Statement cum Fiscal Policy Strategy Statement is presented to Parliament under Section 3 of the Fiscal Responsibility and Budget Management Act, 2003.

It sets out the three-year rolling targets for six specific fiscal indicators in relation to GDP at market prices, namely

- Fiscal Deficit
- Revenue Deficit
- Primary Deficit
- Tax Revenue
- Non-tax Revenue
- Central Government Debt (hence only option 4 is not correct)
- The Statement includes the underlying assumptions, an assessment of the balance between revenue receipts and revenue expenditure and the use of capital receipts including market borrowings for the creation of productive assets.
- It also outlines for the existing financial year, the strategic priorities of the Government relating to taxation, expenditure, lending and investments, administered pricing, borrowings and guarantees.
- The Statement explains how the current fiscal policies are in conformity with sound fiscal management principles and gives the rationale for any major deviation in key fiscal measures.

**19. Ans. C**

**Exp:**

- Advance Authorization (AA) is issued to allow duty free import of inputs, which are physically incorporated in export products (making normal allowance for wastage). In addition, fuel, oil, catalyst which are consumed/ utilized in the process of production of export products are also be allowed.
- It is under the purview of Directorate General of Foreign Trade (DGFT), an attached office of the Ministry of Commerce and Industry and is headed by Director General of Foreign Trade.
- Hence option (c) is the correct answer.

**20. Ans. B**

**Exp:** Monotremes are mammals that lay eggs (Prototheria) instead of giving birth to live young like marsupials (Metatheria) and placental mammals (Eutheria).

- There are only five living monotreme species: the duck-billed platypus and four species of echidna (also known as spiny anteaters). All of them are found only in Australia and New Guinea.
- Monotremes are the only group of mammals that lay eggs, i.e. they are oviparous, laying one to three eggs. They have a single posterior opening, the cloaca, for excretion and reproduction. The name monotreme means one-holed.
- Monotremes resemble other mammals in producing milk to nourish their young, in having three inner ear bones and a single bone in the lower jaw. Monotremes are highly specialized feeders and the adults have no teeth.

**21. Ans. B**

**Exp:**Taiga, also called boreal forest is a biome (major life zone) of vegetation composed primarily of cone-bearing needle leaved or scale leaved evergreen trees, found in northern circumpolar forested regions characterized by long winters and moderate to high annual precipitation.

- The tree line is the edge of the habitat at which trees are capable of growing. It is found at high elevations and high latitudes. Beyond the tree line, trees cannot tolerate the environmental conditions. It occurs at the northern flank of the taiga ecosystem. Beyond the tree line, tundra ecosystem is present. Hence statement 1 is not correct.
- Soils in the boreal forest are typically podzols, gray soils that are thin, acidic,

and poor in nutrients. These soils lie beneath a mat of coniferous tree needles and other organic material that accumulates due to the slow decomposition rates and limited soil microorganism activity that occurs in the cold climate. Tannins and other acidic compounds from this layer cause the upper layers of soil to become acidic. Hence statement 2 is correct.

- Boreal forests have lower productivity than tropical or temperate forests; they also have less diversity, with only a tree layer and ground layer. Temperatures in the arctic tundra are cold year-round and precipitation is very low. However their primary productivity is much higher than tundra.

**22. Ans. C**

**Exp:** Both statements are correct

**Nazca Lines**

- Recently, a giant cat geoglyph was discovered on a hill at the famous Nazca Lines site in Peru.
- Nazca Lines are a group of geoglyphs known for the depictions of larger-than-life animals, plants and imaginary beings.
- Geoglyphs are the large designs made on the ground by creators using elements of the landscape such as stones, gravel, dirt or lumber.
- These are believed to be the greatest known archaeological enigma, owing to their size, continuity, nature and quality.
- The Lines were first discovered in 1927, and were declared a World Heritage Site by UNESCO in 1994.

**23. Ans. B**

**Exp:** Statement 3 is incorrect: Presently, India has approximately 15 VTS systems operational along the Indian Coast and there is no uniformity of VTS software as each system has its own VTS software.

**VTS/ VTMS**

- Minister of State for Shipping e-launched the development of Indigenous Software solution for Vessel traffic services (VTS) and Vessels Traffic Monitoring Systems (VTMS).
- VTMS is a software which determines vessel positions, position of other traffic or meteorological hazard warnings and extensive management of traffic within a port or waterway.
- Vessel Traffic Services (VTS) contribute to safety of life at sea, safety and efficiency of navigation and protection of the marine environment, adjacent shore areas, work sites and offshore installations from possible adverse effects of maritime traffic.
- VTMS is mandatory under IMO Convention SOLAS (Safety of Life at Sea).
- Presently, India has approximately 15 VTS systems operational along the Indian Coast and there is no uniformity of VTS software as each system has its own VTS software.
- With the indigenous software development in progress the recent positive cooperation with office of Director General of Light and Lighthouses (DGLL) on joint development of the indigenous VTMS software development as part of the Aatmanirbhar Bharat initiative will strengthen the cooperation in this area.

**24. Ans. D**

**Exp:** Oxalic acid is used in the bleaching of leather, removal of ink, photography, clothing printing. Hence pair 1 is correctly matched.

- Acetic Acid is used as a solvent, in preparation of vinegar, acetone, and processing of food. Hence pair 2 is correctly matched.
- Citric Acid is used in washing metals, processing of food and drugs, in the cloth industry. Hence pair 3 is correctly matched.

- Benzoic Acid is used for the preservation of medicine and food. Hence pair 4 is not correctly matched.
- Sulphuric Acid is used in accumulation batteries.

**25. Ans. B**

**Exp:** All statements are correct

**Sixth Schedule of the Constitution**

- The Sixth Schedule of the Constitution deals with the administration of the tribal areas in the four north-eastern states of Assam, Meghalaya, Tripura and Mizoram as per Article 244.
- The Governor is empowered to increase or decrease the areas or change the names of the autonomous districts. While executive powers of the Union extend in Scheduled areas with respect to their administration in Vth schedule, the VIth schedule areas remain within executive authority of the state.
- The Acts of Parliament or the state legislature do not apply to autonomous districts and autonomous regions or apply with specified modifications and exceptions.
- The Councils have also been endowed with wide civil and criminal judicial powers, for example establishing village courts etc. However, the jurisdiction of these councils is subject to the jurisdiction of the concerned High Court.
- If at any time the Governor is satisfied that a situation has arisen in which the administration of an autonomous district or region cannot be carried on in accordance with the provisions of this Schedule, he may, by public notification, assume to himself all or any of the functions or powers vested in or exercisable by the District Council or, as the case may be, the Regional Council and declare that such functions or powers shall be exercisable by such person or authority as he may specify in this behalf, for a period not exceeding six month.
- The sixth schedule to the Constitution includes 10 autonomous district councils in 4 states. These are:
- **Assam:** Bodoland Territorial Council, Karbi Anglong Autonomous Council and Dima Hasao Autonomous District Council.
- **Meghalaya:** Garo Hills Autonomous District Council, Jaintia Hills Autonomous District Council and Khasi Hills Autonomous District Council.
- **Tripura:** Tripura Tribal Areas Autonomous District Council.
- **Mizoram:** Chakma Autonomous
- District Council, Lai Autonomous District Council, Mara Autonomous District Council.

**26. Ans. D**

**Exp:** Under the Peshwas, the Marathas developed a very successful military organisation. Their success lay in by-passing the fortified areas of the Mughals, by raiding cities and by engaging Mughal armies in areas where their supply lines and reinforcements could be easily disturbed.

- Between 1720 and 1761, the Maratha empire expanded. It gradually chipped away at the authority of the Mughal Empire. Malwa and Gujarat were seized from the Mughals by the 1720s. By the 1730s, the Maratha king was recognised as the overlord of the entire Deccan peninsula. He possessed the right to levy Chauth and Sardeshmukhi.
- Statement 1 is not correct: Chauth and Sardeshmukhi were the taxes collected not in the Maratha kingdom but in the neighbouring territories of the Mughal empire or Deccan sultanates.
- Statement 2 is not correct: Chauth was one fourth of the land revenue paid to the Marathas in order to avoid the Maratha raids. Sardeshmukhi was an additional levy of ten percent on those lands which the Marathas claimed hereditary rights. It was demanded by Shivaji on account of being the Sardeshmukh (headman).

**27. Ans. B**

**Exp:** Statement 1 is correct: The Harappan inscription was a pictographic script where ideas and objects were expressed in the form of pictures. It is yet to be deciphered. The oldest inscription deciphered so far were issued by Ashoka in the 3rd Century B.C.

- Inscriptions were mostly on flat, rectangular stamp seals, and also on tools, tablets, ornaments, and pottery. 417 distinct symbols have been identified, and the direction of writing is thought to be right to left, and sometimes Boustrophedon (written from right to left and from left to right in alternate lines.) It assumably stands for the name of the owner, the name of an affiliated organization or the name of the deity. The seals containing these inscriptions were probably used for trade as an administrative instrument as well as for other functions too.
- Statement 2 is not correct: Brahmi script, which is used to engrave the Ashokan inscriptions, is written from left to right while Kharoshti script is written from right to left. This script(Brahmi) was fully deciphered in 1837 by James Prinsep, an archaeologist, philologist, and official of the East India Company, with the help of Alexander Cunningham.
- Statement 3 is correct: Brahmi script prevailed in the whole country except for the north-western part where contact with foreign powers like Iran, Greeks was there. Greek and Aramaic scripts were used in writing Ashokan inscriptions in Afghanistan. Brahmi continued to be the main script till the end of Gupta period.

**28. Ans. A**

**Exp:** Statement 1 is not correct: Lightning is produced by discharges of electricity from cloud to cloud or from cloud to ground. A large positive charge builds up in the upper part of a thunder cloud and a negative charge builds up near the base of the cloud.

- When the potential difference between the charged areas becomes large enough, electrical energy is discharged and a flash of lightning occurs. Huge quantities of electricity are discharged in lightning flashes and temperatures of over 30,000°C or more can be reached!
- Statement 3 is correct: Thunder is the loud noise which follows a flash of lightning. Lightning can be seen before thunder is heard as light travels faster than sound. The speed of sound in air is just over 300m/s.
- This means that if you count the seconds between seeing the lightning and hearing the thunder, and divide by three, you can work out how many kilometres away the storm is (for example, if you start counting when you see the lightning and get to 9, then the storm is about 3km away). The noise of thunder is caused by the rapid expansion of heating the air. You can normally hear thunder up to 6 miles (10km) away from the lightning flash.
- Statement 2 is not correct: In a thunderstorm you should not stand under a tree! Lightning tends to strike the highest point around and everything near this can be a target for the lightning too. Very few people survive being hit by lightning.
- To increase your safety in a thunderstorm you should avoid high ground, water, open spaces such as parks and golf courses, staying in a tent or shed, being within 30m of wire fences or using your umbrella. You should make yourself as small as possible – curling up in a ball is good. It is however safe to stay in the car because the car acts as what is known as a Faraday cage, protecting you from the electric field generated by the storm.

**29. Ans. C**

**Exp:** Metamorphic rocks form under the action of pressure, volume and temperature (PVT) changes.

- Metamorphism occurs when rocks are forced down to lower levels by tectonic

processes or when molten magma rising through the crust comes in contact with the crustal rocks or the underlying rocks are subjected to great amounts of pressure by overlying rocks. In Metamorphism consolidated rocks undergo recrystallization and reorganization of materials within original rocks.

- In the process of metamorphism in some rocks grains or minerals get arranged in layers or lines. Such an arrangement of minerals or grains in metamorphic rocks is called foliation or lineation. Sometimes minerals or materials of different groups are arranged into alternating thin to thick layers appearing in light and dark shades. Such a structure in metamorphic rocks is called banding and rocks displaying banding are called banded rocks.
- Metamorphic rocks have been put under great pressure, heated, squashed or stretched. So fossils do not usually survive these extreme conditions. Generally it is only sedimentary rocks that contain fossils.
- Hence option c is the correct answer.

**30. Ans. C**

**Exp:** The Government of India (GoI) has recently proposed the introduction of Remission of Duties or Taxes on Export Product (RoDTEP) scheme to replace the existing Merchandise Exports from India Scheme (MEIS) to comply with the WTO rules. Hence, statement 1 is correct.

- The new scheme is supposed to reimburse all taxes and duties paid on inputs consumed in exports in sync with the WTO norms.
- It will create a fully automated route for Input Tax Credit (ITC) in the GST to help increase the exports in India.
- Since potential revenue forgone in the current MEIS is around Rs 40,000 crore a year, RoDTEP is expected to cost the government an additional Rs 10,000 crore annually.
- Hence, statement 2 is not correct.
- RoDTEP scheme will be monitored by the Ministry of Finance (MoF). Hence, statement 3 is not correct.

**31. Ans. C**

**Exp:** Net International Investment Position (NIIP): It is the stock of external assets minus the stock of external liabilities. In other words it is the value of foreign assets owned by private and public sector of a country minus the value of domestic assets owned by foreigners. Hence, statement 1 is correct.

- NIIP measures the gap between a nation‘s stock of foreign assets and foreigner‘s stock of that nation‘s assets at a specific point in time.
- Changes in NIIP/GDP ratio nets out the impact of investment made by the country abroad from the external liabilities borne by the country thereby measuring the net changes in the debt and equity servicing burden in relation to GDP.
- Higher is the net FDI inflows, higher is the net foreign ownership of domestic assets. Hence, statement 2 is correct.
- The surge in net FDI inflows worsened the absolute NIIP level from 2009-14 to 2014-19.

**32. Ans. D**

**Exp:** The ecads otherwise known as ecophenes are genetically similar but morphologically distinct in response to different environmental conditions. The variation in morphological characters with respect to leaf shape, number of branches, height of the individuals, and length, number and colour of inflorescences according to the intensity of light available is common in plant species. In the species, Plantago lanceolata, the ribwort plantain, populations adapted to either sun or shaded habitats show large differences in growth form.

- The influence of temperature for the ecad formation is remarkable in plant species. It is reported that under optimal night temperatures, the flowers are small

whereas, under low night temperatures, the flowers have larger ovaries in Capsicum annum.

- Soil wetness is one of the primary factors for microclimatic variation in a habitat that in turn induces ecad formations in plant species. For example, the species, Ricinus communis exhibits much variation according to soil moisture regarding the size and ornamentation of the regma (fruit) and colour and patterning of the seeds, fruits, leaves pollens.
- The content of metals in the soil is also found to be an influential factor to initiate morphological variations in some plant species. The differences in leaf dimensions between various mine populations of B. homblei are noted. Leaves of this species from high copper soils were significantly longer and narrower than those of plants from low copper soils.

**33. Ans. B**

**Exp:** Byssinosis is a rare lung disease. It's caused by inhaling hemp, flax, and cotton particles and is sometimes referred to as brown lung disease. It's a form of occupational asthma.

- In the United States, byssinosis occurs almost exclusively in people who work with unprocessed cotton. People who open bales of cotton during the first stage of processing are at the highest risk. There's also a type of byssinosis called grain worker's lung that appears in people who work with grains.
- Patients with byssinosis usually have difficulty with cough and feelings of chest tightness. Some develop "Monday fever" when they are exposed to the dust as they return to work after a break.
- The symptoms improve over the course of the week, and usually cause no long-term effects if the exposure is stopped. However, permanent damage and difficulty in breathing can occur with continued exposure. Most people with symptoms have had exposure for more than 10 years.

**34. Ans. A**

**Exp:** Statement 3 is incorrect: NCDC was set up under an Act of Parliament in 1963 for promotion and development of cooperatives. It functions under the Ministry of Agriculture and Farmers Welfare.

**Ayushman Sahakar**

- Union Minister for Agriculture launched AYUSHMAN SAHAKAR, a unique scheme to assist cooperatives to play an important role in creation of healthcare infrastructure in the country.
- The scheme is formulated by the National Cooperative Development Corporation (NCDC), the apex autonomous development finance institution under the Ministry of Agriculture and Farmers Welfare.
- NCDC would extend term loans to prospective cooperatives to the tune of Rs.10,000 Crore in the coming years.
- There are about 52 hospitals across the country run by cooperatives. The NCDC fund would give a boost to provision of healthcare services by cooperatives.
- Ayushman Sahakar specifically covers establishment, modernization, expansion, repairs, renovation of hospital and healthcare and education infrastructure.
- Any Cooperative Society with suitable provision in its byelaws to undertake healthcare related activities would be able to access the NCDC fund. NCDC assistance will flow either through the State Governments/ UT Administrations or directly to the eligible cooperatives.

**35. Ans. D**

**Exp:** All statements are correct

**Life in Miniature Project**

- Union Minister for Culture and Tourism virtually launched "Life in Miniature" project, a collaboration between the

National Museum, New Delhi, Ministry of Culture, and Google Arts & Culture.

- Several hundred miniature paintings from the National Museum, New Delhi can be viewed online on Google Arts & Culture by people around the world in a new project titled "Life in Miniature."
- The project uses technologies like machine learning, augmented reality and digitization with high-definition robotic cameras, to showcase these special works of art in a magical new way.
- On the Google Arts & Culture app, online viewers can experience the first Augmented Reality-powered art gallery designed with traditional Indian architecture, and explore a life-size virtual space where you can walk up to a selection of miniature paintings.
- Google Arts & Culture is an immersive way to explore art, history and the wonders of the world. The Google Arts & Culture app is free and available online for iOS and Android.

**36. Ans. C**

**Exp:** Minimal state or "night-watchman" state.

- The idea of Minimal state or "night-watchman" state was given by Robert Nozick.
- It is defined as a government which protects individuals, via police and military forces, from force, fraud, and theft, and administers courts of law, but does nothing else. The state has powers only to impose the rule of law and nothing else. Hence option (c) is correct

**Some of the features of the minimal state are:**

- Existence of inviolable rights. i.e individuals are inviolable ends-in-themselves and self-owners, that they have certain rights, in particular, rights to their lives, liberty, and the fruits of their labour.
- Such a state cannot regulate food choice of citizens including drinking or smoking, control what they publish or read, administer mandatory social insurance schemes or public education, regulate economic life in general via minimum age and rent control laws.
- Side constraints may be imposed on individual behaviour to respect the rights of others.
- It allows people to form "mutual protection associations" in order to defend themselves and to exercise their right to rectification.
- Under such an arrangement, all members of the association are "on-call" to defend and enforce the rights of other members.

**37. Ans. B**

**Exp:** Limits on campaign expenditure are meant to provide a level-playing field for everyone contesting elections. It ensures that a candidate cannot win only because she is rich. The Election Commission (EC) imposes limits on campaign expenditure incurred by a candidate, not political parties. Hence statement 1 is not correct.

- Expenditure by a Lok Sabha candidate is capped between Rs 50 lakh and Rs 70 lakh, depending on the state she is fighting from. In Assembly elections, the ceiling is between Rs 20 lakh and Rs 28 lakh.
- This includes money spent by a political party or a supporter of the candidate's campaign. However, expenses incurred either by a party or the leader of a party for propagating the party's programme are not covered. Hence statement 2 is not correct.
- Under Section 77 (1) , Representation of the People Act,1951 provides that candidates must mandatorily file a true account of election expenses with the EC. An incorrect account or expenditure beyond the ceiling can attract disqualification for up to three years under Section 10A of The Representation of the People Act, 1951. Hence statement 3 is correct.
- Hence option (b) is the correct answer.

**38. Ans. A**

**Exp:** While Dhrupad might have had an impetus for popularity even by the 14th century, it finds a blossoming period from 15th century onwards to about the 18th century.

- It is a prominent form of Hindustani music that developed in northern India. During these centuries we find the most respected and renowned singers and patrons of this form.
- There was Man Singh Tomar, the Maharaja of Gwalior. It was he who was mainly responsible for the enormous vogue of dhrupad. There were Baiju, Bakshu and others.
- Swami Haridasa a hermit of Brindavan was not only a dhrupadiya, but one of the most central figures in the Bhakti cult in the Northern areas of India. By tradition he was the guru of Tansen, one of the best known dhrupad singers and one of the nine jewels of Emperor Akbar's court.
- Hence, statements 1 and 3 are correct.
- In structure dhrupad has two parts, the anibaddha section and the sanchari dhrupad proper. The first is free alap. The dhrupad proper is a song in four parts: the asthayee, the antara, the Sanchari and the abhoga.
- The essential quality of the dhrupadic approach is its sombre atmosphere and emphasis on rhythm.
- There were four schools or vanis of singing the dhrupad.
- The Gauhar vani developed the raga or unadorned melodic figures.
- The Dagarvani emphasized melodic curves and graces.
- The Khandar vani specialised in quick ornamentation of the notes.
- Nauhar vani was known for its broad musical leaps and jumps.
- The Been and Pakhawaj which were closely associated with the dhrupad.
- Thumrī is a common genre of semi-classical Indian music. The text is romantic or devotional in nature, the lyrics are usually in Uttar Pradesh dialects of Hindi called Awadhi and Brij Bhasha.
- Thumri is characterized by its sensuality, and by a greater flexibility with the raag. Hence statement 2 is not correct.

**39. Ans. A**

**Exp:** The foundation of the Islamic rule in India was laid down by the Turks. It is believed that Turks came to India during the Slave Dynasty. They introduced or popularized a number of new crafts and techniques.

**Some of the major ones include -:**

- Use of iron stirrup. Hence, option 1 is correct.
- Use of armour both for the horse and rider
- Improvement of rahat (Persian wheel through which water could be lifted from a deeper level for irrigation)
- Paper-making, Glass-making, the spinning wheel, and an improved loom for weaving;
- Use of Lime mortar for building, which enabled the Turks to erect magnificent buildings based on arch and dome. Hence, option 2 is correct.

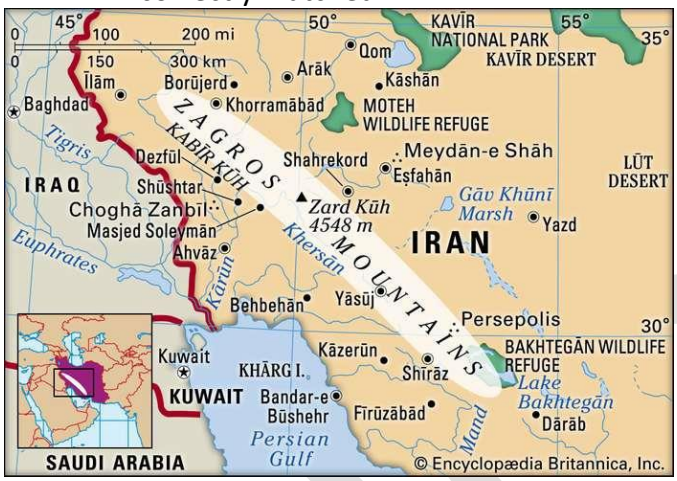
**Printing Press**

- The first printing press in India was established in 1576 by the Jesuit missionaries in Goa. The first book printed in India was "Doctrina Christa" in 1578. Hence, option 3 is not correct.
- Cultivation of Tobacco and Pineapple
- They were introduced by Portuguese in India. Hence, option 4 is not correct.

**40. Ans. C**

**Exp:** Atlas Mountains: Atlas Mountains are a series of mountain ranges in northwestern Africa, running generally southwest to northeast that form the geologic backbone of the countries of the Maghrib (the western region of the Arab world) - Morocco, Algeria, and Tunisia.

- Their thick rim rises to form a high sill separating the Mediterranean basin to the north from the Sahara to the south, thus constituting a barrier. Hence pair 1 is not correctly matched.
- Zagros Mountains: Zagros Mountains is a mountain range in southwestern Iran, extending northwest-southeast from the border areas of eastern Turkey and northern Iraq to the Strait of Hormuz. Situated mostly in what is now Iran, it forms the extreme western boundary of the Iranian plateau, though its foothills to the north and west extend into adjacent countries. Hence pair 2 is correctly matched.




- Altai Mountains: This is a complex mountain system of Central Asia extending approximately in a southeast-northwest direction from the Gobi desert to the West Siberian Plain, through China, Mongolia, Russia, and Kazakhstan. At present the mountains are opened to extensive resource extraction operations. Hence pair 3 is not correctly matched.
- Drakensberg Mountains: The Drakensberg mountains form the eastern portion of the Great Escarpment, which encloses the central Southern African plateau. These mountains are located within the borders of South Africa and Lesotho. The range is the main watershed of South Africa and is the source of the Orange River. Hence pair 4 is correctly matched.


- Hence option c is the correct answer.

**41. Ans. D**

**Exp:** Earthquakes often cause dramatic geomorphological changes, including ground movements—either vertical or horizontal—along geologic fault traces; rising, dropping, and tilting of the ground surface; changes in the flow of groundwater; liquefaction of sandy ground; landslides; and mudflows.

- A seiche is a standing wave in an enclosed or partially enclosed body of water. Seiches and seiche related phenomena have been observed on lakes, reservoirs, swimming pools, bays, harbours and seas.
- They are sometimes induced by earthquakes and tsunamis. Oscillations of this sort may last for hours or even for a day or two. Like the great Lisbon earthquake of 1755 caused the waters of canals and lakes in regions as far away as Scotland and Sweden to go into observable oscillations.
- Liquefaction takes place when loosely packed, water-logged sediments at or near the ground surface lose their strength in response to strong ground shaking. Liquefaction occurring beneath buildings and other structures can cause major damage during earthquakes.

**42. Ans. B**

**Exp:** Price volatility of some of the horticulture commodities affects the consumers by way of an increase in food consumption budget. To mitigate hardships

to consumers, a new central sector scheme for providing working capital and other incidental expenses for procurement and distribution of perishable agri-horticultural commodities was approved.

- For this purpose, a corpus — "Price Stabilisation Fund" of Rs. 500 Crore was announced in the Union Budget 2014-15 with a view to mitigate price volatility.
- To begin with, interventions would be supported for onions, potatoes and pulses only. Hence, statement 1 is not correct.
- A Price Stabilisation Fund (PSF) Trust was earlier established in 2004 for plantation crops such as coffee, tea, rubber and tobacco. It was later discontinued.
- It was set up under the Department of Agriculture, Cooperation & Famers Welfare (DAC&FW), Ministry of Agriculture. The PSF scheme was transferred from DAC&FW to the Department of Consumer Affairs (DOCA), Ministry of Consumer Affairs, Food and Public Distribution. Hence, statement 3 is correct.
- Procurement of these commodities will be undertaken directly from farmers or farmers' organizations at farm gate/mandi and made available at a more reasonable price to the consumers. Losses incurred, if any, in the operations will be shared between the Centre and the States. Hence, statement 2 is correct.

**43. Ans. A**

**Exp:** Creative destruction refers to the incessant product and process innovation mechanism by which new production units replace out-dated ones. The term was coined by Joseph Schumpeter (1942), who considered it 'the essential fact about capitalism'.

- Schumpeter described creative destruction as innovations in the manufacturing process that increase productivity, but the term has been adopted for use in many other contexts such as internet, artificial intelligence etc.
- This restructuring process permeates major aspects of macroeconomic performance, not only long-run growth but also economic fluctuations, structural adjustment and the functioning of factor markets. Over the long run, the process of creative destruction accounts for over 50 per cent of productivity growth.
- Indian Economic Survey 2019-20 notes that 'when creative destruction is fostered, sectors as a whole will always outperform individual companies within the sector in creating wealth and maximizing welfare. Therein lies the motivation for India to pursue pro-business, rather than pro-crony, growth.'

**44. Ans. C**

**Exp:** Coral bleaching is a phenomenon that takes place when the symbiotic relationship between algae (zooxanthellae) and their host corals breaks down under certain environmental stresses.

- Statement 1 is correct: Sea algae and corals share a symbiotic existence in the ocean. When the sea waters turn warm in summers and remain so for more than 28 days, the corals experience thermal stress.
- Due to this, the corals expel the algae residing in their tissues and turn colourless or bleach. Corals are sensitive to temperature changes, which affect photosynthesis and calcification of their structures, making them prone to diseases and even death.
- Statement 2 is not correct: Although coral reefs are known to recover from bleaching in a decade or two, the severity of the bleaching event could overwhelm them and hamper their ability to recover.
- A team of Indian researchers has warned that rising sea temperatures due to climate change could put these wondrous underwater systems under peril. Their study, which analysed data of sea surface temperatures since 1982, has found that three mass bleaching events occurred in 1998, 2010 and 2016, impacting five

major Indian coral reef regions — in Andaman, Nicobar, Lakshadweep, Gulf of Mannar and Gulf of Kutch.

- Statement 3 is correct: Coral bleaching can take place even with a rise of temperature by1-2°C , during summer months. To provide early warnings on the coral bleaching, the nocturnal Sea Surface Temperature (SST) is an important parameter to assess the thermal conditions and intensity of the bleaching.
- The coral bleaching Alert System (CBAS), a service initiated from Indian National Centre for Ocean Information Services (INCOIS) since February 2011. This model uses the satellite derived Sea Surface Temperature (SST) in order to assess the thermal stress accumulated in the coral environs.

**45. Ans. B**

**Exp:** Pyrolysis and gasification are two important processes that are used to decompose materials. Both these processes are different from combustion because the combustion is carried out in the presence of an excessive amount of oxygen.

**What is Pyrolysis?**

- Pyrolysis is the process of thermal conversion of organic matter using a catalyst in the absence of oxygen or near absence. Therefore, it is the decomposition of material in an inert atmosphere. It is a chemical reaction that includes alteration of the chemical composition of the material. Moreover, it is a reversible process.
- In pyrolysis, what we do is heating a material to a temperature above its decomposition temperature. It breaks down the chemical bonds of the material.
- Therefore, this process usually forms small molecules from large fragments. But, these small molecules can combine, forming large molecular masses as well. For example, pyrolysis of triglycerides form alkanes, alkenes, alkadienes, aromatics and carboxylic acids.
- Moreover, the process proceeds at temperatures ranging from 350°C – 600°C

What is Gasification?

- Gasification is a thermo-chemical process that converts biomass into a combustible gas called producer gas (syngas). Here, the materials decompose in an environment where a little amount of oxygen is present. However, this amount of oxygen is not enough for combustion. The products of gasification are heat and combustible gas. The process proceeds at temperatures ranging from 800°C – 1200°C.
- The principle components in the combustible gas that forms during this process include carbon monoxide and hydrogen gas. In addition, there are some other components such as water vapour, carbon dioxide, tar vapour, ash, etc.
- Moreover, pyrolysis is useful for applications in food manufacturing, i.e. caramelization, production of fuel from biomass, production of ethylene, to treat plastic waste, etc. while gasification is useful for heat production, production of electricity, etc.
- Hence only statement 2 is correct.

**46. Ans. D**

**Exp:** Algae is commercially cultivated for Pharmaceuticals, Nutraceuticals, Cosmetics and Aquaculture purpose. Humans use algae as food, for production of useful compounds, as biofilters to remove nutrients and other pollutants from wastewaters, to assay water quality, as indicators of environmental change, in space technology, and as laboratory research systems.

- Carbon Dioxide Fixation: Like any other plant, algae, when grown using sunlight, consume (or absorb) carbon dioxide ($CO_2$) as they grow, releasing oxygen ($O_2$). For high productivity, algae require more $CO_2$, which can be supplied by

emissions sources such as power plants, ethanol facilities, and other sources.

- Bio-fuel & Oil extraction: Algae can be used to make Biodiesel (see algaculture), Bioethanol and biobutanol and can produce vastly superior amounts of vegetable oil, compared to terrestrial crops grown for the same purpose.
- Purification of wastewater: Algae thrive in nutrient-rich waters like municipal waste waters (sewage), animal wastes and some industrial effluents, at the same time purifying these wastes while producing a biomass suitable for biofuels production.
- Food Supplements: Algae are national foods of many nations: China consumes more than 70 species, including fat choy, a cyanobacterium considered a vegetable; Japan, over 20 species; Ireland, dulse; Chile, cochayuyo. Laver is used to make "laver bread" in Wales where it is known as bara lawr; in Korea, gim; in Japan, nori and aonori. It is also used along the west coast of North America from California to British Columbia, in Hawaii and by the Māori of New Zealand.

**47. Ans. B**

**Exp:** Microbes are also used for commercial and industrial production of certain chemicals like organic acids, alcohols and enzymes. Examples of acid producers are Aspergillus niger (a fungus) of citric acid, Acetobacter aceti (a bacterium) of acetic acid; Clostridium butylicum (a bacterium) of butyric acid and Lactobacillus (a bacterium) of lactic acid.

- Yeast (Saccharomyces cerevisiae) is used for commercial production of ethanol. Microbes are also used for production of enzymes.
- Lipases are used in detergent formulations and are helpful in removing oily stains from the laundry.
- Streptokinase produced by the bacterium Streptococcus and modified by genetic engineering is used as a 'clot buster' for removing clots from the blood vessels of patients who have undergone myocardial infection leading to heart attack.
- A bioactive molecule, cyclosporin A, that is used as an immunosuppressive agent in organ-transplant patients, is produced by the fungus Trichoderma polysporum.
- Statins produced by the yeast Monascus purpureus have been commercialised as blood-cholesterol lowering agents. It acts by competitively inhibiting the enzyme responsible for synthesis of cholesterol.

**48. Ans. B**

**Exp:** Square windows were hazardous for airplanes because the pressures inside and outside the cabin are so different, that the sharp edgy corners would not be able to handle the pressure difference and give in.

- Sharp corners naturally concentrate more stress, which further gets weakened by the immense air pressure. Curved or round windows distribute the stress of the outside pressure of air, and thus are stronger and prone to deformation because of the pressure.
- Hence option (b) is the correct answer.

**49. Ans. B**

**Exp:** Option (b) is correct

**Commonwealth of Independent States (CIS)**

- Union Defence Minister is in Moscow to attend the combined meeting of defence ministers of Shanghai Cooperation Organization (SCO), Collective Security Treaty Organization (CSTO) and Commonwealth of Independent States (CIS) member States in commemoration of the 75th Anniversary of victory in the World War II.
- The Commonwealth of Independent States (CIS) was founded in 1991 after the dissolution of the Soviet Union. Meetings are held periodically on a rotating basis at the CIS countries' capitals.
- Upon its foundation, members adopted the Alma-Ata Declaration, which

confirmed the promise of the former republics to cooperate in various fields of external and internal policies, and announced the guarantees for implementation of the international commitments of the former Soviet Union.

- It has 12 member states — Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan.
- The Charter of CIS states that the Commonwealth was formed on the basis of sovereign equality of all its members and that the Member States were independent and equal subjects under international law. The Charter also states that the CIS serves the development and strengthening of friendship, inter-ethnic accord, trust, mutual understanding, and cooperation between States.

**50. Ans. C**

**Exp:** In the traditional sense, the 'Single Directive' is a set of (executive) instructions issued by the Central government which makes it mandatory for the CBI to take the prior approval of the government to even conduct a preliminary inquiry into allegations of corruption against officers in all civil services of the rank/grade of Joint Secretary and above. Hence, option (c) is the correct answer.

- It first appeared in 1969 but became highly contentious when a fresh set was issued in 1988 following the Bofors scandal - mandating "prior consultation" and "government concurrence" for the CBI to initiate probe into corruption cases.
- It took nearly a decade for the Supreme Court to strike it down as unconstitutional in its famous Hawala judgement (Vineet Narayan vs Union of India) of 1997. A few years later, the single directive reappeared in the statutory form when the Central Vigilance Commission (CVC) Act of 2003 was legislated.
- It was immediately challenged (2004) but the apex court took a decade to strike it down. In 2014, the apex court used the very same arguments that the Hawala judgement had. Among other things, this judgement observed that the single directive "neither eliminates public mischief nor achieves some positive public good. On the other hand, it advances public mischief and protects the crime-doer. The provision thwarts an independent, unhampered, unbiased, efficient and fearless inquiry/investigation to track down the corrupt public servants".
- Four years later, in 2018, the single directive was resurrected through an amendment in the Prevention of Corruption Act,1988. A new section (17A) was inserted in the law saying that no inquiry or investigation can be conducted "without the previous approval in the case of a person who is or was employed, at the time when the offence was alleged to have been committed".
- This amendment made a fundamental change in the concept of the singe directive. Instead of protecting just the high-ranking officials (joint secretary and above), it extended the protection to officials of all ranks. A fresh petition has been filed (in 2018) challenging this amendment too.
- However the Supreme Court upheld the validity of the rule laid down in its earlier judgements with regard to inquiry/investigation of allegations of corruption against judges of the High Courts and the Supreme Court. Even registering an FIR against a serving judge of the constitutional courts would require the prior approval of the concerned Chief Justice.

**51. Ans. A**

**Exp:** In a representative democracy, elected representatives make laws on behalf of citizens. Citizens' ability to participate in the legislative process is fundamental to

democracy. Public participation with the legislative process results in better laws and fewer amendments.

- Democratic governments provide for public engagement in lawmaking through consultations. The public may engage in different stages of the legislative process i.e. during the pre-legislative stage , the legislative stage and the post-legislative stage.

**During Pre legislative stage**

- India has a Pre-Legislative Consultation Policy which was formulated taking into consideration the recommendations of the National Advisory Council and the National Commission to Review the Working of the Constitution in February 2014.

**The policy lists out various mandates requiring departments to -:**

- Proactively publish proposed legislations on the internet and/or other public domains;
- Additional details such as a brief justification for the legislation, its' essential elements, broad financial implications,
- An estimated assessment of the impact of such a legislation on the environment, fundamental rights, lives and livelihoods of the concerned/affected people
- These details are required to be kept in the public domain for a minimum period of thirty days, accompanied by an explanatory note on the key legal provisions in a simpler language. Hence, option 1 is correct.

**During Legislative stage**

- Public participation during legislative scrutiny may be conducted through Parliamentary Committees. Prior to1993, Bills were occasionally referred to ad-hoc Joint or Select Parliamentary Committees.
- Since then Department Related Standing Committees (DRSC) have been established to scrutinise Bills. There are 24 DRSCs that cover all ministries of the central government. Once a Bill is introduced in Parliament, it may be referred to a DRSC. Committees publish notices seeking suggestions within a specified timeframe. In most cases, a period of 15 days is provided to send comments. However, the level of public engagement with standing committees varies with different Bills. Hence, option 3 is correct.

**During Post-Legislative stage**

- Scrutiny of current laws is not mandatory in India. However, mechanisms exist for undertaking review of laws. Various Commissions, such as the Law Commission, conduct review of legislation.
- The Commission identifies laws that require amendments or repeal. In preparing its review of laws the Commission circulates its draft analysis amongst the public and invites comments. It also organizes seminars and workshops in different parts of the country to elicit opinion on proposed strategies.

**Cabinet Office's Code of Practice on Consultation**

- The Cabinet Office's Code of Practice on Consultation is code is a practice adopted in Britain. It is not available in India. It sets out the approach the Government ought to adopt when it decides to run a formal, written, public consultation exercise. These guidelines help to ensure that a common standard exists across government for consulting the public. The Code does not have legal force and cannot prevail over statutory or mandatory requirements.
- Hence, option 2 is not correct.

**52. Ans. D**

**Exp:** Statement 1 is not correct: The structure of the society was undergoing a change in the Gupta period and the caste system became rigid as the supremacy of the Brahmanas was increasing and they occupied the top ladder of the society.

- They were getting large-scale land grants not only from the rulers but from other people also. The land was given along with administrative rights and tax exemptions. Thus, a new class of brahmana landlords was created.
- Statement 2 is correct: The position of Shudras improved somewhat during the Gupta period. They were allowed to listen to the religious texts like Ramayana and Mahabharata and the Puranas. They could also perform some domestic rituals that were earlier prohibited for them. In the seventh century, Hsuan Tsang calls Shudras as agriculturists and the vaishyas as traders.
- A distinction was also made between Shudras and untouchables, the latter being treated lower in status than the Shudras. The untouchables are referred to as chandalas. They lived outside the village and dealt in unclean jobs such as scavenging or butchery. The Chinese traveler Fa-Hien tells us that whenever they entered the towns or market places they would strike a piece of wood to announce their arrival so that the others might not touch them and get polluted.
- Statement 3 is not correct: The status of women continued to decline in the Gupta period. The main reason for the subordination of women was their complete dependence on men for their livelihood. The women were not entitled to inherit property. The practice of Swyamvara was given up and the Manusmriti suggested early marriage for girls.

**53. Ans. D**

**Exp:** The Mughal Empire held sway over a large part of India for nearly three centuries, but a drastic decline in its power and prestige came about by the first half of the eighteenth century.

- Not only did the political boundaries of the Empire shrink, but the decline also saw the collapse of the administrative structure so assiduously built by rulers like Akbar and Shah Jahan.

**Various factors leading to its decline can be attributed to reign of Aurangzeb:**

**Deccan Policy**

- It refers to the extended period of conflict and diplomacy between the Mughals and the states of Bijapur, Golconda and the Maratha Swarashtra under Shivaji and his successors.
- It has been argued that the economical dimension of the perpetual conquest of Deccan marked the beginning of the decline of Mughal power in India.

**Religious Fanaticism**

- He discriminated against sections of the nobles and officials on the basis of religion.
- This led to wide scale resentment among the nobility.
- Failure of the mansabdar-jagirdari system
- Towards the end of Aurangzeb's reign, this system went into disarray.
- The sudden increase in the number of nobles caused due to the expansion of the Empire into the Deccan and Maratha territory created a crisis in the functioning of the jagir system.
- According to Athar Ali (historian), the nobles competed for better jagir, which was increasingly becoming rare due to the influx of nobles from the south. This often resulted in law and order problems and decimated the authority of the state.
- The logical consequence was the erosion in the political structure which was based on jagirdari to a large extent.
- Hence all the statements are correct.

**54. Ans. A**

**Exp:** Limestone and chalk are sedimentary rocks of organic origin derived from the accumulation of corals an shells in the sea . In its pure state limestone is made up of calcite or calcium carbonate.

- Chalk is a very pure form of limestone. Limestone is soluble in rain water which, with carbon dioxide from the air forms a weak acid . A region with a large stretch of limestone possesses distinct type of topography called as Karst topography.

**Major Limestone regions of the World:**

- The most characteristic stretch of limestone occurs in north west Yugoslavia. Other regions include:
- the Causses district of southern France
- the Pennines of Britain, Yorkshire and Derbyshire in particular
- the Kentucky region of the United States
- the Yucatan Peninsula of Mexico
- the Cockpit Country of Jamacia
- and the limestone hills of Perlis.
- Hence option a is the correct answer.

**55. Ans. A**

**Exp:** Authorized Economic Operator (AEO) is a voluntary program under the aegis of the World Customs Organization (WCO) SAFE Framework of Standards to secure and facilitate Global Trade. Hence, statement 2 is not correct.

- The programme aims to enhance international supply chain security and facilitate movement of legitimate goods. Hence, statement 1 is correct.
- AEO encompasses various players in the International supply chain.
- Under this programme, an entity engaged in international trade is approved by Customs as compliant with supply chain security standards and granted AEO status & certain benefits.
- It enables custom authorities to enhance and streamline cargo security through close cooperation with the principle stakeholders of the international supply chain viz. importers, exporters, logistics providers, custodians or terminal operators, custom brokers and warehouse operators.

**56. Ans. A**

**Exp:** For a company, there are two types of funds to finance its activities. They are equity capital and debt. Companies generally use debt to finance because funds from shareholders may not be enough.

- Leverage means fusing borrowed money to acquire assets. A company borrowing money from market or financial institutions to create assets like building, machineries or even to acquire another firm are the common examples for leverage.
- Leverage ratio is the ratio of debt to assets. It shows a company's debt levels. A high financial leverage ratio shows that the company is using debt to finance its assets.
- Deleveraging is the act of reducing debt by selling own assets or by using internally available funds. Deleveraging happens when a firm cuts down its financial leverage or debt by raising capital, or selling off assets and/or making cuts where necessary.
- When deleveraging affects the economy, the government steps in by taking on leverage to buy assets and put a floor under prices, or to encourage spending.
- The Economic Survey 2019-20 pointed out that the bust after the credit boom of the UPA era was characterised by deleveraging and low investment rate in the corporate sector, which eventually caused the recent deceleration of economic growth.

**57. Ans. A**

**Exp:** Cenospecies: They are separate species of organisms that are related through their capability of interbreeding, such as dogs and wolves. A cenospecies contains all those ecospecies so related that they are able to exchange genes among themselves to a

limited extent through hybridization. Hence option (a) is the correct answer.

- Cryptic species: The species which are alike on the basis of observed features but are genetically and sexually they are different are cryptic species. There is a confusion between the terms sibling species and cryptic species. The cryptic species are incapable of interbreeding but the sibling species can interbreed and are incapable of producing fertile hybrids.
- Monotypic species: When a genus includes a single species but does not include any subspecies, e.g., Vampyroteuthis, a vampire squid which is a single monotypic genus and also contains a single species, V. infernalis (monotypic species). Blackwelder (1967) states that the species with a single subspecies, called monotypic species.
- Sibling species: Two or more than two closely related species which are morphologically alike but behaviourally or reproductively isolated from each other. Examples are Drosophila persimilis and D. pseudoobscura. The mosquito Anopheles maculipennis complex consists of several subspecies, of which a few are vector of malaria and the rest are harmless.

**58. Ans. D**

**Exp:**A microbial fuel cell (MFC) is a bio-electrochemical device that harnesses the power of respiring microbes to convert organic substrates directly into electrical energy. At its core, the MFC is a fuel cell, which transforms chemical energy into electricity using oxidation-reduction reactions. Microbial fuel cells are devices that use microbes, such as bacteria, as the catalysts to oxidize organic and inorganic matter and generate current.

- Microbial fuel cells rely on living biocatalysts to facilitate the movement of electrons throughout their systems instead of the traditional chemically catalyzed oxidation of fuel at the anode and reduction at the cathode. The most promising MFC's for commercialization in today's energy industry are mediators MFC's which use a special type of microorganism termed exoelectrogens. Exoelectrogens are electrochemically active bacteria.

**The operational and functional advantages of MFCs are:**

- MFCs use organic waste matter as fuels and readily available microbes as catalysts.
- MFCs do not require highly regulated distribution systems like the ones needed for Hydrogen Fuel Cells.
- MFCs have high conversion efficiency as compared to Enzymatic Fuel Cells, in harvesting up to 90% of the electrons from the bacterial electron transport system.

**Microbial fuel cells can be used in a variety of applications like:**

- to power a wide range of vital conservation tools remotely, including sensors, monitoring platforms, and camera traps.
- in wastewater treatment: conditions of a wastewater treatment plant are ideal for the types of bacteria that can be used in an MFC. Exoelectrogens are more than happy to breakdown and metabolize the carbon-rich sewage of a wastewater stream to produce electrons that can stream into a cheap conductive carbon cloth anode.
- Powering underwater monitoring devices.
- Power supply to remote sensors.
- BOD sensing- to use it as a sensor for pollutant analysis and in situ process monitoring and control.
- Bio-hydrogen production for the remediation of various environmental pollutants viz. antibiotics, synthetic dyes, phenolic compounds, nitrogen-based compounds, ethyl acetate, toluene,

polycyclic aromatic hydrocarbons, perchlorate, pesticide, sulphur, emerging contaminants, trace organic compounds etc.

**59. Ans. A**

**Exp:** Statement 2 is incorrect: The programme will support a transition from "rules-based to roles-based" HR management, so that work allocations can be done by matching an official's competencies to the requirements of the post.

Statement 3 is incorrect: A Public Human Resources Council comprising of select Union Ministers, Chief Ministers, eminent public HR practitioners, thinkers, global thought leaders and Public Service functionaries under the Chairmanship of Prime Minister will serve as the apex body for providing strategic direction to the task of Civil Services Reform and capacity building.

**Mission Karmayogi**

- Cabinet recently approved "Mission Karmayogi"- a National Programme for Civil Services Capacity Building (NPCSCB).
- NPCSCB has been carefully designed to lay the foundations for capacity building for Civil Servants so that they remain entrenched in Indian Culture and sensibilities and remain connected, with their roots, while they learn from the best institutions and practices across the world.

**The core guiding principles of the Programme will be:**

- Supporting Transition from 'Rules based' to 'Roles based' HR Management.
- Aligning work allocation of civil servants by matching their competencies to the requirements of the post
- To emphasize on 'on-site learning' to complement the 'off-site' learning

**It comprises the following institutional framework:**

- A Public Human Resources Council with PM as chairman that will serve as the apex body for providing strategic direction to the task of Civil Services Reform and capacity building.
- A Capacity Building Commission to ensure a uniform approach in managing and regulating the capacity building ecosystem on collaborative and cosharing basis.
- Special Purpose Vehicle for owning and operating the digital assets and the technological platform for online training,
- Coordination Unit headed by the Cabinet Secretary

**60. Ans. B**

**Exp:** The Lokpal and Lokayukta Act, 2013 envisages the appointment of a Lokpal at the Centre and Lokayuktas in the States to look into cases of corruption against certain categories of public servants.

- It has jurisdiction to inquire into allegations of corruption against anyone who is or has been Prime Minister, or a Minister in the Union government, or a Member of Parliament, as well as officials of the Union government under Groups A, B, C and D. Also covered are chairpersons, members, officers and directors of any board, corporation, society, trust or autonomous body either established by an Act of Parliament or wholly or partly funded by the Centre.
- Statement 2 is not correct: It also covers any society or trust or body that receives foreign contribution above ₹10 lakh.
- Statement 1 is correct: A complaint under the Lokpal Act should be in the prescribed form and must pertain to an offence under the Prevention of Corruption Act against a public servant. There is no restriction on who can make such a complaint. When a complaint is received, the Lokpal may order a preliminary inquiry by its Inquiry Wing,

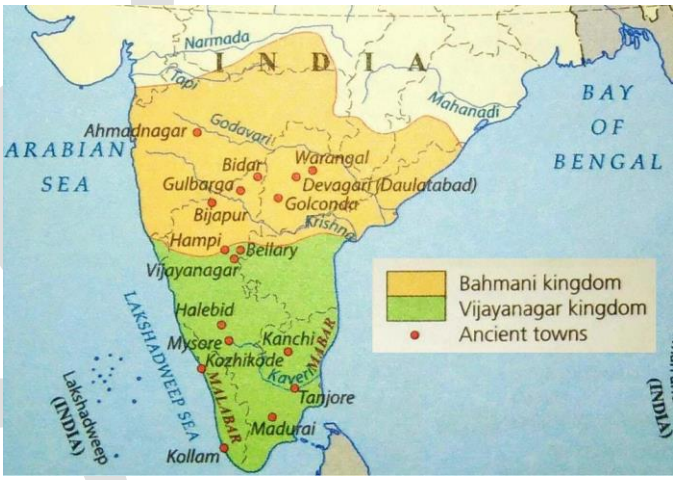
or refer it for investigation by any agency, including the CBI, if there is a prima facie case.

- Statement 3 is correct: A Bench of at least three members considers the investigation report and may grant sanction to the Prosecution Wing to proceed against the public servant based on the agency's chargesheet. It may also ask the competent authority to take departmental action or direct the closure of the report. Previously, the authority vested with the power to appoint or dismiss a public servant was the one to grant sanction under Section 197 of the Code of Criminal Procedure and Section 19 of the Prevention of Corruption Act. Now this power will be exercised by the Lokpal, a judicial body.

**61. Ans. C**

**Exp:** The Bahmani Kingdom was founded by Alauddin Bahman Shah with its capital at Gulbarga. After the death of Sultan Firoz Shah, his brother Ahmed Shah Wali succeeded him in 1422 AD and shifted the seat of the Bahmani kingdom from Gulbarga to Bidar sometime about 1425 AD.

- While some historians have attributed that it is possible that death of Sultan Firoz Shah was one of the causes of the change of the capital from Gulbarga to Bidar, the other major reasons are as under -:
- Bidar was located to the north of Gulbarga. It was centrally located of the Bahmani Kingdom territory. Thus, it enabled a better control over the administration of the Bahmani Kingdom areas.
- This was a strategic decision, as Bidar being away from Gulbarga was out of the immediate striking range of the Vijayanagara kingdom. Hence, statement 1 is not correct.
- Bidar is not situated on the banks of River Krishna. In contrast to Gulbarga, it was situated on a sloping promontory, on which were built the fort and its associated town. The fort, naturally, was at the highest level, with its citadel at the northern tip. The fort could be isolated for better defence from the town by a system of gates and moats. Hence, statement 2 is not correct.
- It also provided for a convergence of the three linguistic areas namely - Marathi, Kannada and Telugu.
- This enabled in a better social cohesion and consequently better administration. Hence, statement 3 is correct.




**62. Ans. B**

**Exp:** The Crust is the outermost solid part of the earth. It is brittle in nature. The thickness of the crust varies under the oceanic and continental areas.

- Oceanic crust is thinner as compared to the continental crust. The mean thickness of the oceanic crust is 5 km whereas that of the continental is around 30 km.
- The continental crust is thicker in the areas of major mountain systems. It is as much as 70 km thick in the Himalayan region. Hence statement 2 is correct.
- Oceanic crust is primarily composed of mafic rocks, or sima, which is rich in iron and magnesium. It is denser, having a mean density of about 3.0 grams per cubic centimeter as opposed to the continental crust which has a density of about 2.7 grams per cubic centimeter.
- Along with Oceanic and Continental plate margins, the oceanic lithosphere

subducts because the continental lithosphere is less dense and lighter than Oceanic crust. Hence statement 1 is not correct.

- Although the core and mantle are about equal in thickness, the core forms only 15 percent of the Earth's volume, whereas the mantle occupies 84 percent. The crust makes up the remaining 1 percent. It is a thin shell on the outside of the Earth. Hence statement 3 is correct.

**63. Ans. A**

**Exp:**

| | Country | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 (April-Novembe |
|---|---|---|---|---|---|---|---|
| Trade Surplus Countries | U S A | 20.63 | 18.55 | 19.90 | 21.27 | 16.86 | 10. |
| | United Arab Emirates | 6.89 | 10.87 | 9.67 | 6.41 | 0.34 | 0. |
| Trade Deficit Countries | China PRP | -48.48 | -52.70 | -51.11 | -63.05 | -53.57 | -35. |
| | Saudi Arabia | -16.95 | -13.94 | -14.86 | -16.66 | -22.92 | -14. |
| | Iraq | -13.42 | -9.83 | -10.60 | -16.15 | -20.58 | -13. |
| | Germany | -5.25 | -5.00 | -4.40 | -4.61 | -6.26 | -3. |
| | Korea RP | -8.93 | -9.52 | -8.34 | -11.90 | -12.05 | -7. |
| | Indonesia | -10.96 | -10.31 | -9.94 | -12.48 | -10.57 | -6. |
| | Switzerland | -21.06 | -18.32 | -16.27 | -17.84 | -16.90 | -11. |
| | Hong Kong | 8.03 | 6.04 | 5.84 | 4.01 | -4.99 | -3. |
| | Singapore | 2.68 | 0.41 | 2.48 | 2.74 | -4.71 | -3. |

- India currently maintains trade surplus with USA and UAE.
- India have a trade deficit with China and Iraq.
- Hence option (a) is the correct answer.

**64. Ans. C**

**Exp:** Standards & Labelling Programme is an initiative of the Bureau of Energy Efficiency.

- The scheme targets display of energy performance labels on high energy end-use equipment & appliances and lays down minimum energy performance standards. It has both mandatory and voluntary labelling standards.

**The following items are mandated to carry the labelling standards:**

- Frost Free (No-Frost) Refrigerator
- Tubular Fluorescent Lamps
- Room Air Conditioners
- Distribution Transformers
- Room Air Conditioners (Cassette, Floor Standing Tower, Ceiling, Corner AC)
- Direct Cool Refrigerator
- Electric Geysers
- Colour TV
- Room Air Conditioners (Inverter type)
- LED lamps

**The following products have been notified under voluntary labelling:**

- Induction Motors
- Agricultural pump sets
- Ceiling fans
- Domestic Liquefied Petroleum Gas (LPG) Stoves
- Computer (Notebook/Laptops)
- Ballast (Electronic/Magnetic)
- Office equipment's (Printer, Copier, Scanner, MFD's)
- Diesel Engine Driven Monoset Pumps for Agricultural Purposes
- Solid State Inventor
- Diesel Generator
- Chillers
- Microwave Ovens

**65. Ans. B**

**Exp:**

- Recent context: India was accepted as an observer in the Indian Ocean Commission, getting a seat at the table of the organization that handles maritime governance in the western Indian Ocean. India's entry is a consequence of its deepening strategic partnership with France as well as its expanding ties with the Vanilla Islands.
- About Indian Ocean Commission (IOC): It is an intergovernmental organization created in 1982, was institutionalized in 1984 by the Victoria Agreement in Seychelles.
- It is composed of five African Indian Ocean nations: Comoros, Madagascar, Mauritius, Réunion (an overseas region of France), and Seychelles. Hence only options 2 and 4 are correct.
- The principal mission is to strengthen the ties of friendship between the countries and to be a platform of solidarity for the entire population of the African Indian Ocean region.

- The Commission has a Secretariat which is located in Mauritius and headed by a Secretary General.
- The Commission has now five observers — India, China, EU, Malta and International Organisation of La Francophonie (OIF).

**66. Ans. D**

**Exp:** Permafrost is perennially frozen soil that has been below 0oC for at least two years. Permafrost is a condition where top layer upto depth of 20-40 cm is completely frozen. This happens in high latitude and altitude regions.

- It's found underneath about 25% of the northern hemisphere, mainly around the Arctic - but also in the Antarctic and Alpine regions. In the northern region of Alaska, the permafrost has been warming at about one-tenth of a degree Celsius per year since the mid - 2000s.
- These top soils melt due to global warming which is a great threat as there melt will aggravate the condition of global warming. As permafrost thaws, this carbon is released to the atmosphere in the form of methane, a powerful greenhouse gas. This process leads to more climate change and is an example of a positive feedback loop, which happens when warming causes changes that lead to even more warming.
- As permafrost thaws, it can also cause substantial changes in the local ecosystem, altering the flow of water atop and through the soil, as well as what plant and animal life can thrive in the area.
- It is a part of life in the frigid North Slope, underlying buildings, roads and other infrastructure. When it thaws, it can cause considerable damage. In Alaska, the warming of the permafrost has been linked to trees toppling, roads buckling and the development of sinkholes.
- When permafrost melts, the land above it sinks or changes shape. Sinking land can damage buildings and infrastructure such as roads, airports, and water and sewer pipes. It also affects ecosystems.

**67. Ans. D**

**Exp:** The term forensic investigation refers to the use of science or technology in the investigation and establishment of facts or evidence to be used in criminal justice or other proceedings.

- The following are the part of forensic analysis done to assist civil and criminal investigations.
- Mitochondrial DNA Analysis - Mitochondrial DNA typing is a method used by forensic scientists to match DNA from an unknown sample to a sample collected at a crime scene
- Polygraph Test - A polygraph, popularly referred to as a lie detector test, is a device or procedure that measures and records several physiological indicators such as blood pressure, pulse, respiration, and skin conductivity while a person is asked and answers a series of questions.
- Brain Electrical Oscillation Signature (BEOS) Profiling - BEOS test is applicable in the forensic field for the detection of a person as suspect, accused, witness or complainant. The BEOS test was designed and developed as an alternative method to the use of a polygraph based lie-detection test BEOS is a neurocognitive indicator of the presence of r remembrance taking place in the brain, when the same is cued by probes referring to previous experiences.

**68. Ans. D**

**Exp:** 5G is the communications backbone that will enable revolutionary applications in other markets, including industrial, automotive, medical and even defense. For a world that is becoming increasingly connected with the Internet of Things (IoT), 5G's significant improvements in speed (at least 10 times faster than 4G, up to 10 Gbps), latency (10 times lower than 4G, down to 1 ms) and density (supporting 1 million IoT

devices per square kilometer) will make many innovative applications possible – especially those in which security, reliability, quality of service, efficiency and cost are equally important.

- The Internet of Things is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.
- Edge Computing: Edge computing means taking real-time decisions close to the source of data. By locating computational intelligence close to the individual and different sources of the data, edge computing reduces latency in the implementation of a requested service. Instead of sending data through the entire core network to the cloud for processing, edge computing uses a distributed network architecture to ensure near-real-time processing with reduced delays, which would otherwise simply not be acceptable for the specific service.
- Network Slicing: Network slicing allows operators to separate the packet traffic layer from the control layer, supporting multiple applications and services running in parallel for a range of users who require different levels of quality, latency, and bandwidth. This means that 5G systems will have many logical network slices, or "fast-track lanes," to support specific applications and customers.

**69. Ans. A**

**Exp:** Statement 1 is incorrect: It is an international non-governmental organization defending human rights and the rule of law worldwide.

**International Commission of Jurists (ICJ)**

- The International Commission of Jurists (ICJ) recently said civil rights lawyer Prashant Bhushan's conviction for criminal contempt of court by the Supreme Court seemed to be inconsistent with the freedom of expression law guaranteed by the International Covenant on Civil and Political Rights that India was a party to.
- It is an international non-governmental organization defending human rights and the rule of law worldwide.
- It comprise of 60 eminent judges and lawyers – from all parts of the world and all legal systems – with unparalleled knowledge of the law and human rights. The composition of the Commission aims to reflect the geographical diversity of the world and its many legal systems.
- The Commission is supported by an International Secretariat based in Geneva, Switzerland.

**70. Ans. B**

**Exp:**

- Gram Nyayalayas are mobile village courts in India established under Gram Nyayalayas Act, 2008 for speedy and easy access to justice system in the rural areas of India. They are aimed at providing inexpensive justice to people in rural areas at their doorsteps. The Act came into force on October 2, 2009 i.e. the birth anniversary of Mahatma Gandhi.
- Gram Nyayalaya are courts of Judicial Magistrate of the first class and its presiding officer (Nyayadhikari) is appointed by the State Government in consultation with the High Court of the State concerned.
- Gram Nyayalaya exercises the powers of both Criminal and Civil Courts; i.e.,it can try criminal cases, civil suits, claims or disputes which are specified in the First Schedule and the Second Schedule to the Gram Nyayalaya Act and the scope of these cases can be amended by the Central as well as the State Governments, as per their respective

legislative competence. Hence, statement 1 is correct.

- The Gram Nyayalayas are not bound by the rules of evidence provided in the Indian Evidence Act, 1872 . They are guided by the principles of natural justice and subject to any rule made by the High Court. Hence, statement 2 is not correct.
- Appeal in criminal cases shall lie to the Court of Session, which shall be heard and disposed of within a period of six months from the date of filing of such appeal. Appeal in civil cases shall lie to the District Court, which shall be heard and disposed of within a period of six months from the date of filing of the appeal. Hence, statement 3 is not correct.
- It is a mobile court. The seat of the Gram Nyayalaya will be located at the headquarters of the intermediate Panchayat, but they will go to villages, work there and dispose of the cases. The Gram Nyayalaya can follow summary procedure for its execution.

**71. Ans. A**

**Exp:** The constitutional provisions which deal with matter of privy purse are Articles 291 and 362. Article 291 guarantees payment of privy purse from the Consolidated Fund of India in accordance with covenants or agreements entered into with rulers of Indian States before the commencement of the Constitution and also exempts these sums from income-tax. The Article 362 guarantees the rights and privileges of the exrulers.

- The practise of ‗privy purse' done away with passing of 26th Amendment to the Constitution of India in 1971. The then Prime Minister, Indira Gandhi, argued the case for abolition based on equal rights for all citizens and the need to reduce the Government's revenue deficit.
- In Bommai case (1994), the Supreme Court had laid down some guidelines for the imposition of President's Rule in a state under Article 356. In the same case SC declared Secularism as one of the 'basic features' of the Constitution. On the basis of this, a state government pursuing anti-secular politics is liable to action under Article 356.
- Originally, the Constitution mentioned 'internal disturbance' as the third ground for the proclamation of a National Emergency, but the expression was too vague and had a wider connotation. Hence, the 44th Amendment Act of 1978 substituted the words 'armed rebellion' for 'internal disturbance'. Thus, it is no longer possible to declare a National Emergency on the ground of ‗internal disturbance' as was done in 1975 by the Congress government headed by Indira Gandhi.
- Hence, option a is correct.

**72. Ans. D**

**Exp:** Bharatnatyam is one of the oldest dance forms and its roots have been traced back to almost 2000 years. It can be compared with Odissi in terms of form and technique.

- Statement 1 is not correct: The music associated with Bharatanatyam is in South India's Carnatic style and instruments played comprise of cymbals, the flute, a long pipe horn called nagaswaram, a drum called mridangam and veena. The verses recited during performance are in Sanskrit, Tamil, Kannada and Telugu.
- The music in Odissi dance is a blend of both the Carnatic and Hindustani classical traditions of India. With regard to creative literature, Geet Govind in Sanskrit, which is used as a popular rendition in Odissi is performed extensively in Bhartanatyam as well.
- Statement 2 is not correct: Most of the postures and Mudras like Tribhanga posture , Kataka mukha hasta mudras etc are common to both odissi and bharatnaytam dance forms. In terms of performance and technique, the two dance forms occasionally share the dvibhanga.

- Although the tribhanga is seen in the South Indian temple on a Nataraj figure, the Natavara bhangi in Odissi is the familiar tribhanga of the Indian sculptural tradition, which emerges from the Kati Sutr. Both the styles use a variety of Hastas or hand gestures both in its technique (pure dance) and also in abhinaya. The gestures might have different names but the mudras are the same, ie, patakam, ardhapataka, mayura, arallam
- Statement 3 is not correct: Odissi is a major ancient Indian classical dance that originated in the Hindu temples of Odisha. Odissi, in its history, was performed predominantly by women and expressed religious stories and spiritual ideas, particularly of Vaishnavism.
- Archaeological evidence of this dance form dating back to the 2nd century B.C. is found in the caves of Udayagiri and Khandagiri near Bhubaneshwar. Bharatnatyam also originated in temples of Tamil Nadu. There is also a great deal of visual evidence of this dance form in paintings and stone and metal sculptures of ancient times. On the gopurams of the Chidambaram temple, one can see a series of Bharatnatyam poses, frozen in stone as it were, by the sculptor. The style was kept alive by the devadasis, who were young girls 'gifted' by their parents to the temples and who were married to the gods. The devadasis performed music and dance as offerings to the deities, in the temple courtyards.
- Bharatnatyam Dance is considered to be over 2000 years old. Several texts beginning with Bharata Muni's Natya Shastra (200 B.C.E. to 200 C.E.) provide information on this dance form. The Abhinaya Darpana by Nandikesvara is one of the main sources of textual material, for the study of the technique and grammar of body movement in Bharatnatyam Dance. Bharatnatyam dance is known to be ekaharya, where one dancer takes on many roles in a single performance. Other elements of similarity between the two dance forms
- Sculptural evidence shows that the ardhamandali is very close to the chauka position of Odissi involving the out-turned knees and a bent position wherein the inter-foot cubit space in Bharatnatyam is lesser than that of Odissi
- Textual evidence also shows many manuscripts describing the tandava aspect of Shiva and the manner in which it is should be executed. Again, it is evident that there is an interchange between Orissa and South India because many of the descriptions of the Tandavas (pertaining to Odissi) are reminiscent of the descriptions found in the South Indian agamas (pertaining to bharatnatyam).

**73. Ans. B**

**Exp:**Simon Commission appointed in November 1927 by the British government to report on the working of the Government of India Act of 1919. In 1930, the Commission published its two-volume report, also known as the Simon Report.

- In response to the inadequacy of the Simon Report, the Labour Government, which had come to power under Ramsay MacDonald in 1929, decided to hold a series of Round Table Conferences in London. The first Round Table Conference convened from 12 November 1930 to 19 January 1931. Since many of the Congress' leaders were in jail, Congress did not participate in the first conference, but representatives from all other Indian parties and a number of Princes did.
- The outcomes of the First Round Table Conference were minimal: India was to develop into a federation, safeguards regarding defense and finance were agreed and other departments were to be transferred.
- The British policy of 'Divide and Rule' found another expression in the announcement of the Communal Award

in August 1932. The Award allotted to each minority a number of seats in the legislatures to be elected on the basis of a separate electorate, that is Muslims would be elected only by Muslims and Sikhs only by Sikhs, and so on. Muslims, Sikhs, and Christians had already been treated as minorities.

- The Award declared the Depressed Classes (Scheduled Castes of today) also to be a minority community entitled to separate electorate and thus separated them from the rest of the Hindus.
- Gandhiji demanded that the representatives of the Depressed Classes should be elected by the general electorate under a wide if possible universal, common franchise. At the same time, he did not object to the demand for a larger number of the reserved seats for the Depressed Classes. He went on a fast unto death on 20 September 1932 to enforce his demand. In the end they succeeded in hammering out an agreement, known as the Poona Pact(1932), according to which the idea of separate electorates for the Depressed Classes was abandoned but the seats reserved for them in the provincial legislatures were increased from seventy-one in the Award to 147 and in the Central Legislature to eighteen percent of the total.

**74. Ans. A**

**Exp:** Thermohaline circulation, also called Global Ocean Conveyor or Great Ocean Conveyor Belt, the component of general oceanic circulation controlled by horizontal differences in temperature and salinity. It continually replaces seawater at depth with water from the surface and slowly replaces surface water elsewhere with water rising from deeper depths. Although this process is relatively slow, tremendous volumes of water are moved, which transport heat, nutrients, solids, and other materials vast distances.

- Thermohaline circulation also drives warmer surface waters poleward from the subtropics, which moderates the climate of Iceland and other coastal areas of Europe.
- The general circulation of the oceans consists primarily of wind-driven ocean currents. These, however, are superimposed on the much more sluggish circulation driven by horizontal differences in temperature and salinity—namely, thermohaline circulation.
- Wind-driven circulation, which is strongest in the surface layer of the ocean, is the more vigorous of the two and is configured as large gyres that dominate an ocean region. In contrast, thermohaline circulation is much slower, with a typical speed of 1 centimetre (0.4 inch) per second, but this flow extends to the seafloor and forms circulation patterns that envelop the global ocean.

**75. Ans. C**

**Exp:** The Reserve Bank of India last year introduced Prudential Framework for Resolution of Stressed Assets Directions 2019 for the resolution of stressed assets. It is a set of guidelines to banks for tackling their stressed assets.

- The following are the main changes and of course relaxations made in the Prudential Framework for Resolution of Stressed Assets.
- It is voluntary of banks to go for insolvency procedures compared to the previous norm – banks have to (mandatorily) refer defaults to the NCLT, and resolution should be completed within 180 days. Hence statement 1 is correct.
- The new norm makes it lenders' choice to go for legal proceedings and insolvency or not. On the other hand, under the previous guidelines, banks should report the default to the NCLT and should complete the proceedings within 180 days.
- Thirty-day Review Period instead of launching a resolution plan on the first day of the default.

- As per the new Prudential Framework, the lenders need not take resolution action on the first day of default. Rather, they have to make plans on the first thirty days of default to undertake the resolution of the stressed assets.
- Based on the new Prudential Framework, the RBI will provide instructions to banks on specific defaults.
- Resolution of Stressed Asset Framework is extended to a larger number of financial institutions  Scheduled Commercial Banks (excluding Regional Rural Banks). Hence statement 2 is not correct.
- All India Term Financial Institutions (NABARD, NHB, EXIM Bank, and SIDBI) Small Finance Banks and Systemically Important Non-Deposit taking Non-Banking Financial Companies (NBFC-ND-SI) and Deposit taking Non-Banking Financial Companies (NBFC-D).
- Agreement by all lenders required for resolution plan while in the earlier framework, ratification by only 75% of the lenders was required. Hence statement 3 is correct.

**76. Ans. A**

**Exp:** The Essential Commodities Act, 1955 was enacted to ensure the easy availability of essential commodities to consumers and to protect them from exploitation by unscrupulous traders. The Act provides for the regulation and control of production, distribution, and pricing of commodities which are declared as essential.

- The Act aims at maintaining/increasing supplies/securing equitable distribution and availability of these commodities at fair prices.
- The Act empowers the Central and state governments concurrently to control production, supply and distribution of certain commodities in view of rising prices. Hence statement 1 is not correct.

**Major commodities are covered under the act are:**

- Petroleum and its products, including petrol, diesel, kerosene, Naphtha, solvents, etc. (Hence statement 3 is not correct)
- Foodstuff, including edible oil and seeds, vanaspati, pulses, sugarcane and its products like, Khansari and sugar
- Rice paddy
- Jute and textiles
- Drugs- prices of essential drugs are still controlled by the DPCO.
- Fertilizers- the Fertilizer Control Order prescribes restrictions on transfer and stock of fertilizers apart from prices.
- If the Centre finds that a certain commodity is in short supply and its price is spiking, it can notify stockholding limits on it for a specified period. The States act on this notification to specify limits and take steps to ensure that these are adhered to. Anybody trading or dealing in a commodity, be it wholesalers, retailers or even importers are prevented from stockpiling it beyond a certain quantity. Hence statement 2 is correct.
- The ECA gives consumers protection against irrational spikes in prices of essential commodities. The Government has invoked the Act umpteen times to ensure adequate supplies. It cracks down on hoarders and black-marketers of such commodities.

**77. Ans. B**

**Exp:** Warm-blooded creatures, like mammals and birds, try to keep the inside of their bodies at a constant temperature. They do this by generating their own heat when they are in a cooler environment, and by cooling themselves when they are in a hotter environment. To generate heat, warm-blooded animals convert the food that they eat into energy. They have to eat a lot of food, compared with cold-blooded animals, to maintain a constant body temperature. Hence statement 3 is correct.

- Cold-blooded creatures take on the temperature of their surroundings. They are hot when their environment is hot and cold when their environment is cold. Thus they match the temperature of their environment. Hence statement 1 is correct.
- Humans are warm-blooded endotherms like other mammals and birds. Cold-blooded animals such as amphibians and reptiles must constantly move in and out of sunlight, trying to maintain their body temperature. Hence statement 2 is not correct.

**78. Ans. A**

**Exp:** Statement 2 is incorrect: TRAI has the power to regulate tariffs for the telecommunication sector in India.

- Statement 3 is incorrect: The TRAI Act was amended by an ordinance, effective from 24 January 2000, establishing a Telecommunications Dispute Settlement and Appellate Tribunal (TDSAT) to take over the adjudicatory and disputes functions from TRAI. TDSAT was set up to adjudicate any dispute between a licensor and a licensee, between two or more service providers, between a service provider and a group of consumers, and to hear and dispose of appeals against any direction, decision or order of TRAI.

**Adjusted Gross Revenue (AGR)**

- Recently, the Supreme Court of India allowed telecom companies 10 years' time to pay their Adjusted Gross Revenue (AGR) dues to the government.
- Telecom operators are required to pay licence fee and spectrum charges in the form of 'revenue share' to the Centre. The revenue amount used to calculate this revenue share is termed as the AGR. According to the DoT, the calculations should incorporate all revenues earned by a telecom company – including from non-telecom sources such as deposit interests and sale of assets.
- The companies, however, have been of the view that AGR should comprise the revenues generated from telecom services only and non-telecom revenues should be kept out of it.
- The slugfest between DoT and the telecom companies has been on since 2005, when the the Cellular Operators Association of India — the lobby group for players such as Airtel and Vodafone Idea — challenged the DoT's definition for AGR calculation.
- Subsequently, in 2015, the TDSAT ruled that the AGR included all receipts, except capital receipts and revenue from non-core sources such as rent, profit on the sale of fixed assets, dividend, interest and miscellaneous income, etc.
- All the appeals against the TDSAT order dated April 23, 2015, alongside multiple appeals and verdicts by the DoT and the industry in various forums including High Courts and the Supreme Court of India, were heard before the Bench of Justice Arun Mishra, Justice S Abdul and Justice MR Shah in 2019 in which the SC upheld the Department of Telecommunications' (DoT) definition of adjusted gross revenue (AGR).

**79. Ans. D**

**Exp:** Caretaker government

- It is a temporary ad hoc government that performs some governmental duties and functions in a country until a regular government is elected or formed
- There is no mention of the caretaker government in the Constitution of India.
- There are, however, conventions and court judgments dealing with its formation and powers.

**Origin**

- The caretaker government is a concept of the Westminster parliamentary system since the days of Churchill.
- It can be installed under certain conditions such as:

**Dissolution of the State Assembly or parliament.**

- Recently in Telangana '(2018 elections), the outgoing government continued as caretaker government till the formation of the new government. Hence statement 2 is correct.
- The defeat of government over a motion of no-confidence  In 1999, Government under PM Vajpayee continued as caretaker government after being defeated by No-Confidence Motion.
- Party securing maximum seats has yet to prove its majority on the floor of the house. Hence statement 3 is correct.
- After general elections of 2019, BJP won the majority seats. President appointed PM Modi as caretaker prime minister and asked him to form the new government.
- A vacancy in the office of the President does not necessitate any change in the composition or functioning of the Council of Ministers and thus the government functions (normally) like before. Hence statement 1 is not correct.

**80. Ans. D**

**Exp:** Statement 1 is not correct: According to article 118 of the Indian constitution, the President, after consultation with the Chairman of the Council of States and the Speaker of the House of the People, is responsible for making rules regarding procedure with respect to joint sittings.

- Statement 2 is not correct: The Speaker is looked upon as the true guardian of the traditions of parliamentary democracy. However, it is not mandatory for the speaker to resign from his party upon joining his office. In Britain, speakers remain strictly non-partisan and renounce all affiliation with their former political parties when taking office and afterward.
- Statement 3 is not correct: The speaker can suspend a member of the Lok Sabha without calling for adoption of motion. He may invoke Rule 374A of the Lok Sabha's rules of procedure and conduct of business in case of grave disorder occasioned by a member coming into the well of the House or abusing the Rules of the House or persistently and wilfully obstructing its business by shouting slogans or otherwise. In such a case, the member concerned, on being named by the Speaker, stands automatically suspended from the service of the House for five consecutive sittings or the remainder of the session, whichever is less.

**81. Ans. B**

**Exp:** Quit India Movement was launched under the leadership of Gandhi ji in august 1942 with the slogan “Do or Die”. The Quit India Resolution was passed by the Congress Working Committee on 8 August 1942 in Bombay.

- As in earlier mass struggles, the youth were in the forefront of the struggle. Students from colleges and even schools were the most visible element, especially in the early days of August (probably the average age of participants in the 1942 struggle was even lower than that in earlier movements). Women, especially college and school girls, played a very important role. Aruna Asaf Ali and Sucheta Kripalani were two major women organizers of the underground, and Usha Mehta an important member of the small group that ran the Congress Radio. Workers were prominent as well and made a considerable sacrifice by enduring long strikes and braving police repression in the streets.
- Statement 1 is not correct: Gandhiji asked government servants to openly declare their allegiance to the congress and not to resign.
- Statement 2 is not correct: Gandhiji asked the soldiers to refuse to fire on their own people and not to leave their posts.
- Statement 3 is correct: Gandhiji asked the princes of the Princely states to

accept the sovereignty of their own people.

**82. Ans. B**

**Exp:** The Congress ministries took a series of measures to alleviate the suffering of the peasants and agrarian sector which included -:

- In U.P. a tenancy act was passed in October 1939 which gave all statutory tenants both in Agra and Oudh full hereditary rights in their holdings while taking away the landlord's right to prevent the growth of occupancy.
- In Bihar, the new tenancy legislation was passed mainly in 1937 and 1938 which was more radical in approach as compared to that of U.P.
- In Orissa, a tenancy bill was passed in May 1938 granting the right of free transfer of occupancy holdings, reducing the interest on arrears of rent and abolishing all illegal levies on tenants. The Governor refused to give assent to the bill as it would have reduced the zamindars' incomes by fifty to sixty per cent.
- In Madras, a committee under the chairmanship of T. Prakasam (1872-1957) recommended that in the areas under Permanent Zamindari Settlement the ryot and not the zamindar was the owner of the soil and that therefore the level of rents prevailing when the Settlement was made in 1802 should be restored. The Legislative Assembly passed, in January 1939, a resolution accepting the recommendations, but before a bill could be drafted, the Ministry resigned.
- Measures of tenancy reform, usually extending security of tenure to tenants in landlord areas, were also carried in the legislatures of Bombay, the Central Provinces and the North-West Frontier Province.
- Hence, option (b) is the correct answer.

**Indian Peasants' Institute**

- It was set up in 1933 by N.G. Ranga in the village of Nidobrolu in Guntur district which trained peasants to become active workers of the peasant movement.
- Bengal Bargadars Temporary Regulation Bill, 1947
- This bill was introduced by Muslim league ministry in Bengal to incorporate the demand of the Sharecroppers against the backdrop of Tebhaga struggle. This encouraged the movement and led to the increased participation of the peasants from rural areas. However, the government failed to pass the bill immediately and it was only in 1950, the bill was passed.
- Hence, option (b) is the correct answer.

**83. Ans. D**

**Exp:** The flow of water through well-defined channels is known as 'drainage' and the network of such channels is called a 'drainage system'.

- The drainage pattern of an area is the outcome of the geological time period, nature and structure of rocks, topography, slope, amount of water flowing and the periodicity of the flow. Hence, all the options are correct.

**Some of the different types of drainage patterns are:**

- **Dendritic:** The drainage pattern resembling the branches of a tree is known as Dendritic. It is formed in areas of gently sloping land. Himalayan rivers follow Dendritic pattern.
- **Radial:** When the rivers originate from a hill and flow in all directions, the drainage pattern is known as Radial. The rivers originating from the Amarkantak range present a good example of it.
- **Trellis:** When the primary tributaries of rivers flow parallel to each other and secondary tributaries join them at right angles, the pattern is known as Trellis. Rivers in the upper part of the Himalayan region form a trellis pattern

- **Centripetal:** When the rivers discharge their waters from all directions in a lake or depression, the pattern is known as Centripetal pattern. For example, Loktak lake in Manipur.

**84. Ans. C**

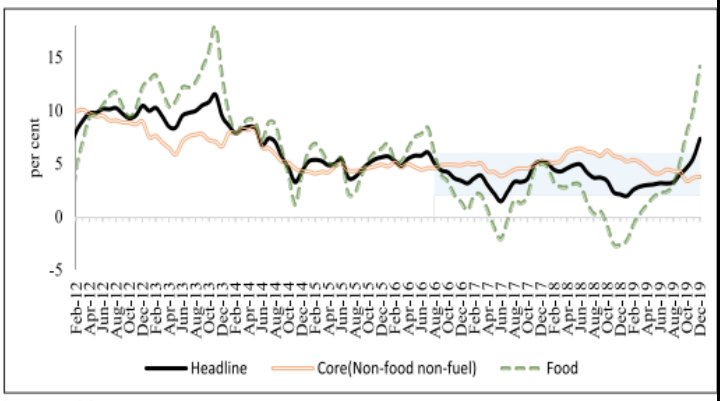
**Exp:** Total liabilities of the Central Government include debt contracted against the Consolidated Fund of India, technically defined as Public Debt, as well as liabilities in the Public Account. Hence, statement 1 is correct.

- These liabilities include external debt (end-of-the financial year) at current exchange rate but exclude part of NSSF liabilities to the extent of States' borrowings from the NSSF and investments in public agencies out of the NSSF, which do not finance Central Government deficit.
- Total liabilities of the Central Government, as a ratio of GDP, has been declining, particularly after the enactment of the FRBM Act, 2003. This is an outcome of both fiscal consolidation efforts as well as relatively high GDP growth. Hence, statement 2 is correct.
- Owing to the low share of external debt in the debt portfolio and almost entire external borrowings being from official sources, central Government debt is characterized by low currency and interest rate risks.
- Further, most of the public debt has been contracted at fixed interest rate making India's debt stock virtually insulated from interest rate volatility. This lends certainty and stability to budget in terms of interest payments.

**85. Ans. D**

**Exp:**

**Figure 1: Trends in CPI-C Headline, Core and Food inflation**




Source: NSO.

- In the last two years core inflation has been higher than the headline inflation. Hence statement 1 is not correct.

**Table 1: General inflation based on different price indices (in per cent)**

| | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2018-19* | 2019-20* |
|---|---|---|---|---|---|---|---|---|
| WPI | 5.2 | 1.2 | -3.7 | 1.7 | 3.0 | 4.3 | 4.7 | 1.5 (P) |
| CPI - C | 9.4 | 5.9 | 4.9 | 4.5 | 3.6 | 3.4 | 3.7 | 4.1 (P) |
| CPI - IW | 9.7 | 6.3 | 5.6 | 4.1 | 3.1 | 5.4 | 4.9 | 7.6 |
| CPI - AL | 11.6 | 6.6 | 4.4 | 4.2 | 2.2 | 2.1 | 1.7 | 7.3 |
| CPI - RL | 11.5 | 6.9 | 4.6 | 4.2 | 2.3 | 2.2 | 1.9 | 7.1 |

Source: Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade (DPIIT) for Wholesale Price Index, National Statistical Office (NSO) for CPI-C and Labour Bureau for CPI-IW, CPI-AL and CPI-RL.

Note: CPI-C inflation for 2013-14 is based on old series 2010=100; (P) - Provisional; C stands for Combined, IW stands for Industrial Workers, AL stands for Agricultural Labourers and RL stands for Rural Labourers.
* 2019-20 refers to April to December 2019 for CPI-C, WPI, CPI-AL, CPI-RL and April to November 2019 for CPI-IW.

- WPI has been higher than CPI combined in the last two years. Hence statement 2 is not correct.

**86. Ans. A**

**Exp:** Carbon in the Earth's atmosphere exists in two main forms: carbon dioxide and methane. Both of these gases absorb and retain heat in the atmosphere and are partially responsible for the greenhouse effect.

- Methane produces a larger greenhouse effect per volume as compared to carbon dioxide, but it exists in much lower concentrations and is more short-lived than carbon dioxide, making carbon dioxide the more important greenhouse gas of the two. Increase in average global temperature causes glacial melt. Hence statement 2 is correct.
- Ocean acidification is a direct consequence of increased human induced carbon dioxide concentrations in the atmosphere. The ocean absorbs over

25% of all anthropogenic emissions from the atmosphere each year.

- As CO2 dissolves in sea water it forms carbonic acid, thereby decreasing the ocean's pH, leading to a suite of changes collectively known as ocean acidification. Hence statement 3 is not correct.
- Carbon dioxide is essential for plant and phytoplankton growth. An increase in carbon dioxide could increase growth by fertilizing those few species of phytoplankton and ocean plants (like sea grasses) that take carbon dioxide directly from the water.
- With more atmospheric carbon dioxide available to convert to plant matter in photosynthesis, plants will be able to grow more. This increased growth is referred to as carbon fertilization. Hence statement 1 is not correct.

**87. Ans. D**

**Exp:** Bees are disappearing at an alarming rate due to the excessive use of pesticides in crops, diseases, growth of parasites that capture bee colonies. It's true that the extinction of bees would mean the end of humanity. Out of the 100 crop species that provide us with 90% of our food, 35% are pollinated by bees, birds and bats.

- Option 2 is correct: Some plants are pollinated by wind, but that rate is very slow. Insects are the primary pollinators on the planet. Beetles and butterflies also pollinate, but bees are the most efficient insects for this purpose. Some of the crops benefited by bee pollination include:
- **Fruits and nuts:** Almond, apple, apricot, peach, strawberry, citrus and litchi.
- **Vegetable and Vegetable seed crops:** Cabbage, cauliflower, carrot, coriander, cucumber, melon, onion, pumpkin, radish and turnip.
- **Oilseed crops:** Sunflower, niger, rapeseed, mustard, safflower, gingelly. If bees went extinct, there would be a massive decline in the production of crops.
- Option 1 is correct: Herbivores, who depend on certain plant species, will be affected first. They would go extinct if plants ceased to exist. For example, many cattle used for milk and meat depend on grasses like alfalfa and lupins, both of which depend on insect pollination. Due to the declining population of herbivores, tertiary carnivores will begin to suffer immediately. The only beneficiaries from this scenario would be scavengers (eagles, vultures, ravens etc.)
- Option 3 is correct: Wild bees pollinate flowers, trees and shrubs, which in turn provide flood control, prevent soil erosion and help regulate the climate. Seed and shelter other native wildlife.

**88. Ans. B**

**Exp:** All the options are correct.

- **Doppler Effect:** The Doppler effect is a phenomenon observed whenever the source of waves is moving with respect to an observer. The Doppler effect can be described as the effect produced by a moving source of waves in which there is an apparent upward shift in frequency for the observer and the source are approaching and an apparent downward shift in frequency when the observer and the source are receding. The Doppler effect can be observed to occur with all types of waves - most notably water waves, sound waves, and light waves.
- **Examples:** A police car or emergency vehicle was traveling towards you on the highway. As the car approached with its siren blasting, the pitch of the siren sound (a measure of the siren's frequency) was high; and then suddenly after the car passed by, the pitch of the siren sound was low. That was the **Doppler effect** - a shift in the apparent frequency for a sound wave produced by a moving source.

**Applications of Doppler Effect:**

- Police radar to check the speed of vehicles on a highway.

- To read weather events. In this case, the stationary transmitter is located in a weather station and the moving object being studied is a storm system.

**Echocardiogram.**

- Sonic boom produced by the supersonic aircraft.
- Echolocation by bats: To help them find their prey in the dark, most bat species have developed a remarkable navigation system called echolocation

**89. Ans. B**

**Exp:**

- The provision for National Emergency is provided for under Article 352 of the Constitution. The President can declare a national emergency only if the Cabinet recommends in writing to do so.
- Such a proclamation of emergency has to be approved by both the Houses of Parliament by an absolute majority of the total membership of the Houses, as well as 2/3rd majority of members present and voting within one month, otherwise, the proclamation ceases to operate.
- While a proclamation of national emergency is in operation, the President can modify the constitutional distribution of revenues between the centre and the states. President can either reduce or cancel the transfer of finances from the Centre to the states. Such modification continues till the end of the financial year in which the Emergency ceases to operate.
- While a proclamation of national emergency is in operation, the President can issue ordinances on the state subjects also, if the Parliament is not in session.
- Article 359 authorises the president to suspend the right to move any court for the enforcement of Fundamental Rights during a National Emergency. The suspension of enforcement relates to only those Fundamental Rights that are specified in the Presidential Order. The said rights are theoretically alive but the right to seek remedy is suspended. Suspension could be for the period during the operation of emergency or for a shorter period as mentioned in the order, and the suspension order may extend to the whole or any part of the country. It should be laid before each House of Parliament for approval.
- Hence, statements 1 and 3 are not correct and statement 2 is correct.

**90. Ans. B**

**Exp:** A major portion of Part IX of the Constitution deals with structural empowerment of the PRIs but the real strength in terms of both autonomy and efficiency of these institutions is dependent on their financial position (including their capacity to generate own resources). In general, Panchayats in our country receive funds in the following ways:

- Grants from the Union Government based on the recommendations of the Central Finance Commission as per Article 280 of the Constitution.
- Devolution from the State Government based on the recommendations of the State Finance Commission as per Article 243-I. Hence statement 1 is correct.
- Loans / grants from the State Government.
- Programme-specific allocation under Centrally Sponsored Schemes and Additional Central Assistance. Hence statement 2 is correct.
- Internal Resource Generation (tax and non-tax).
- Taxes on the sale or purchase of newspapers and on advertisements published therein is a subject under the Union List in Schedule seven of the Constitution of India. It does not lie under the purview of the Panchayats. Hence statement 3 is not correct.

**91. Ans. A**

**Exp:** Akshay Kumar Dutt was one of the initiators of the Bengal Renaissance. In 1839, he joined the Tattwabodhini Sabha and soon became its assistant secretary. He was appointed a teacher of the Tattwabodhini Pathsala the next year and in 1843, Tattwabodhini Patrika was published as mouthpiece of both the Tattwabodhini Sabha and Brahmo Samaj. He was the first editor of the journal and contributed substantially towards the development of prose writing in Bengali.

- Akshay Kumar held that all-natural and social phenomena could be analyzed and understood by purely mechanical processes. This perspective not only enabled them to adopt a rational approach to tradition but also to evaluate the contemporary socio-religious practices from the standpoint of social utility.
- In advocating widow marriage and opposing polygamy and child marriage, Akshay Kumar was not concerned about religious sanction or whether they existed in the past. His arguments were mainly based on their effects of Society.
- Instead of depending on the scriptures, he cited medical Opinion against Child marriage. He held very advanced ideas about marriage and family: courtship before marriage, partnership and equality as the basis of married life and divorce by both law and custom.
- Hence option a is the correct answer.

**92. Ans. B**

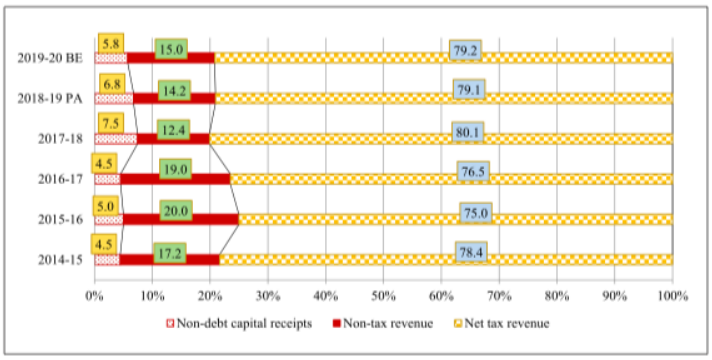
**Exp:** Temperate Continental (Steppe) Climate A steppe is a dry, grassy plain. Steppes occur in temperate climates, which lie between the tropics and polar regions.

- Temperate regions have distinct seasonal temperature changes, with cold winters and warm summers.
- Though they lie in the Westerly wind belt, they are so remote from the maritime influence that the grasslands are practically treeless.
- In the northern hemisphere, the grasslands are far more extensive and are entirely continental. Hence statement 1 is correct.
- In Eurasia, they are called the Steppes, and stretch eastwards from the shores of the Black Sea across the great Russian plain to the foothills of the Altai Mountains, a distance of well over 2,000 miles.
- In the southern hemisphere, there is a maritime influence in the steppe type of climate.
- Its annual precipitation is always more than the average 20 inches because of the warm ocean currents that wash the shores of the steppe-lands here.
- Pretoria, in South Africa, has an annual precipitation of 26 inches with the wettest months in November, December, January and February, the summer season of the southern hemisphere.
- There are three months (June, July and August) without any rain. This is the period of drought. The dry season is particularly pronounced in temperate grasslands adjoining deserts, for example in Australia. Hence statement 2 is not correct.
- Chinook is a warm, dry wind descending the eastern slopes of the Rocky Mountains in the USA, primarily in winter. Hence statement 3 is not correct.
- Winds of the same kind occur in other parts of the world and are known generally as foehns.
- It comes in a south-westerly direction to the Prairies and has a considerable effect on the local pastures. It melts the snow-covered pastures and animals can be driven out of doors to graze in the open fields.
- It actually comes with the depressions in winter or early spring from the Pacific coast ascending the Rockies and then descending to the Prairies.

**93. Ans. C**

**Exp:**

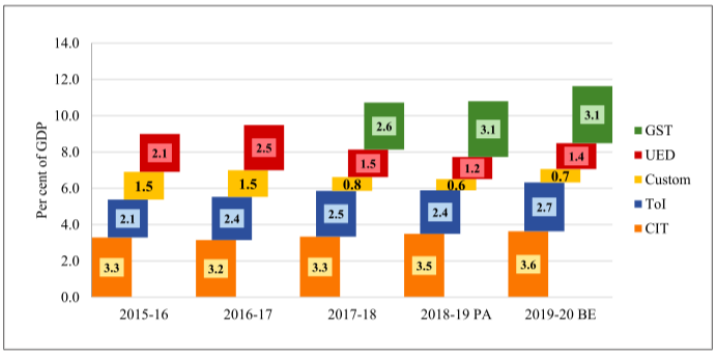
**Figure 5: Composition of Non-debt receipts of Central Government**




Source: Union Budget Documents & CGA
BE: Budget Estimate, PA: Provisional Actuals

- Tax revenue forms the major component of non-debt receipts of the Central Government. Hence statement 1 is correct.
-

**Figure 4: Taxes as a percent of GDP**




Source: Union Budget Documents & CGA
Note: 1. CIT: Corporation Tax, ToI: Taxes on Income other than Corporation Tax (includes STT), UED: Union Excise Duties, GST: Goods and Services Tax, 2. GST includes CGST, IGST and Compensation Cess

- Corporate taxes have been the largest source of tax revenue in the last five years. Hence statement 2 is correct.

**94. Ans. B**

**Exp:** An exchange-traded fund (ETF) is a type of security that involves a collection of securities - such as stocks - that often tracks an underlying index. ETFs are in many ways similar to mutual funds; however, they are listed on exchanges and ETF shares trade throughout the day just like an ordinary stock.

- ETF contains a basket of stocks that reflects the composition of an Index, like BSE Sensex. The ETFs trading value is based on the net asset value of the underlying stocks that it represents.
- An ETF is called an exchange-traded fund since it's traded on an exchange just like stocks. The price of an ETF's shares will change throughout the trading day as the shares are bought and sold on the market. This is unlike mutual funds, which are not traded on an exchange, and trade only once per day after the markets close.
- An ETF's expense ratio is the cost to operate and manage the fund. ETFs typically have low expenses since they track an index. ETFs provide lower average costs since it would be expensive for an investor to buy all the stocks held in an ETF portfolio individually. Investors only need to execute one transaction to buy and one transaction to sell, which leads to fewer broker commissions since there are only a few trades being done by investors.
- Lately, the Government has latched upon the Exchange Traded Funds (ETFs) route to disinvest its holdings in public sector companies rather than sell them on a piecemeal basis in the market. The latest such vehicle is the Bharat 22 ETF, a fund that houses 22 public sector companies.

**95. Ans. C**

**Exp:** High-altitude adaptation in humans is an instance of evolutionary modification in certain human populations, including those of Tibet in Asia, the Andes of the Americas, and Ethiopia in Africa, who have acquired the ability to survive at extremely high altitudes.

- People living in high altitude regions have undergone extensive physiological and genetic changes, particularly in the regulatory systems of oxygen respiration and blood circulation, when compared to the general lowland population.
- Tibetans inhale more air with each breath and breathe more rapidly than either sea level populations or Andeans. Tibetans have better oxygenation at birth, enlarged lung volumes throughout life, and a higher capacity for exercise. They show a sustained increase in cerebral blood flow, and less susceptibility to chronic mountain

sickness than other populations, due to their longer history of high-altitude habitation. Hence statement 3 is correct.

- In addition, Tibetans have a second biological adaptation, which expands their blood vessels, allowing them to deliver oxygen throughout their bodies more effectively than sea-level people do. Tibetans' lungs synthesize larger amounts of a gas called nitric oxide from the air they breathe. One effect of nitric oxide is to increase the diameter of blood vessels, which suggests that Tibetans may offset low oxygen content in their blood with increased blood flow. Hence statement 2 is not correct.
- In contrast to the Tibetans, the Andeans counter having less oxygen in every breath by having higher hemoglobin concentrations in their blood. Haemoglobin is the protein in red blood cells that ferries oxygen through the blood system. Having more haemoglobin to carry oxygen through the blood system than people at sea level counterbalances the effects of hypoxia. Hence statement 1 is correct.

**96. Ans. C**

**Exp:** The President is elected not directly by the people but by members of an electoral college consisting of:

- the elected members of both the Houses of Parliament;
- the elected members of the legislative assemblies of the states; and
- the elected members of the legislative assemblies of the Union Territories of Delhi and Puducherry
- CM of Delhi is covered under this category. Hence statement 1 is correct and 3 is not correct.
- The Representation of the People Act, 1951
- It provides for the conduct of the election of the Houses of Parliament and to State Legislatures
- Qualifications and disqualifications for membership of those Houses
- The corrupt practices and other offenses at or in connection with such elections
- Supreme Court in Lily Thomas Case, 2013 held that members convicted in a criminal case stand disqualified from the membership of the House immediately from the date of conviction.
- Hence they would not be able to vote in the election for President. The Supreme court had said that the charge sheet in a criminal case is not a ground to disqualify a politician for seeking votes and becoming a legislator.
- Thus politicians facing criminal charges are not debarred from contesting elections. Also levelling of charges against an MLA does not lead to his disqualification until and unless he is convicted of any crime. Hence statement 2 is correct.

**97. Ans. A**

**Exp:**Article 246 of the Constitution demarcated the powers of the Union and the State by classifying their powers into 3 lists, i.e.

(i) Union List- on which the Centre has the exclusive jurisdiction to make laws

**(ii)** State list, on which states have exclusive jurisdiction to make laws and

**(iii)** Concurrent List – on which both centre and state can make laws and as stated above, the central law prevails over state in cases of repugnancy.

- According to Article 246A Parliament has exclusive power to make laws with respect to goods and services tax where the supply of goods, or services, or both takes place in the course of inter-State trade or commerce.
- According to Article 269A Goods and services tax on supplies in the course of inter-State trade or commerce shall be levied and collected by the Government of India and such tax shall be apportioned between the Union and the States in the manner as may be provided by Parliament by law on the recommendations of the Goods and

Services Tax Council. Hence, statement 1 is correct and 2 is not correct.

**98. Ans. B**

**Exp:**More than 500 vital functions have been identified with the liver. Some of the more well-known functions include the following:

- Production of bile, which helps carry away waste and break down fats in the small intestine during digestion
- Production of certain proteins for blood plasma
- Production of cholesterol and special proteins to help carry fats through the body
- Conversion of excess glucose into glycogen for storage (glycogen can later be converted back to glucose for energy) and to balance and make glucose as needed
- Regulation of blood levels of amino acids, which form the building blocks of proteins
- Processing of hemoglobin for use of its iron content (the liver stores iron)
- Conversion of poisonous ammonia to urea (urea is an end product of protein metabolism and is excreted in the urine)
- Clearing the blood of drugs and other poisonous substances
- Regulating blood clotting
- Resisting infections by making immune factors and removing bacteria from the bloodstream
- Clearance of bilirubin, also from red blood cells. If there is an accumulation of bilirubin, the skin and eyes turn yellow.
- The hormone insulin is a main regulator of the glucose (sugar) levels in the blood. Insulin is produced by the beta cells in the islets of Langerhans in the pancreas.

**99. Ans. A**

**Exp:** EBRs are those financial liabilities that are raised by public sector undertakings for which repayment of the entire principal and interest is done from the Central Government Budget.

- These EBRs are not taken into account while calculating the Fiscal Deficit. However, they are considered in the calculations of Government Debt.
- Government has raised EBRs of Rs. 88,454 crore during three years from 2016-17 to 2018-19. It proposes to raise EBR of Rs. 57,004 crore in 2019-20 BE which is 0.27 per cent of GDP.

**100.Ans. C**

**Exp:**Employment elasticity is a measure of the percentage change in employment associated with a 1 percentage point change in economic growth. Hence, statement 1 is correct.

**Employment elasticity of:**

- 1 denotes that employment grows at the same rate as economic growth.
- 0 denotes that employment does not grow at all, regardless of economic growth.
- Negative employment elasticity denotes that employment shrinks as the economy grows.
- It indicates the ability of an economy to generate employment opportunities for its population as per cent of its growth process. This implies that when the employment generation is commensurate with the economic growth, there is positive employment elasticity.
- Negative employment elasticity indicates a slow employment growth in comparison to economic growth.
- Negative employment elasticity indicates that the economy is not able to generate employment with the progress in the economy. Low and negative employment elasticity show —jobless growth.
- The manufacture of rubber and plastic products, electronic and optical products, transport equipment, machinery, basic metals and fabricated metal products, chemicals and chemical products, textiles and leather & leather

products, are the subsectors with highest employment elasticities

- To step up the impact of economic growth on employment, the focus has to be on such high employment elastic sectors.
- In the 1990s, the employment elasticity in India was nearly 0.4. This number measures how much a given rise in growth impacts jobs. At 0.4, a one per cent rise in GDP growth gives us a 0.4% rise in employment; 5% growth gives jobs a 2% boost.
- Now, this elasticity is down to 0.2 or lower. This means, for every percentage rise in growth, we get only a 0.2% impact on employment. Put another way, we need a minimum of 10% GDP growth to give us the kind of jobs kick we used to get in the 1990s.
- This falling employment elasticity is partly the result of a large-scale substitution of labour with capital and industrial automation. This is easy in a world with surplus capital, and especially in a country with restrictive labour laws. It is a no-brainer for promoters to use capital and automation when labour is going to be heavily regulated. Hence, statement 2 is correct.