अखिल मूर्ति के निर्देशन में

ऑनलाइन लर्निंग प्रोग्राम के तहत

# यूपीएससी (प्री.) 2021 टेस्ट सीरीज़

(हिंदी एवं अंग्रेज़ी दोनों माध्यमों में)

# Explanation

## टेस्टकोड : SNK-PG2101

1. **Answer (d)**

**Explanation**

- Badami was the capital of the western Chalukyan dynasty. which ruled the region from 500 to 757 AD. With the decline of the Vakataka rule, the Chalukyas established their power in the Deccan. The Chalukya king Mangalesha patronised the built of the Badami caves. He was the younger son of the Chalukya king, Pulakesin I, and the brother of Kirtivarman I.
- In Badami, cave no. 1 portrays Shiva as Nataraja, Harihara (half-Shiva and half-Vishnu) and Ardhanarishvara; cave no. 2 and 3 are dedicated to Lord Vishnu and Vaishnavism whereas cave no. 4 is dedicated to Jain Tirthankaras.
- Mural Paintings in this cave depict palace scenes. One shows Kirtivarman, the son of Pulakesin I and the elder brother of Mangalesha, seated inside the palace with his wife and feudatories watching a dance scene. Towards the corner of the panel are figures of Indra and his retinue.

2. **Answer (c)**

**Explanation**

- In due course during the Iqta System, the Muqti was given complete charge of the administration of the Iqta which included the task of maintaining an army. The Muqti was to help the Sultan with his army in case of need. He was expected to maintain the army and meet his own expenses with the revenue collected. From the time of Balban the muqti was expected to send the balance (fawazil) of the income to the centre after meeting his and the army's expenses. This means that the central revenue department had made an assessment of the expected income of the Iqta, the cost of the maintenance of the army and the muqti's own expenses.
- This process became even more strict during the time of Alauddin Khalji. As the central control grew, the control over muqti's administration also increased. The Khwaja (probably same as Sahib-i-Diwan) was appointed to keep a record of the income of the Iqtas. It was on the basis of this record that the Sultan used to make his revenue demands. A Barid or intelligence officer was also appointed to keep the Sultan informed. During the reign of Muhmmad-bin-Thughlaq a number of governors were appointed on revenue sharing terms where they were to give a fixed sum to the state. During the time of Feroz Shah Tughlaq the control of state over iqtas was diluted when iqtas became hereditary.

3. **Answer (d)**

**Explanation**

- The Constitution States that the Vice President can be removed by a resolution of the Rajya Sabha passed by an absolute majority (majority of total number of House) and agreed by the Lok Sabha. Resolution can be moved only in Rajya Sabha. Hence statement 1 is incorrect.
- Impeachment Motion for the removal of the President can be initiated in either house of Parliament. Hence statement 2 is also incorrect.

4. **Answer (d)**

**Explanation**

- There were many reasons for the shift in the League's position:
- Britain's refusal to help Turkey (ruled by the Khalifa who claimed religio-political leadership of all Muslims) in its wars in the Balkans (1912-13) and with Italy (during 1911) had angered the Muslims.
- Annulment of partition of Bengal in 1911 had annoyed those sections of the Muslims who had supported the partition.
- The refusal of the British government in India to set up a university at Aligarh with powers to affiliate colleges all over India also alienated some Muslims.
- The younger League members were turning to bolder nationalist politics and were trying to outgrow the limited political outlook of the Aligarh school. The Calcutta session of the Muslim League (1912) had committed the League to "working with other groups for a system of self-government suited to India, provided it did not come in conflict with its basic objective of protection of interests of the Indian Muslims". Thus, the goal of self-government similar to that of the Congress brought both sides closer.
- Younger Muslims were infuriated by the government repression during the First World War. Maulana Azad's Al Hilal and Mohammad Ali's Comrade faced suppression while the leaders such as Ali brothers, Maulana Azad and Hasrat Mohani faced internment. This generated anti-imperialist sentiments among the young cadre of the party.

5. **Answer (d)**

**Explanation**

- The Swarajists lacked a policy to co-ordinate their militancy inside legislatures with the mass struggle outside. They relied totally on newspaper reporting to communicate with the public (Hence Statement 2 is correct).
- An obstructionist strategy had its limitations.
- They could not carry on with their coalition partners very far because of conflicting ideas, which further limited their effectiveness.
- They failed to resist the perks and privileges of power and office.
- They failed to support the peasants' cause in Bengal and lost support among Muslim members who were pro-peasant.
- The Responsivists among Swarajists—Lala Lajpat Rai, Madan Mohan Malaviya and N.C. Kelkar (Hence Statement 1 is correct)—advocated cooperation with the government and holding of office wherever possible. Besides they also wanted to protect the so-called Hindu interests. The communal elements accused leaders like Motilal Nehru, who did not favour joining the council, of being anti-Hindu even as Muslim communalists called the Swarajists anti-Muslim (Hence Statement 3 is correct).

6. **Answer (c)**

**Explanation**

The objections of the Indian leaders to Montagu's statement were two-fold—

(i) No specific time frame was given.

(ii) The government alone was to decide the nature and the timing of advance towards a responsible government, and the Indians were resentful that the British would decide what was good and what was bad for Indians.

7. **Answer (a)**

**Explanation**

- The court of Sri Krishna Devaraya was adorned with many Sanskrit, Kannada, Tamil poets. He had the titles of "Andhra Bhoja" "Sahitya Samaranga Sarvabhauma". The period of Sri Krishna Devaraya is the Augustan Age of Telugu literature. His period was a golden age for Telugu literature. He proclaimed Telugu as a great language among all the languages of the country. He was himself a Telugu poet. He wrote Amuktamalyada in Telugu and Ushaparinayam in Sanskrit. In his court called "Bhuvana Vijayam" eight great telugu poets known as "Ashtadiggajas" flourished. Hence statement 1 is incorrect. Among them Allasani Peddana, Nandi Timmana, Tenali Ramakrishna, Pingali Surana, Dhurjati were famous. Allasani Peddana was known as Andhra Kavita Pitamaha. He was the author of Manucharitram.
- The Chola traditions of village self-government were considerably weakened under Vijayanagara rule. The growth of hereditary nayakships tended to curb their freedom and initiative. The governors of the provinces were royal princes at first. Later, persons belonging to vassal ruling families and nobles were also appointed as governors. The provincial governors had a large measure of autonomy. They held their own courts, appointed their own officers, and maintained their own armies. They were allowed to issue their own coins, though of small denominations only. There was no regular term for a provincial governor, his term depending on his ability and his strength. The governor had the right to impose new taxes or remit old ones. Each governor paid a fixed contribution in men and money to the central government. (Hence statement 2 is correct.)

8. **Answer (d)**

**Explanation**

- The Gupta period witnessed a brilliant activity in the sphere of mathematics, astronomy, astrology and medicine.
- Aryabhatta was a great mathematician and astronomer. He wrote the book Aryabhatiya in 499 AD. It deals with mathematics and astronomy. It explains scientifically the occurrence of solar and lunar eclipses. Aryabhatta was the first to declare that the earth was spherical in shape and that it rotates on its own axis. However, these views were rejected by later astronomers like Varahamihira and Brahmagupta. Varahamihira composed Pancha Siddhantika, the five astronomical systems. He was also a great authority on astrology. His work Brihadsamhita is a great work in Sanskrit literature. It deals with a variety of subjects like astronomy, astrology, geography, architecture, weather, animals, marriage and omens. His Brihat Jataka is considered to be a standard work on astrology.

9. **Answer (d)**

**Explanation**

- Bacterial communities can be used in degrading hazardous waste, producing human insulin, making antibiotics and biosensors.
- According to an article published in Down To Earth magazine, a team of scientists from the National Collection of Industrial Microorganisms (NCIM) at National Chemical Laboratory, Pune have isolated untapped bacterial cultures from Ankeshwar hot springs on the bank of river Penganga in Maharashtra. These bacteria are being studied for their metabolic use in enzyme biotechnology and environmental remediation.

10. **Answer (c)**

**Explanation**

- These were part of the later Vedic texts.
- The Upanishads, a part of the Vedas, are ancient Sanskrit texts of spiritual teaching and ideas of Hinduism, some of which are shared with religious traditions like Buddhism and Jainism. Among the most important literature in the history of Indian religions and culture, the Upanishads played an important role in the development of spiritual ideas in ancient India, marking a transition from Vedas to new ideas and institutions. Of all Vedic literature, the Upanishads alone are widely known, and their central ideas are at the spiritual core of Hinduism.
- The Upanishads are commonly referred to as Vedanta. Vedanta has been interpreted as the "last chapters, parts of the Veda" and alternatively as "object, the highest purpose of the Veda". The concepts of Brahman (ultimate reality) and Atman (soul, self) are central ideas in all of the Upanishads, and "know that you are the Atman" is their thematic focus. Along with the Bhagavad Gita and the Brahmasutra, the main Upanishads (known collectively as the Prasthanatrayi) provide a foundation for the several later schools of Vedanta, among them, two influential monistic schools of Hinduism.

11. **Answer (b)**

**Explanation**

- Gram Nyayalaya is a mobile court and exercises the powers of both Criminal and Civil Courts; i.e., the seat of the Gram Nyayalaya will be located at the headquarters of the intermediate Panchayat. They will go to villages, work there and dispose of the cases. 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.
- 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; The Nyayadhikaris who will preside over these Gram Nyayalayas are strictly judicial officers and will be drawing the same salary and deriving the same powers as First Class Magistrates working under High Courts.
- 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.

12. **Answer (c)**

**Explanation**

- Introduction to the Ishwar Chandra Vidyasagar (1820-1891) and his contributions:
- He, received the title Vidyasagar (ocean of knowledge) for his outstanding academic performance, was a legendary educationist, a Sanskrit scholar and a social reformer who questioned oppressive social traditions of Hindu society.
- He was invited by the Fort William College to teach Bengali to the European recruits at the age of twenty-one and later he went on to become the head of the Sanskrit Department. In 1846, he joined the Sanskrit College.
- Campaign for Widow remarriage: It was in 1854 that he began the campaign for widow remarriage by writing against the practice in the Tattvabodhini Patrika. He challenged the Brahminical authorities and proved that widow remarriage is sanctioned by Vedic scriptures (he discovered a stanza from the Parashara Samhita, an ancient legal text which favored widow remarriage). In 1855, he filed a petition before the government, seeking legislation that would allow widow remarriage, which finally resulted in the passing of the Widow Remarriage Act, 1856. He even married his son Narayan Chandra to an adolescent widow in 1870 to set an example.
- Campaign for Child Marriage: By vigorously challenging the barbaric practice of child marriage he demanded raising the marriageable age of the girl child. British administration passed the Age of Consent Act in 1891, which legally abolished child marriage.
- He wrote student-friendly Sanskrit grammar texts 'Upakramonika' and 'Byakaran Koumudi' in Bengali.
- Translation of several Sanskrit books into Bengali, including Kalidas' Abhigyana Shakuntalam.

13. **Answer (c)**

**Explanation**

- The Chola kingship was hereditary. The heir apparent was called Yuvaraja. Kings were assisted by ministers and officials in their administration. Chola kings had tiger as their royal emblem.
- Besides land revenue, there were tolls and customs on goods taken from one place to another, various kinds of professional taxes, dues levied on ceremonial occasions like marriages and judicial fines.
- Taxes on mines, ports, forests and salt pans were collected. Professional tax and house tax were also collected.

14. **Answer (c)**

**Explanation**

- Madan Lal Dhingra was a revolutionary activist who was charged for the killing of Curzon Wyllie, a British officer in London.
- In December 1915, Maulana Barkatullah established the first Provisional Government of India at Kabul in Afghanistan, during the First World War. It was a government-in-exile of Free Hindustan with Raja Mahendra Pratap as president, and himself became Prime Minister.
- V. G. Pingley was a member of the Ghadar Party in the USA.

15. **Answer (a)**

**Explanation**

- Statement 1 is correct as certain duties such as cherishing noble ideals of freedom struggle is a moral precept while respecting the constitution is a civic duty.
- Fundamental duties are confined only to citizens.

16. **Answer (c)**

**Explanation**

- When no party has a clear majority in the legislative assembly, then the Governor may exercise his personal discretion in the selection and appointment of CM. In such a situation the Governor usually appoints the leader of the largest party or largest coalition party, as the CM and asks him to seek a vote of confidence in the house within a month.
- The Governor may exercise his individual judgment in the selection and appointment of CM when CM in the office dies suddenly and there is no obvious successor. However, on the death of a CM, the ruling party usually elects a new leader and the Governor appoints him/ her as CM.

17. **Answer (c)**

**Explanation**

- The salient features of Gandhara art are:
- Moulding the human body in a realistic manner with minute attention to physical features like muscles, moustache and curly hair.
- Thick drapery with large and clear fold lines.
- Rich carving, elaborate ornamentation and symbolic expressions.
- The main theme was the new form of Buddhism 'Mahayanism'.
- The evolution of an image of Buddha.

18. **Answer (d)**

**Explanation**

- Khayal is one of the most prominent Styles of Hindustani music.
- Literally means 'idea or imagination'.
- Origin attributed to Amir Khusrow.
- Theme of Khayal is romantic in nature.
- Khayal is based on the imagination of performers and allows improvisations.
- Khayal is also composed in a particular raga and tala and has a brief text
- Khayal compositions are about divine love and sorrow, praise of kings, description of seasons, pranks of Lord Krishna.

There are six main gharanas in khayal: Delhi, Patiala, Agra, Gwalior, Kirana and Atrauli-Jaipur

19. **Answer (c)**

**Explanation**

As in earlier periods, the varied contradictions of the Indian society found expression in caste associations and movements. These movements could be divisive, conservative and at times potentially radical, and included:

- Justice Party (Madras)
- Self-respect movement (1925) (E.V Periyar).
- Ramaswamy Naicker (Madras)
- Satyashodhak activists Satara , Maharashtra (Jyotiba Phule)
- Bhaskar Rao Jadhav (Maharashtra)
- Mahars under Ambedkar (Maharashtra)
- Radical Ezhavas under K. Aiyappan and C. Kesavan in Kerala
- Unionist Party under Fazl-i-Hussain (Punjab)

20. **Answer (c)**

**Explanation**

Amendments to be done by Simple Majority of the Parliament:

- Admission or establishment of new States.
- Formation of new states and alteration of areas, boundaries or names of existing States.
- Abolition or creation of legislative councils in States.
- Second Schedule-emoluments,
- Allowances, privileges and so on of the president, the governors, the Speakers, judges, etc.
- Quorum in Parliament.
- Salaries and allowances of the members of Parliament.
- Rules of procedure in Parliament.
- Privileges of the Parliament, its members and its committees.
- Use of the English language in Parliament.
- Number of puisne judges in the Supreme Court.
- Conferment of more jurisdiction on the Supreme Court.
- Conferment of more jurisdiction on the Supreme Court.
- Citizenship-acquisition and termination.
- Elections to Parliament and state legislatures.
- Delimitation of constituencies.
- Union territories
- Fifth Schedule-administration of scheduled areas and scheduled tribes.
- Sixth Schedule-administration of tribal areas.

21. **Answer: (b)**

**Explanation**

Nehru Report had the following provisions:

(i) Dominion status on lines of self-governing dominions as the form of government desired by Indians. Much to the chagrin of the younger, militant section- J. L. Nehru being prominent among them. Hence Statement 1 and 3 are correct.

(ii) Rejection of separate electorates had been the basis of constitutional reforms so far. Instead, a demand for joint electorates was put forward with reservation of seats for Muslims at the Centre and in provinces where they were in minority (and not in those where Muslims were in majority, such as Punjab and Bengal).

(iii) Linguistic provinces.

(iv) Nineteen fundamental rights including equal rights for women, right to form unions, and universal adult suffrage.

(v) Responsible government at the Centre and in provinces.

(vi) Full protection to cultural and religious interests of Muslims.

(vii) Complete dissociation of State from religion.

22. **Answer : (d)**

**Explanation**

- NITI Aayog, Department of Atomic Energy and National Board of Wildlife are headed by the Prime Minister.
- Zonal Councils have been established by the state reorganization act 1956 to advise on matters of common interest to each of the five zones, into which the territory of India has been divided. They are headed by the Union Home Minister.

23. **Answer : (d)**

**Explanation**

- Irradiation is a cold process and can be used to pasteurise and sterilise foods without causing changes in freshness and texture of food, unlike heat.
- Unlike chemical fumigants, irradiation does not leave any harmful toxic residues in food and is more effective.
- It is efficient and can be used to treat pre-packed commodities.
- Irradiation produces very little chemical changes in food. None of the changes known to occur have been found to be harmful.
- X rays, Gamma rays and electron beams can be used for the irradiation process.

24. **Answer : (b)**

**Explanation**

- Permaculture is the design of agriculturally productive ecosystems which have diversity and stability while considering the existing environment and natural ecosystems.
- True permaculture, is not just organic farming - the ideology should in practise means harmonious integration of environment and people- providing their food, shelter, and energy in a sustainable way.

25. Answer : (a)

**Explanation**

- During Mughal rule, Pietra dura also called as Parchinkari, is a term for the inlay technique of using cut and fitted, highly polished colored stones to create images. It is considered as a decorative art.
- Many different colored stones, particularly marbles, were used, along with semi precious, and even precious stones.
- Towards the end of Jahangir's reign began the practice of putting up buildings entirely of marble and style of pietra dura. In Agra, in the Tomb of Itimad al Dawla, pietra dura was used on a large scale for the first time.

26. Answer : (a)

**Explanation**

- Indian Railways was almost fully funded by British investors who suffered a loss of interest payments guaranteed to them. The stake of Indian investors was very low.
- The railways were established with a view to link India's raw material producing areas in the interior with the ports of export.

27. **Answer : (d)**

**Explanation**

- Equality means no section of society enjoys special privileges and individuals are provided with adequate opportunities without any discrimination.
- Secular- In S.R. Bommai Vs UOI (1994), the SC held "A state which does not recognize any religion as the state religion and it treats all religions equally". State can interfere in religious matters if it breaches the very basic principles of the constitution.
- Republic means Head of the State is an elected person and not a hereditary monarch. The manner of election can be both direct and indirect. However, in India, the Head of the State is indirectly elected.

28. **Answer : (a)**

**Explanation**

Article 25 accords the Right to propagate one's own religious belief. But it does not include a right to convert another person to one's own religion. Forcible conversions amount to a violation of one's Freedom of Conscience'.

29. **Answer : (c)**

**Explanation**

Statements 1, 2 and 3 are the unitary features of Indian Constitution and hence removing them would make Indian Constitution more federal. Supremacy of the Constitution is a federal feature. The Constitution is the supreme (or the highest) law of the land. The laws enacted by the Centre and the States must conform to its provisions. Thus, the organs of the government (legislative, executive and judicial) at both the levels must operate within the jurisdiction prescribed by the Constitution.

30. **Answer : (b)**

**Explanation**

- The art of bronze-casting was practised on a wide scale by the Harappans. Their bronze statues were made using the 'lost wax technique' in which the wax figures were first covered with a coating of clay and allowed to dry. Then the wax was heated and the molten wax was drained out through a tiny hole made in the clay cover. The hollow mould thus created was filled with molten metal which took the original shape of the object. Once the metal cooled, the clay cover was completely removed. In bronze we find human as well as animal figures. Techniques of the same nature are practiced even now in many parts of the country, having a continuous tradition.
- Terracotta was used in making seals and pottery. Ornaments made of gold, silver, copper, ivory, pottery and beads have been discovered in civilisations as ancient as the Harappa and Mohenjodaro.

31. **Answer (d)**

**Explanation**

- Statement 1 is incorrect. Article 263 contemplates the establishment of an Inter- State Council to effect coordination between the states and between Centre and states. Thus, the President can establish such a council if at any time it appears to him that the public interest would be served by its establishment (It's not a permanent body). The Sarkaria Commission on Centre-State Relations (1983–87) made a strong case for the establishment of a permanent Inter-State Council under Article 263 of the Constitution.
- Statement 2 is incorrect. President can define the nature of duties to be performed by such a council and its organization and procedure. Even though the president is empowered to define the duties of an interstate council, Article 263 specifies the duties that can be assigned to it in the following manner:
  - Enquiring into and advising upon disputes which may arise between states;
  - Investigating and discussing subjects in which the states or the Centre and the states have a common interest;
  - Making recommendations upon any such subject, and particularly for the better coordination of policy and action on it.
- Statement 3 is incorrect. "The council's function to enquire and advise upon interstate disputes is complementary to the Supreme Court's jurisdiction under Article 131 to decide a legal controversy between the governments. The Council can deal with any controversy whether legal or non-legal, but its function is advisory unlike that of the court which gives a binding decision."

32. **Answer (a)**

**Explanation**

- Decision of the Chairman/ Speaker of disqualification of a Member of Parliament under the tenth Schedule is subject to judicial review. Hence Statement 1 is correct.
- If a disqualified person is elected to the Parliament, the Constitution lays down no procedure to declare the election void. This matter is dealt with by the Representation of the People Act (1951), which enables the High Court to declare the election void if a disqualified candidate is elected. The aggrieved party can appeal to the Supreme Court against the order of the High Court in this regard. Hence Statement 2 is incorrect.

33. **Answer (b)**

**Explanation**

- The Prime Minister can speak on the budget in the lower house but he cannot vote on the budget. Hence statement 1 is incorrect.
- Since only members of Lok Sabha are eligible to vote in the event of a no confidence motion, the Prime Minister being a member of Upper House cannot vote. Hence statement 2 is correct.
- Members of any House of the Parliament can present a Constitutional Amendment Bill in the Parliament. Hence statement 3 is incorrect.

34. **Answer (b)**

**Explanation**

- Recently, the Supreme Court itself agreed to review its Sabarimala verdict but refused to do so in the Rafale case. So, let us understand what a review petition means.
- Under Article 137, the Supreme Court has the power to review any of its judgments or orders.
- Scope for Review-
- When a review takes place, the law is that it is allowed not to take fresh stock of the case but to correct grave errors that have resulted in the miscarriage of justice.

35. **Answer: (c)**

**Explanation**:

- 'Street hawker culture' deals with street food and a variety of cuisine centers in a multi-cultural urban environment in Singapore.
- Street hawker centers are naturally open premises with stalls of traditional and delicious dishes of Indian, Malay and Chinese origin.
- Recently, street hawker culture has been included in the UNESCO representative list.

Hence option (c) is the correct answer.

36. **Answer (c)**

**Explanation**

The Act abolished the office of Viceroy and provided, for each dominion, a governor-general, who was to be appointed by the British Monarch on the advice of the dominion cabinet.

37. **Answer (a)**

**Explanation**

- They are extra-constitutional in emergence. In other words, The cabinet committees have neither been mentioned in the Constitution nor in the rules of business of Parliament. This has been mentioned in Government of India (Transaction of business) rules, 1961 Therefore, statement 1 is correct.
- They usually include only Cabinet Ministers. Hence statement 2 is correct.
- They are an organisational device to reduce the enormous workload of the Cabinet. They also facilitate in-depth examination of policy issues and effective coordination. They are based on the principles of division of labour and effective delegation. Hence statement 3 is correct.

38. **Answer (c)**

**Explanation**

- **Statement 1 is correct:** Salary, allowance and pension of UPSC members are charged on the consolidated fund of India. Thus, they are not subject to the vote of Parliament.
- **Statement 2 is incorrect:** The UPSC chairman can be removed on the grounds and in the manner prescribed in article 317 of the constitution of India. He/ she shall be removed after the President refers the matter to the Supreme Court for an inquiry.
- **Statement 3 is correct:** The chairman or a member of UPSC (after having completed his first term) is not eligible for reappointment to that office (i.e., not eligible for the second term).

39. **Answer (b)**

**Explanation**

- Modern democratic governments are classified into Parliamentary and Presidential on the basis of the nature of relations between the Executive and the Legislative organs of the Government. The Parliamentary system of government is the one in which the executive is responsible to the legislature for its policies and acts. The Presidential system of government, on the other hand, is one in which the executive is not responsible to the legislature for its policies and acts, and is constitutionally independent of the legislature in respect of its term of office.
- Parliamentary government is also known as cabinet government or responsible government or Westminster model of government. It is also called the ministerial or cabinet system. Hence option b is correct.

40. **Answer (b)**

**Explanation**

- The RBI controls the money supply in the economy in various ways. The tools used by the Central Bank to control money supply can be quantitative or qualitative. Quantitative tools control the extent of money supply by Open Market Operations (OMOs), varying Reserve Requirements, or Bank Rate policy.
- Under Open Market Operations, RBI purchases (or sells) government bonds from the general public in a bid to increase (or decrease) the money supply in the economy.
- **Varying Reserve Requirements:** Cash Reserve Ratio (CRR) and Statutory Liquidity Ratio (SLR) work through the rdr (reserve deposit ratio) route. A high (or low) value of CRR or SLR helps increase (or decrease) the value of reserve deposit ratio, thus diminishing (or increasing) the value of the money multiplier and money supply in the economy.
- **Bank Rate Policy:** A low (or high) bank rate encourages banks to keep a smaller (or greater) proportion of their deposits as reserves, since borrowing from RBI is now less (or more) costly than before. As a result banks use a greater (or smaller) proportion of their resources for giving out loans to borrowers or investors, thereby enhancing (or depressing) the multiplier process via assisting (or resisting) secondary money creation.
- Qualitative tools include persuasion by the Central Bank in order to make commercial banks discourage or encourage lending which is done through moral suasion, margin requirement, etc.

41. **Answer (d)**

**Explanation**

- Surcharge is an additional charge or tax levied on an existing tax. Unlike a cess which is meant to raise revenue for a specific purpose, surcharge is usually levied for fulfilling any socio- economic obligation. Thus Statement 1 is not correct.
- Revenue earned via surcharge is solely retained by the Centre and unlike other tax revenues, is not shared with the States. Thus Statement 2 is also not correct.

42. **Answer (d)**

**Explanation**

**Determinants of MSP:** While recommending price policy of various commodities under its mandate, the Commission keeps in mind the various Terms of Reference (ToR) given to CACP in 2009. Accordingly, it analyzes

(1) demand and supply;

(2) cost of production;

(3) price trends in the market, domestic and international;

(4) inter-crop price parity;

(5) terms of trade between agriculture and non-agriculture;

(6) a minimum of 50 percent as the margin over cost of production; and

(7) likely implications of MSP on consumers of that product.

**Current reference:** The issue of minimum support price (MSP) has been raised prominently in the ongoing farmers' agitation against the recently introduced 3 Agriculture Acts.

43. **Answer (b)**

**Explanation**

- There are two main accounts in the Balance of Payment (BoP): current account and capital account
- Invisibles are part of current account, and refer to services and other products that do not result in the transfer of physical objects.
- Invisibles include services, transfers and flows of income that take place between different countries. Services trade includes both factor and non-factor income. Factor income includes net international earnings on factors of production (labour, land and capital) like remittances etc. Non-factor income is net sale of service products like shipping, banking, tourism, software services, etc.
- Thus remittance and export of software services will come into invisibles. (Statement 1 and 2 are correct). FDIs are part of the capital account thus not covered under invisibles. (So Statement 3 is wrong)

44. **Answer (b)**

**Explanation**

- Full capital account convertibility opens up the country's markets to global players, including investors, businesses and trade partners. This allows easy access to capital for different businesses and sectors. (Statement 1 is correct)
- There is a development of "offshore" rupee markets in locations like Dubai, London, New York and Singapore. Due to the existence of capital controls in local Indian markets, the offshore centers are gaining the trading business. Making the rupee fully convertible will enable these trades to happen in India, helping national markets with improved liquidity, better regulatory purview and reduced dependence and risks from offshore market participants. (Statement 2 is correct)
- Full convertibility will mean the rupee exchange rate would be left to market factors, without any regulatory intervention. There may be no limit on inflow or outflow of capital. (Statement 3 is wrong)
- Local businesses can benefit from easy access to foreign loans at comparatively lower costs (low interest rates).(Statement 4 is correct)

45. **Answer (a)**

**Explanation**

- The population trap (or Malthusian trap) is a condition whereby excess population would stop growing due to shortage of food supply leading to starvation.
- As per this theory, as population growth is ahead of agricultural growth, there must be a stage at which the food supply is inadequate for feeding the population.
- Malthus suggested that while technological advances could increase a society's supply of resources, such as food, and thereby improve the standard of living, the resource abundance would encourage population growth, which would eventually bring the per capita supply of resources back to its original level.

46. **Answer (b)**

**Explanation**

- 1st statement is correct: With the enactment of IPR policy in 2016, It sets in place an institutional mechanism for implementation, monitoring and review. It aims to incorporate and adapt global best practices to the Indian scenario. Thus, Department of Industrial Policy & Promotion (DIPP), Ministry of Commerce, Government of India, has been appointed as the nodal department to coordinate, guide and oversee the implementation and future development of IPRs in India
- 2nd statement is not correct: CL is the grant of permission by the government to entities to use, manufacture, import or sell a patented invention without the patent-owner's consent. Patents Act in India deals with CL.
- CL is problematic for foreign investors who bring technology as they are concerned about the misuse of CL to replicate their products. It has been impacting many of India's FTA negotiations.
- Also note that CL is permitted under the WTO's TRIPS (IPR) Agreement provided conditions such as 'national emergencies, other circumstances of extreme urgency and anti-competitive practices' are fulfilled.
- 3rd statement is correct: In its last Special 301 report released by the United States Trade Representative (USTR), the US termed India as "one of the world's most challenging major economies" with respect to protection and enforcement of IP. Thus India is still on the USTR's priority watch list for alleged violations of IPR.

47. **Answer (d)**

**Explanation**

- The Government has been following an active policy on disinvestment in CPSEs through the various modes such as
- Buy-back of shares by large PSUs having huge surplus.
- Merger and acquisitions among PSUs in the same sector.
- Launch of exchange traded funds (ETFs).
- Disinvestment through minority stake sale.
- Strategic Disinvestment

48. **Answer (c)**

**Explanation**

- These funds are like circling vultures patiently waiting to pick over the remains of a rapidly weakening company. Their goal is high returns at bargain prices.
- Investors in the fund profit by buying debt at a discounted price on a secondary market and then using numerous methods to gain a larger amount than the purchasing price. Debtors include companies, countries, and individuals.

49. **Answer (c)**

**Explanation**

- Tax to gross domestic product (GDP) ratio is the ratio of taxes collected by a government and the GDP of the nation. Taxes constitute an important component of revenue and the aforesaid ratio is a key barometer that indicates the ability of the government to invest in various development initiatives. India has had a comparatively low tax-to-GDP ratio. Some of the reasons for this sluggish tax-to-GDP ratio could be attributed to factors such as the so-called parallel economy, lower per capita income, tax litigations, tax exemptions for agricultural income and lower compliances. Hence, statements 1), 2) and 3) are correct. High corporate income tax rates and a narrow base distort the allocation of resources, discourage foreign investment and make tax evasion and avoidance more attractive.
- **Current context :** Recently Government reduced corporate tax rate from 30% to 25% for companies with turnover of up to Rs 250 crore with an aim of broadening the tax base and improving the tax to GDP ratio. Hence, (c) is the correct answer.

50. **Answer (a)**

**Explanation**

- India has a Locust Control and Research scheme that is being implemented through the Locust Warning Organisation (LWO), established in 1939 and amalgamated in 1946 with the Directorate of Plant Protection Quarantine and Storage (PPQS) of the Ministry of Agriculture.
- The LWO's responsibility is monitoring and control of the locust situation in Scheduled Desert Areas mainly in Rajasthan and Gujarat, and partly in Punjab and Haryana.
- Not rising temperatures and more desertification in Arabian peninsula, but increased rainfall in deserts is the direct reason behind the increased frequency of Locust swarms entering Pakistan-India. Change in cyclonic patterns over the Arabian Sea is behind the locust invasions in east Africa, west and south Asia, experts have said. Locusts do breed in dry deserts but the nymph (immature insect) fails to come out of the egg because of the heat. Cyclone caused rainfall moderated the temperature and made favourable breeding grounds for locusts in Arabian deserts and in Thar, Rajasthan.

51. **Answer (a)**

**Explanation**

- India's export penetration in high-income countries is perceptibly low, and has declined disproportionately during the recent decades.
- But high-income countries generally provide a relatively larger market for India's unskilled labour-intensive products.

52. **Answer (d)**

**Explanation**

- Following are the five components of the RBI's capital reserve.
- Contingency Fund (CF)
- Asset Development Fund (ADF)
- Currency and Gold Revaluation Account (CGRA)
- Investment Revaluation Account (IRA) and
- Foreign Exchange Forward Contracts Valuation Account (FCVA).
- Contingency Fund is a fund set apart for meeting the unforeseen contingencies, including depreciation in the value of securities, risks arising out of monetary/exchange rate policy operations.
- Asset Development Fund has been set aside for investment in subsidiaries and associates and internal capital expenditure.
- Currency and Gold Revaluation Account shows funds that is available to compensate RBI's loss in the value of gold and foreign exchange reserve holdings. Gains and losses of the values of Gold and Foreign Currency Assets decrease or increase the CGRA money.
- Investment Revaluation Account shows the buffer amount available with the RBI to compensate losses and to accommodate gains in (i) foreign securities and (ii) domestic securities.
- Foreign Exchange Forward Contracts Valuation Account is marked to market (periodic) gains and losses for the RBI from foreign exchange forward contracts.

53. **Answer (a)**

**Explanation**

Concept of 'Significant Economic Presence' (SEP) refers to taxing the income of the non-residents in India arising from transactions through digital means. Section 9(1)(i) of the Income-tax Act, 1961 ('the Income-tax Act') was amended to bring in the concept of "Significant Economic Presence" for establishing "business connection" in the case of non-resident in India. Accordingly, 'significant economic presence' shall mean–

(i) Any transaction in respect of any goods, services or property carried out by a non-resident in India including provision of download of data or software in India if the aggregate of payments arising from such transaction or transactions during the previous year exceeds the amount as may be prescribed.

(ii) Systematic and continuous soliciting of its business activities or engaging in interaction with such a number of users as may be prescribed, in India through digital means.

54. **Answer (d)**

**Explanation**

- Levels of dissolved oxygen in the tropical oceans are dropping (Hypoxia) at a rate that threatens the survival of fish and other marine organisms and fish are moving away from water off the hypoxic western coast of India. The hypoxic or 'dead zones' off the coast are primarily the result of a boom in phytoplankton growth due to nitrogen-rich fertilizers leaking from agricultural lands. This process is known as eutrophication.
- Eutrophication causes Cyanobacteria, an algae to bloom called 'algal blooms'. Cyanobacteria are not good food for zooplankton and fish and hence over-accumulate in water, die and then decompose.The bacterial degradation of their biomass consumes the oxygen in the water, thereby creating the state of hypoxia or dead zones .
- The outcome of dead zones — caused by eutrophication and algal blooms — is a large-scale migration of fishes and other free-swimming marine organisms, and the death of bottom dwellers like crabs and starfish because they need oxygen to survive.
- Climate change and global warming may be the cause of hypoxia, as warming reduces solubility of oxygen. But a definite link between global warming and oxygen-deficiency could not be established in the absence of long-time oxygen measurements.

55. **Answer (a)**

**Explanation**

- Insolvency and Bankruptcy Code separates commercial aspects of insolvency and bankruptcy proceedings from judicial aspects.
- Insolvency and Bankruptcy Code represents the legal and institutional mechanisms in India for dealing with debt default of companies and limited liability entities, partnership firms and individuals. judicial issues will be handled by proposed Adjudicating Authorities (National Company Law Tribunal / Debt Recovery Tribunal).

56. **Answer (a)**

**Explanation**

- On August 25, 2019 Prime Minister Narendra Modi announced that rice provided to India's poor categorised under five government schemes, including the public distribution system and mid-day meals, will soon be fortified with micronutrients such as vitamin B12, iron and folic acid, to help fight malnutrition. Usually it contains Vitamin A, Vitamin B1, Vitamin B12, Folic Acid, Iron and Zinc.
- Rice can be fortified by adding a micronutrient powder to the rice that adheres to the grains or spraying of the surface of ordinary rice grains in several layers with a vitamin and mineral mix to form a protective coating (Hence statement 2 is wrong).

57. **Answer (a)**

**Explanation**

- The unobservable market force that helps the demand and supply of goods in a free market to reach equilibrium automatically is the invisible hand.
- The phrase Invisible Hand was introduced by Adam Smith in his book 'The Wealth of Nations'. He assumed that an economy can work well in a free market scenario where everyone will work for his/her own interest.
- In a free market scenario where there are no regulations or restrictions imposed by the government, if someone charges less, the customer will buy from him. Therefore, you have to lower your price or offer something better than your competitor. Whenever enough people demand something, it will be supplied by the market and everyone will be happy. The seller ends up getting the suitable price and the buyer will get better goods at the desired price.

58. **Answer (c)**

**Explanation**

- **Groundnut:** About 85 % of the total groundnut in India is sown in the kharif season under rainfed conditions (irrigation is not required).
- **Sesamum :** It is mainly a rainfed crop. It is cultivated in the kharif season in north India and in South India, it is cultivated both in kharif and rabi seasons.

59. **Answer (b)**

**Explanation**

- The total kinetic energy of all the particles in a sample of matter is called thermal energy. The average kinetic energy of the individual particles is the temperature.
- An important requirement for condensation is the drop in the temperature of an air parcel. This requirement is fulfilled by the rising of air resulting into a drop in temperature. This rise of air leads to the temperature drop in the following way,
- As air rises, air pressure decreases and air expands.
- In expanding air, Individual molecules or particles of gases in the air parcel are more widely apart and do not move so fast.
- In slower gas particles, average kinetic energy of the individual particles decreases resulting into drop in temperature

60. **Answer (c)**

**Explanation**

- It has been discovered that duration of light also plays a major role in inducing flowering in plants. This flowering response in plants to the relative length of light and dark periods within a 24 hour cycle is called 'Photoperiodism'.
- Every plant has a specific critical period of light duration needed for flowering. In order to flower they must be exposed to either more or less light hour than that of the critical period.
- Based on flowering response to light duration, plants have been classified into:
  - Long day plants,
  - Short day plants, and
  - Day neutral plants

61. **Answer (a)**

**Explanation**

- Indian Railways has commissioned the country's first government Waste to Energy Plant, called POLYCRACK, having capacity of 500 Kg waste per day, in Mancheswar Carriage Repair Workshop at Bhubaneswar in East Coast Railway.
- It is first-of-its-kind in Indian Railways and fourth in India. It is the world's first patented heterogeneous catalytic process which converts multiple feed stocks into hydrocarbon liquid fuels, gas, carbon and water.
- olycrack Plant can be fed with all types of Plastic, Petroleum sludge, Un-segregated Municipal Solid Waste with moisture up to 50%, E–Waste, Automobile fluff, Organic waste including bamboo, garden waste etc., and Jatropha fruit and palm bunch. Waste generated from Mancheswar Carriage Repair Workshop, Coaching Depot and Bhubaneswar Railway Station will be feeder material for this plant.

62. **Answer (c)**

**Explanation**

- According to the Big Bang Theory, all the matter in the universe was created in one instant at a fixed moment in time, from a point known as singularity 13 billion years ago. About a billion years after the Big Bang, gravity caused these atoms to gather in huge clouds of gas, forming collections of stars known as galaxies.
- The planets are largely formed of the elements having high atomic weight but the constituent elements of the sun are of lighter atomic weight like hydrogen and helium. Over billions of years, stars "cook" hydrogen and helium atoms in their hot cores to make heavier elements like carbon and oxygen. Large stars explode over time, blasting these elements into space. This matter then condenses into the planets and satellites that make up solar systems like our own.

63. **Answer (a)**

**Explanation**

- Ocean trenches are long, narrow depressions on the seafloor. These are the deepest parts of the ocean. Ocean trenches are a feature of convergent plate boundaries, where two or more tectonic plates meet. At convergent plate boundaries, dense lithosphere slides beneath less-dense lithosphere in a process called 'seduction', creating a trench. More oceanic trenches are found along Pacific Ocean than along the Atlantic Ocean. In Pacific Ocean, trenches occur mostly around the eastern continental margins of Asia and on the border of island arcs. This is because Pacific Ocean has long active margins where two plates collide thus forming trenches, whereas the Atlantic Ocean mostly has passive margins.
- Back-arc basins are not found between oceanic trenches and volcanic arcs, but between volcanic arcs and mainland. The basins of back-arcs are spreading just like the mechanism of sea-floor spreading as discussed by Harry Hess. The island arcs of Japan and Philippine were separated from mainland Asia by back-arc spreading.

64. **Answer (d)**

**Explanation**

The slower rise of water surface temperature than land surface can be attributed to the following factors,

1. Solar radiation penetrates water, distributing the absorbed heat throughout a substantial water-layer.
2. The specific heat of water is more than that of soil particles.
3. Water is mixed through eddy motions that carry the heat to lower layers.
4. Water surface is cooled by evaporation.

65. **Answer (b)**

**Explanation**

- LIDAR (Light Detection and Ranging) technique is a remote sensing technique in which light is used as a pulse laser. Lidar technology allows an area to be surveyed through laser equipment equipped with aircraft. In this, G.P.S. and the scanners are also used. A GPS instrument is mounted on the aircraft and at or around a survey site. In this technique, laser light is thrown on the surface of the Earth and the distance of the object is determined by calculating the time when the light is returned.
- Uses of LIDAR
- Analysis of topography and land characteristics in agricultural landscapes. It can also be used in the selection of land for various crops.
- LIDAR is used by archaeologists to understand the surface of the land. With the help of this technique, the topography covered with vegetation can also be inspected.
- Ground-based LIDAR technology is used to know the structure of the building. With the help of the information obtained from this, 3-D Mapping can be done on the ground.

- This technique plays an important role in the operation of automated vehicles. LIDAR provides the automatic car with a technology that can see all the time with the help of LIDAR sensors.
- With the help of LIDAR technology, loss of farmers' money, labor and time can be reduced by identifying the areas requiring more water or fertilizer.
- In the river survey, LIDAR's water penetrating green light is used to see the objects under water. With the help of this technique, a three-dimensional map of the river can be obtained for its depth, width and its flow, which can be used to assess the flood situation in rivers.
- LIDAR technology can test pollution levels and air quality. This technique accurately estimates the presence of contaminants dissolved in the air through laser rays from the sky.
- LIDAR technology cannot create artificial rain.

66. **Answer (c)**

**Explanation**

- Neglected tropical diseases (NTDs) are a diverse group of tropical infections which are commonly seen in low-income populations in developing regions of Asia, Africa and the Americas. They are caused by a variety of pathogens such as viruses, bacteria, protozoa and helminths. NTD co-infection can also make HIV AIDS and tuberculosis more deadly.
- Why in News?
- The World Health Organization, on the occasion of World Water Day (22nd March), said access to clean and safe water for all is fundamental to control and eliminate ‘Neglected Tropical Diseases’ (NTDs) in southeast Asia.

67. **Answer (d)**

**Explanation**

- Gene Therapy refers to the process of introduction, removal or change in content of an individual’s genetic material with the goal of treating the disease and a possibility of achieving long term cure.
- Germ-line gene therapy: The concept of germ-line gene therapy is to introduce gene modified cells into the germ-line that can be transmitted vertically across generations. Germ-line gene therapy is prohibited in India, due to ethical and social considerations.
- Somatic cell gene therapy: It affects the targeted cells/tissue/organs in the patient, and is not passed on to subsequent generations. It is legal in India. This also includes genome modification as done in CRISPR-related and other technologies.

68. **Answer (c)**

**Explanation**

**Microbial Fuel Cells**

- A microbial fuel cell (MFC) is a device that converts chemical energy to electrical energy by the action of microorganisms, in this case found in the soil.
- It is a bio-electrochemical system that uses bacteria as the catalyst to oxidize organic and inorganic matter, and consequently, generate electric current out of it. Plants naturally deposit biomatter as they grow which in turn feeds the natural bacteria present in the soil. This creates energy that can be harnessed by fuel cells and used to power a wide range of vital conservation tools remotely including sensors, monitoring platforms, and camera traps.
- It has applications in various fields such as power generation systems, bio-recovery, waste-water treatment, etc.

69. **Answer (d)**

**Explanation**

- Carbon quantum dots (CQDs or C-dots) are small carbon nanoparticles (less than 10 nm in size) with some form of 'surface passivation'.
- Surface passivation refers to a common semiconductor device fabrication process critical to modern electronics. It is the process by which a semiconductor surface is rendered inert.
- Possessing such superior properties as low toxicity and good biocompatibility renders CQDs favorable materials for applications in bioimaging, biosensor and drug delivery.
- Based upon excellent optical and electronic properties, CQDs can also find applications in catalysis, sensors, and optronics.

70. **Answer (c)**

**Explanation**

- According to a NASA Study, higher concentrations of atmospheric carbon dioxide affect crops in two important ways: First, they boost crop yields by increasing the rate of photosynthesis, which spurs growth, and secondly, they reduce the amount of water crops lose through transpiration.
- Genetic Use Restriction Technology (GURT), also known as terminator technology in seeds creates sterile plants, depriving insects, birds and bees of the pollen, nectar and fruit they need to survive. This is done by activating some genes only in response to certain stimuli, especially to cause second generation seeds to be infertile. Farmers purchasing the seeds would be greatly impacted, given they would have to buy new seeds every year. It has been argued that this would result in higher prices in food.

71. **Answer (d)**

**Explanation**

- Warm Temperate Eastern Margin climate is also known as China-type, Gulf-type or Natal-type. This climate is found on the eastern sides of continents between latitude 30° and 40° north and south hamisphere. Following are the features associated with this climatic type:
- Fairly uniform distribution of rainfall throughout the year: There is abundant rainfall in the summer, much of which is convective. Occasional tropical cyclones add to this summer precipitation. There is also plenty of winter precipitation, produced in mid-latitude cyclones.
- Devastated by tropical cyclones like Typhoons.
- Lowlands carry evergreen broad-leaved trees and deciduous trees both, while highlands, conifers like Pines and Cypresses.
- This climate is suitable for maize, cotton and tobacco cultivation.

72. **Answer (c)**

**Explanation**

Humboldt, Benguela and California, all the three are cold currents as they are accompanied by upwelling of cold waters. In this process, colder water from greater depths rises to the surface.

73. **Answer (a)**

**Explanation**

- The 10 °C or 50 °F isotherm of the warmest month is the boundary between Boreal forests and Tundra.
- In the Arctic Tundra Ecosystem, the food chain is simple and direct. Mosses, lichens, sedges etc. are producers, while small mouse-like lemmings, caribou or reindeers, snowshoe rabbits are herbivores. Wolverines, Arctic foxes and Polar bears are predators or carnivores.

74. **Answer (d)**

**Explanation**

- Laterite soils are rich in iron and aluminium and are of rusty-red coloration, because of high iron oxide content. Laterites are formed from the leaching of both parent sedimentary (sandstone, limestone) and crystalline rocks like metamorphic (schist, gneiss) and igneous rocks (granite, basalt, gabbro). An essential feature for the formation of laterite is the repetition of wet and dry seasons. Rocks are leached by percolating rainwater during the wet season.
- Red soils are generally derived from granite and gneiss like crystalline rocks. Their colour is red mainly due to ferric oxides. The majority of red soils are loamy.

75. **Answer (a)**

**Explanation**

- The Andaman Islands are home to 4 negrito tribes– the Great Andamanese, Onge, Jarawa and Sentinelese, while The Nicobar Islands are home to 2 mongoloid tribes– the Shompen and Nicobarese.
- It believes that 'Negrito' tribes were arrived on these islands from Africa around 60000 years ago. All are nomadic hunter-gatherers, hunting wild pigs and monitor lizards, and catching fish with bows and arrows. They also collect honey, roots and berries from the forests.
- The 'Mongoloid' tribes probably came to the islands from the Malay-Burma coast several thousand years ago.

76. **Answer (a)**

**Explanation**

- A primary mineral is any mineral formed during the original crystallization of the host igneous primary rock and it has not been altered chemically since its crystallization. On the other hand, secondary minerals are formed during weathering of primary minerals.
- Silver is a mineral of primary origin occurring in igneous rocks. But silver is rarely found as a native element mineral. When found, it is often associated with quartz, gold, copper or sulfides of other metals. Silver is usually extracted by melting silver-bearing lead ore, argentiferous galena which is a primary mineral mainly found in crystalline igneous and metamorphic rocks.
- Bauxite is a secondary mineral with high aluminium content. Bauxite is formed by lateritic weathering of either carbonate rocks (limestone and dolomite) or silicate rocks such as granite, gneiss, basalt. So Bauxite is a secondary mineral associated with both sedimentary and crystalline rocks.
- In India and other tropical countries, Bauxite is mainly associated with crystalline silicate rocks, whereas in Europe, Guyana, and Jamaica, It is mainly associated with sedimentary carbonate rocks. India bauxite resources are extracted from the mines of Panchpatmali (Koraput, Orissa), Bagru (Lohardaga, Jharkhand) and Sarguja, Chhattisgarh.

77. **Answer (b)**

**Explanation**

- The snowline in the Western Himalaya is lower than in the Eastern (4250 m and 4570 m respectively) because Western Himalayas are at higher latitude and hence have low temperatures compared to Eastern Himalayas.
- The Eastern Himalayas rise abruptly from the planes without the intervention of High ranges. So in the absence of mid-altitude ranges in the eastern Himalayas, snowfall occurs here at higher altitude.
- Though the total precipitation is much less in the western Himalayas, it all takes place in the form of snow so the snowline in the Western Himalaya is at a lower altitude.

78. **Answer (b)**

**Explanation**

- Tropical cyclogenesis requires following main factors: sufficiently warm sea surface temperatures (at least 26.5 °C (79.7 °F)), atmospheric instability, high humidity in the lower to middle levels of the troposphere, enough Coriolis force to develop a low-pressure center, a pre-existing low-level focus or disturbance, and low vertical wind shear. Hence Statement 1 is correct.
- Statement 2 is also correct, as Bay of Bengal's sea surface temperature is more than the Arabian sea thus it witnesses more cyclones than the Arabian sea.
- Statement 3 is not correct since cyclones are not named by WMO. Cyclones that form in every ocean basin across the world are named by the Regional Specialised Meteorological Centres (RSMCs) and Tropical Cyclone Warning Centres (TCWCs). There are six RSMCs in the world, including the India Meteorological Department (IMD), and five TCWCs. As an RSMCs, IMD names the cyclone new developing over the north indian ocean including the bay of bengal and arabian sea, after following a standard procedure.

79. **Answer (b)**

**Explanation**

- Volcanic aerosols have both a warming and, at other times, a cooling effect, but a net cooling effect on the atmosphere. Volcanic activity propels particles and gases, especially sulfur dioxide ($SO_2$). into the stratosphere, forming stratospheric aerosols. Strong winds spread the aerosols quickly throughout the entire layer, where they reflect incoming solar radiation, having a cooling effect.
- Chlorofluorocarbons (CFCs) have both a warming and cooling effect. The compounds are very good absorbers of longwave energy, providing a warming effect. But CFCs also destroy ozone in the stratosphere, and since ozone contributes to warming, the CFCs also have a cooling effect.

80. **Answer (b)**

**Explanation**

- Volatile organic compounds (VOCs) are organic chemicals that have a high vapor pressure at ordinary room temperature. Their high vapor pressure results from a low boiling point, which causes large numbers of molecules to evaporate or sublimate from the liquid or solid form of the compound and enter the surrounding air. That is why they are the main contributors of indoor air pollution.
- VOCs have biological and anthropogenic sources. Majority of biological VOCs are produced by plants, the main compounds being isoprene and terpene. They play an important role in communication between plants, and messages from plants to animals.
- Anthropogenic sources are such as paints which emit VOCs like acetone and formaldehyde, building materials emitting formaldehyde, smoking emitting benzene.
- They are used as a biomarker to test for diseases such as lung cancer.
- Air (Prevention and Control of Pollution) Act in 1981, amended in 1987, to address concerns about air pollution in India. While the document does not differentiate between VOCs and other air pollutants, the CPCB monitors "oxides of nitrogen (NOx), sulphur dioxide (SO2), fine particulate matter (PM10) and suspended particulate matter (SPM)."

81. **Answer (c)**

**Explanation**

Taken separately or together, moisture, temperature, light, and wind can limit the distribution of plant and animal species. Biogeographers recognize that there is a critical level of climatic stress beyond which a species cannot survive. This means that we can mark out a 'Bioclimatic frontier'. So, 'Bioclimatic frontier' is a geographic boundary which shows the limits of the potential distribution of species.

82. **Answer (b)**

**Explanation**

- There are following international networks and conventions to monitor wildlife trade.
- TRAFFIC is an NGO working globally on trade in wild animals and plants. TRAFFIC is a joint programme of the World Wide Fund for Nature (WWF) and IUCN.
- CITES is a multilateral treaty which aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival.
- Appendix II of CITES includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival.

83. **Answer (c)**

**Explanation**

Humification occurs during decomposition in the soil. Humification leads to accumulation of a dark-colored amorphous substance called humus that is highly resistant to microbial action and undergoes decomposition at an extremely slow rate. Being colloidal in nature it attracts nutrients. Stable humus consisting of humic acids are so highly insoluble or tightly bound to clay particles that they cannot be penetrated by microbes. Thus, they are greatly resistant to decomposition.

84. **Answer (a)**

**Explanation**

- Soils in humid climates typically have high acidity, while in arid climates, soils are typically alkaline.
- Acidity can be corrected by applying lime or CaCO3, which removes acid ions and replaces them with the base calcium.

85. **Answer (d)**

**Explanation**

**Causes of desertification:**

- Canal Irrigation practices in arid and semi-arid regions which result in a build-up of salts.
- Climate change.
- Excessive tillage of average land.
- The movement and migration of large herds of livestock and wildlife has an integral role in the preservation of vegetation and soil fertilization. Keeping animals fenced at one place causes overgrazing which leads to desertification.

86. **Answer (b)**

**Explanation**

- Decomposers (fungi, bacteria, invertebrates such as worms and insects) have the ability to break down dead organisms into smaller particles and create new compounds. We use decomposers to restore the natural nutrient cycle through controlled composting.
- Viruses invade other organisms, but they are not decomposers.

87. **Answer (d)**

**Explanation**

- 'Protection of Plant Varieties and Farmers' Rights Act, 2001' talks about the following rights:
- Researchers' Rights - Researchers can use any of the registered varieties under the Act for conducting experiments or research.
- Farmers' Rights - A farmer can save, use, sow, re-sow, exchange, share or sell his farm produce including seed of a variety protected under the PPV&FR Act, 2001 in the same manner as he was entitled before the coming into force of this Act provided farmer shall not be entitled to sell branded seed of a variety protected under the PPV&FR Act, 2001.
- Breeders' Rights - Breeders will have exclusive rights to produce, sell, market, distribute, import or export the protected variety.

88. **Answer (c)**

**Explanation**

- It is a Wildlife Sanctuary and estuary situated in Andhra Pradesh.
- The sanctuary is a part of the Godavari estuary.
- It has extensive mangroves and dry deciduous tropical forests.
- It is the second largest stretch of mangrove forests in India after Sundarbans.
- Some critically endangered species like the white-backed vulture and the long-billed vulture are present in the sanctuary.
- Hope Island is a small tadpole shaped Island situated off the coast of Kakinada, India, in Bay of Bengal. It is a part of the Coringa Wildlife Sanctuary.

89. **Answer (b)**

**Explanation**

- Fires are a major cause of forest degradation and have wide ranging ecological, economic and social impacts, such as
- Loss of valuable forest resources.
- Degradation of catchment areas.
- Loss of biodiversity and extinction of plants and animals
- Global warming.
- Loss of carbon sink resource and increase in percentage of $CO_2$ in atmosphere
- Change in the microclimate of the area with unhealthy living conditions.
- Byproduct of forest fires increases the nutrients in the soil.
- Ozone layer depletion
- Forest fires may help regrow native plants by eliminating invasive weeds.

90. **Answer (b)**

**Explanation**

- For the first time since it became law in 2005, the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) will have non-human beneficiaries — the rare Golden Langur in a reserve forest in western Assam's Bongaigaon district.
- On June 5 2019, the district authorities launched a Rs 27.24 lakh project under the MGNREGA to plant guava, mango, blackberry and other fruit trees to ensure the resident Golden Langurs of the 17 sq.km. Kakoijana Reserve Forests do not have to risk their lives to find food. Several Golden Langurs have died due to electrocution and in road accidents while looking for food beyond the reserve forest.

91. **Answer (b)**

**Explanation**

More than1400 governmental and non-governmental organizations are the members of IUCN. It's headquarter is in Gland, Switzerland.

- The IUCN Council is the principal governing body of IUCN.
- It releases the IUCN Red List of Threatened Species and the IUCN Red List of Ecosystems which in a similar way measures risks to ecosystems. It divides species into 9 categories; these are– Not Evaluated, Data Deficient, Least Concern, Near Threatened, Vulnerable, Endangered, Critically Endangered, Extinct in the Wild and Extinct.
- IUCN aims to have a solid factual base for its work and takes into account the knowledge held by indigenous groups and other traditional users of natural resources. IUCN runs field projects for conservation of habitats and species all around the world.

92. **Answer (d)**

**Explanation**

- Recently, N.T.P.C. (NTPC) Ltd. has successfully developed the geo-polymer aggregate from fly ash.
- Uses and importance of geo-polymer aggregate:
- The total demand of these aggregates in India is around 2000 million metric tons per year. NTPC Aggregate developed by fly ash will help in meeting this demand.
- Geo-polymer aggregates can be used as a replacement for natural aggregates. This will help reduce the impact on the environment.
- It does not require cement at any stage for mixing in concrete, as fly ash based geo-polymer mortar acts as a binding agent.
- Geo-polymer aggregates will help reduce carbon emissions. Also, its use will also reduce water consumption.
- It is well known that stone excavation is required to obtain natural aggregates, which also causes damage to the environment.

93. **Answer (c)**

**Explanation**

'Bioprospecting' means exploring genetic and species-level diversity for products of economic importance. Under this, bioresources including plants, micro-organisms, animals, etc. are developed further for commercialization and overall benefits of the society. But when a region's bioresources or indigenous knowledge are unethically appropriated or commercially exploited without providing fair compensation, this is known as biopiracy.

94. **Answer (d)**

**Explanation**

Hydrogen is considered as a clean energy source. Its combustion releases mainly water as a byproduct. It has the advantage of having the highest energy density when compared to any other fuel. Moreover, hydrogen may be produced biologically by dark fermentation from renewable sources, such as agro-industrial wastes.

95. **Answer (b)**

**Explanation**

- In the year 2019, the Nobel Prize for Physiology or Medicine was awarded to three scientists, William G. Kaelin Jr., Sir Peter J. Ratcliffe and Gregg L. Semenza for their discovery of how cells sense and adapt to oxygen availability. The three scientists have uncovered the genetic mechanisms that allow cells to respond to varying levels of oxygen.
- Oxygen is used by all cells to convert food to useful energy. While oxygen is essential for the survival of cells, excess or too little oxygen can lead to adverse health consequences.
- Oxygen supply temporarily reduces in muscles during intense exercise and under such conditions the cells adapt their metabolism to low oxygen levels. Proper growth of the foetus and placenta depends on the ability of the cells to sense oxygen.s

96. Answer (b)

**Explanation**

- Statement 1 is wrong: The National Aeronautics and Space Administration (NASA) launched a satellite ICON to detect dynamic zones of Earth's Ionosphere as neutral gas and ionized plasma collide in this area. At the same time, it has to find the link between space and earth's weather.
- About ICON Mission:
- The ICON satellite will study the Earth's Ionosphere. It includes various layers of the uppermost atmosphere where free electrons flow freely. It affects Earth's magnetic field and radio communications.
- ICON has been designed as a two year's mission but if all goes well according to the plan, it will last for more than a decade.
- Four instruments have been sent along with ICON. One of these instruments will measure wind speed and temperature, one will measure the speed of ions and two others will observe light emitted from the ion by ultraviolet cameras.

97. **Answer (a)**

**Explanation**

When rubber bands are twisted and untwisted, it produces a cooling effect. This is called the "elastocaloric" effect, and researchers have suggested that it can be used in a very relevant context today. Researchers from multiple universities, including Nankai University in China, have found that the elastocaloric effect, if harnessed, may be able to do away with the need of fluid refrigerants used in fridges and air-conditioners. These fluids are susceptible to leakages, and can contribute to global warming.

98. **Answer (b)**

**Explanation**

- The programme aims to investigate the role of the Weddell Gyre in the meridional overturning circulation (MOC) and its influence on deep ocean properties and in sequestering carbon and nutrients in the global ocean abyss.
- Scientists have discovered that, contrary to existing assumptions, biological processes far out at sea are the most important factors determining how the ocean absorbs carbon dioxide.
- This enhances the understanding of the link between the Southern Ocean — next to Antarctica — and the atmospheric carbon dioxide levels. Scientists studied data collected as part of the ANDREX project (Antarctic Deep-water Rates of Export) which measured the physical, biological, and chemical properties of the waters in the gyre between 2008 and 2010.

99. **Answer (d)**

**Explanation**

- Statement 1 is correct: The National Legal Services Authority (NALSA) has been constituted under the Legal Services Authorities Act, 1987.
- Statement 2 and 3 are correct: The principal objective of NALSA is to provide free and competent legal services to the weaker sections of the society and to ensure that opportunities for securing justice are not denied to any citizen by reason of economic or other disabilities, and to organize Lok Adalats for amicable settlement of disputes. Apart from the above mentioned, functions of NALSA include spreading legal literacy and awareness, undertaking social justice litigations etc.

100. **Answer (d)**

**Explanation**

- Scientists at CSIR- North East Institute of Science and Technology, Jorhat, have developed a ceramic membrane with the help of a mixture of potter's clay, stone dust and tea waste. They have tested the membrane on effluents from a textile unit and it could remove adsorptive dyes from wastewater. It is capable of removing two commonly used toxic dyes - methylene blue and Congo red -from water.
- Ceramic filters and membranes are commonly used in several sectors like food and beverage, drug and chemicals, waste recovery and recycling industries. Ceramic membranes can withstand frequent cleaning, harsh operating environments and situations that require continuous flows of material.
- They can also be regenerated over many cycles and used for separation of both aqueous and non-aqueous solutions. These filters are especially useful in petrochemical processing, where it is not possible to use organic membranes.

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