

EXAM CODE: 01030812

NEXT IAS



AANKALAN-III
UPPSC Prelims 2024
GENERAL STUDIES-I
SUB. CODE 01

Answer Key

- | | | | | | |
|---------|---------|---------|----------|----------|----------|
| 1. (c) | 26. (a) | 51. (c) | 76. (c) | 101. (b) | 126. (a) |
| 2. (b) | 27. (a) | 52. (b) | 77. (b) | 102. (c) | 127. (a) |
| 3. (d) | 28. (c) | 53. (d) | 78. (d) | 103. (a) | 128. (b) |
| 4. (b) | 29. (b) | 54. (a) | 79. (a) | 104. (d) | 129. (a) |
| 5. (c) | 30. (a) | 55. (b) | 80. (a) | 105. (d) | 130. (b) |
| 6. (a) | 31. (c) | 56. (d) | 81. (b) | 106. (d) | 131. (c) |
| 7. (d) | 32. (d) | 57. (a) | 82. (d) | 107. (a) | 132. (c) |
| 8. (c) | 33. (b) | 58. (b) | 83. (c) | 108. (a) | 133. (a) |
| 9. (d) | 34. (a) | 59. (c) | 84. (b) | 109. (b) | 134. (b) |
| 10. (c) | 35. (d) | 60. (b) | 85. (a) | 110. (d) | 135. (c) |
| 11. (b) | 36. (a) | 61. (c) | 86. (a) | 111. (b) | 136. (b) |
| 12. (c) | 37. (b) | 62. (a) | 87. (b) | 112. (c) | 137. (c) |
| 13. (c) | 38. (c) | 63. (c) | 88. (b) | 113. (d) | 138. (d) |
| 14. (d) | 39. (c) | 64. (b) | 89. (d) | 114. (b) | 139. (a) |
| 15. (b) | 40. (c) | 65. (b) | 90. (b) | 115. (c) | 140. (b) |
| 16. (b) | 41. (d) | 66. (a) | 91. (b) | 116. (b) | 141. (d) |
| 17. (d) | 42. (a) | 67. (d) | 92. (a) | 117. (d) | 142. (b) |
| 18. (c) | 43. (a) | 68. (b) | 93. (b) | 118. (a) | 143. (c) |
| 19. (a) | 44. (c) | 69. (a) | 94. (c) | 119. (c) | 144. (b) |
| 20. (a) | 45. (c) | 70. (b) | 95. (a) | 120. (a) | 145. (a) |
| 21. (c) | 46. (a) | 71. (d) | 96. (c) | 121. (c) | 146. (a) |
| 22. (a) | 47. (c) | 72. (b) | 97. (b) | 122. (b) | 147. (a) |
| 23. (b) | 48. (d) | 73. (c) | 98. (c) | 123. (c) | 148. (d) |
| 24. (a) | 49. (b) | 74. (a) | 99. (a) | 124. (d) | 149. (a) |
| 25. (d) | 50. (a) | 75. (c) | 100. (b) | 125. (a) | 150. (d) |

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General Studies-I

UPPSC 2024 | Aanklan-III

1. (c)

1. **Agrahara** refers to tax-free land grants given to Brahmins by rulers or nobles. These grants were provided for religious and educational purposes and played a crucial role in strengthening the Brahmanical order during the Gupta period. The land given under Agrahara was exempt from taxes and often came with the right to collect revenue from the people living on the land.
2. **Vishaya** was an important administrative division during the Gupta era, comparable to a district. The administrative head of the Vishaya was the Vishayapati, who was responsible for local governance, law and order, and revenue collection. Vishayas were further divided into smaller units such as villages.
3. **Bhukti** referred to a province or a larger administrative division in the Gupta empire. It was not the title for a governor but denoted the province itself. The Bhukti was headed by an official called Uparika, who was appointed by the king and managed provincial administration, including tax collection and law enforcement.
4. **Uparika** was the title of the governor of a Bhukti (province) and not associated with temple donations. This official was appointed by the central authority to oversee the administration of the province and maintain the connection between the local and imperial administration.

2. (b)

The Satavahanas, one of the prominent dynasties in ancient Indian history, are referred to as the “Andhras” in the **Puranas**. These texts, composed over several centuries, serve as a significant source of historical and genealogical information about Indian dynasties.

- **Mahabharata**: While the Mahabharata is an epic that contains references to various tribes and kingdoms, it does not

explicitly mention the Satavahanas as the Andhras. The focus of the text is more on mythological and heroic narratives rather than historical accounts of specific dynasties like the Satavahanas.

- **Puranas**: The Puranas provide extensive genealogies of dynasties, including the Satavahanas. They describe the Satavahanas as the Andhras, highlighting their origin, rule, and influence. This makes the Puranas the primary source for associating the Satavahanas with the Andhras.
- **Kalpasutra**: The Kalpasutra is a Jain text attributed to Bhadrabahu. It primarily deals with the lives of Jain Tirthankaras and does not mention the Satavahanas or refer to them as the Andhras.
- **Arthashastra**: The Arthashastra by Kautilya is a treatise on statecraft, economics, and military strategy. While it mentions various administrative and political entities, it does not directly refer to the Satavahanas as the Andhras.

3. (d)

1. **Black and Red Ware (A)**: Black and Red Ware (BRW) is primarily associated with the **Harappan Civilization** and its later cultural extensions. This pottery type is known for its dual coloring, where the interiors are black and the exteriors are red. It was commonly found in the post-urban Harappan phases and some chalcolithic sites.
2. **Painted Grey Ware (B)**: Painted Grey Ware (PGW) is linked to the **Vedic Period**, specifically the later Vedic era. It is associated with early settlements of the Indo-Aryans in the Gangetic plains and northern India. PGW is often found in sites related to the Mahabharata tradition, such as Hastinapur and Kurukshetra.
3. **Northern Black Polished Ware (C)**: Northern Black Polished Ware (NBPW) is

associated with the **Mauryan Period**. This highly polished pottery, often considered luxurious, reflects advancements in craftsmanship during the Mauryan Empire. It is found extensively in urban centers of the Mauryan period.

4. (b)

- **James Prinsep:** James Prinsep, a British antiquary and philologist, is credited with the successful identification and decipherment of the **Brahmi script** used in Ashokan inscriptions in 1837. His work on the inscriptions found in Girnar, Delhi, and Allahabad was pivotal in understanding the edicts of Emperor Ashoka. By analyzing these inscriptions, Prinsep decoded the language and content, revealing significant historical and administrative details of the Mauryan Empire.
- **Max Müller:** Max Müller was a German philologist and Orientalist who focused primarily on the translation and study of Vedic texts..
- **John Marshall:** John Marshall was an archaeologist known for his work in the **Indus Valley Civilization**, particularly the excavations at Mohenjo-Daro and Harappa.
- **Mortimer Wheeler:** Mortimer Wheeler was a British archaeologist who worked extensively in South Asia, especially on the Indus Valley Civilization. His focus was on excavation and stratigraphy.

5. (c)

Indian philosophical systems are divided into **Astika (orthodox)** and **Nastika (heterodox)** schools based on their acceptance or rejection of the authority of the Vedas. Here is a detailed analysis of the major schools, including their founders or key proponents:

Nastika Schools

1. **Charvaka:**

- ♦ **Proponent:** Brihaspati (traditionally credited).
- ♦ **Philosophy:** A materialistic and atheistic system that denies metaphysical concepts like the soul, karma, and moksha. It focuses on sensory perception and hedonism as the foundation of life.

2. **Ajivika:**

- ♦ **Proponent:** Makkhali Gosala.
- ♦ **Philosophy:** A deterministic school that emphasizes **Niyati (fate)**, arguing that everything is preordained and beyond human control. It rejects free will and promotes ascetic practices.

3. **Buddhism:**

- ♦ **Proponent:** Gautama Buddha.
- ♦ **Philosophy:** Centers on the Four Noble Truths and the Eightfold Path, aiming to overcome suffering (dukkha) and achieve Nirvana. It denies the concept of a permanent soul (anatman).

4. **Jainism:**

- ♦ **Proponent:** Vardhamana Mahavira (24th Tirthankara).
- ♦ **Philosophy:** Emphasizes non-violence (ahimsa), strict ethical conduct, and asceticism. Liberation (moksha) is achieved through self-discipline, knowledge, and meditation.

Astika Schools

1. **Nyaya:**

- ♦ **Proponent:** Gautama (also called Akshapada).
- ♦ **Philosophy:** Focuses on logic, epistemology, and systematic reasoning. It recognizes perception, inference, comparison, and testimony as valid sources of knowledge (pramana).

2. **Vaisheshika:**

- ♦ **Proponent:** Kanada (also called Uluka).
- ♦ **Philosophy:** Concerned with metaphysics and atomism, it classifies reality into categories like substance, quality, action, and relation.

3. **Samkhya:**

- ♦ **Proponent:** Kapila.
- ♦ **Philosophy:** A dualistic school distinguishing between **Purusha (consciousness)** and **Prakriti (matter)**. Liberation is achieved by understanding the distinction between the two.

4. **Yoga:**

- ♦ **Proponent:** Patanjali.
- ♦ **Philosophy:** Builds on Samkhya metaphysics, emphasizing practical techniques like meditation, self-discipline, and ethical living to achieve self-realization and liberation.

5. **Purva Mimamsa:**

- ♦ **Proponent:** Jaimini.
- ♦ **Philosophy:** Focuses on the ritualistic and dharmic aspects of the Vedas, emphasizing the performance of yajnas (sacrifices) and adherence to dharma for worldly and spiritual benefits.

6. **Vedanta (Uttara Mimamsa):**

- ♦ **Proponent:** Badarayana (also called Vyasa).
- ♦ **Philosophy:** Centers on understanding **Brahman (ultimate reality)** and **Atman (self)**, drawing primarily from the Upanishads. Different schools like Advaita (Shankaracharya) and Vishishtadvaita (Ramanuja) later emerged.

6. (a)

Chalukya, defeated by Narasimhavarman I

Pulakeshin II (610–642 CE) was one of the most prominent rulers of the **Chalukya dynasty**. He is known for his military conquests, efficient administration, and patronage of art and culture. Let us delve into the specifics of the dynasty and his defeat:

Pulakeshin II and the Chalukya Dynasty:

- **Capital:** Vatapi (modern-day Badami, Karnataka).
- **Achievements:**
 - ♦ Extended his empire across the Deccan Plateau.
 - ♦ Defeated Harsha in the northern Deccan, preventing his southern expansion.
 - ♦ Maintained diplomatic relations with the Persian king Khosrow II.
 - ♦ Patronized art and architecture, including the famous rock-cut temples at Badami and Aihole.

Defeat by Narasimhavarman I:

- Pulakeshin II faced a significant challenge from the **Pallava dynasty**, led by **Narasimhavarman I** (also known as Mamalla).
- In **642 CE**, Narasimhavarman I decisively defeated Pulakeshin II in the Battle of Vatapi, capturing and destroying the Chalukya capital, Vatapi.
- This defeat marked a significant setback for the Chalukya dynasty, though they eventually regained power under later rulers like Vikramaditya I.

7. (d)

Satavahanas

Ikshvakus, also known as the **Shriparvatiyas**, were an important dynasty that ruled parts of the Deccan region in the 3rd and 4th centuries CE. They emerged as successors to the **Satavahanas** in the Krishna-Guntur region of present-day Andhra Pradesh. Here is a detailed account of the context:

Satavahanas:

- Satavahanas were a prominent dynasty in the Deccan, ruling from around 2nd century BCE to 3rd century CE. They were known for their contributions to trade, administration, and architecture (e.g., Amaravati Stupa).
- By the 3rd century CE, the Satavahanas weakened due to internal strife and external invasions, creating a power vacuum in the region.

Rise of the Ikshvakus:

- Ikshvakus arose as local rulers in the Krishna-Guntur region after the decline of the Satavahanas.
- They were significant patrons of Buddhism, supporting the construction and expansion of Buddhist sites such as the Amaravati Stupa and Nagarjunakonda.
- **Capital:** Vijayapuri (near Nagarjunakonda in modern Andhra Pradesh).
- **Religion:** The Ikshvakus supported both Hinduism and Buddhism, but their most notable contributions were towards Buddhist monuments.

Other Options:

1. **Rashtrakutas:**

- ♦ They were a later dynasty (8th to 10th centuries CE) that ruled much of the Deccan and were not contemporaries of the Ikshvakus.

2. **Chalukyas:**

- ♦ Chalukyas of Badami emerged in the 6th century CE, much after the Ikshvakus.

3. **Pallavas:**

- ♦ Pallavas were primarily based in the Tamil region and rose to prominence after the 4th century CE. They were not predecessors to the Ikshvakus.

8. (c)

The three crowned kings of Tamilakam: Cheras, Cholas, and Pandyas

The term “**Muvendar**” in Sangam literature refers to the **three crowned kings** of ancient Tamilakam: the **Chera, Chola, and Pandya** dynasties. These kings were central figures in the political and cultural landscape of South India during the Sangam age (circa 300 BCE to 300 CE).

The Three Crowned Kings (Muvendar):

1. **Cheras:**

- ♦ Ruled the western part of Tamilakam, corresponding to modern Kerala.
- ♦ Noted for their role in maritime trade with the Romans and Arabs.
- ♦ Famous port: **Muziris (modern-day Kodungallur)**.

2. **Cholas:**

- ♦ Ruled the central and northern parts of Tamilakam, around the fertile Kaveri River delta.
- ♦ Known for their administrative skills and early naval power.
- ♦ Famous cities: **Kaveripattinam** and **Uraiyur**.

3. **Pandyas:**

- ♦ Ruled the southern region of Tamilakam, with their capital at **Madurai**.
- ♦ Significant patrons of Tamil literature, art, and culture.

- ♦ Known for sponsoring the Sangam assemblies.

9. (d)

All of the above

Arthashastra by Kautilya outlines a sophisticated administrative system, including officials responsible for various aspects of economic regulation. The roles of the mentioned officials are as follows:

1. **Samaharta:**

- ♦ **Samaharta** was responsible for the collection and consolidation of revenue from different provinces of the empire. This included taxes, tributes, and other sources of income for the state.

2. **Sannidhata:**

- ♦ **Sannidhata** functioned as the treasurer of the empire, managing the state treasury, including cash reserves, grains, and other valuable assets. This official ensured proper accounting and safekeeping of state wealth.

3. **Panyadhyaksha:**

- ♦ **Panyadhyaksha** was the superintendent of trade. This official supervised market operations, controlled prices, ensured the quality of goods, and prevented malpractices in trade.

4. **Sulkaadhyaksha:**

- ♦ **Sulkaadhyaksha** was responsible for overseeing the collection of customs duties and tolls on goods traded across borders or transported within the empire. This official ensured the proper taxation of goods in transit.

10. (c)

Rock Edict I:

Ashoka, the Mauryan emperor, is known for his inscriptions, which highlight his policies of Dhamma (righteous conduct) and his concern for the welfare of animals and humans. Among these inscriptions, **Rock Edict I** contains the earliest evidence of prohibition against animal sacrifices. Here is a detailed analysis:

Rock Edict I:

- This edict explicitly mentions Ashoka’s directive to prohibit animal sacrifices and

festive gatherings involving the killing of animals.

- It states that Ashoka stopped the killing of animals in royal kitchens and limited the number of animals slaughtered for food.
- This is considered the earliest historical evidence of a ruler taking active measures against animal sacrifices in India.

Other Options:

1. **Rummindei Inscription:**

- ♦ Found at Lumbini, this inscription commemorates Ashoka's visit to the birthplace of the Buddha. It records the exemption of Lumbini from taxes and does not mention animal sacrifices.

2. **Minor Rock Edict at Bairat:**

- ♦ This edict focuses on Ashoka's promotion of Dhamma and the propagation of Buddhist principles but does not specifically address animal sacrifices.

3. **Kalinga Edicts:**

- These inscriptions, found in Dhauli and Jaugada, deal primarily with Ashoka's administrative policies and efforts to spread Dhamma after the Kalinga war. They do not mention animal sacrifices.

11. (b)

1. **Battle of Tarain (First) - 1191**

- ♦ **First Battle of Tarain** was fought in 1191 CE between **Prithviraj Chauhan**, the Rajput ruler of the Chauhan (Chahamana) dynasty, and **Muhammad of Ghor**, the ruler of the Ghurid Empire.
- ♦ **Outcome:** Prithviraj Chauhan defeated Muhammad of Ghor, forcing him to retreat.

2. **Battle of Chausa - 1539**

- ♦ **Battle of Chausa** was actually fought in 1539 CE, not in 1527.
- ♦ It was a significant battle between **Humayun**, the Mughal emperor, and **Sher Shah Suri** (Sher Khan), the founder of the Sur Empire.
- ♦ **Outcome:** Sher Shah Suri defeated Humayun, leading to the temporary loss of the Mughal throne.

3. **Battle of Khanwa - 1527**

- ♦ **Battle of Khanwa** was fought in 1527 CE, not in 1528.
- ♦ It was a crucial battle between **Babur**, the founder of the Mughal Empire, and **Rana Sanga** of Mewar.
- ♦ **Outcome:** Babur's victory solidified Mughal presence in India after his initial victory at the First Battle of Panipat in 1526.

4. **Battle of Ghaghra - 1529**

- ♦ **Battle of Ghaghra** took place in 1529 CE.
- ♦ It was fought between **Babur** and the combined forces of the Afghans and Sultan Mahmud Lodi, brother of Ibrahim Lodi.
- **Outcome:** Babur's victory further consolidated Mughal control over northern India.

12. (c)

Moti Masjid in the Red Fort, Delhi: Built by Aurangzeb in 1659–1660, this mosque was the private place of worship for the emperor and the queens of the Qila. It's made of white marble and features intricate floral carvings.

- **Moti Masjid in Agra Fort:** Built by Shah Jahan, this mosque is known as the Pearl Mosque because it shines like a pearl. It's located in the Agra Fort complex and is a great example of Mughal architecture.
- **Moti Masjid in Lahore Fort:** Built by Mughal emperor Jahangir, this mosque was consecrated in 1630.

13. (c)

The Bahmani Kingdom (1347–1527 CE), established by Alauddin Bahman Shah, was one of the first Islamic kingdoms in the Deccan. Its administrative, cultural, and political structure reflected Persian influence and local adaptations.

The kingdom was divided into **five tarafs (provinces):** Gulbarga, Bijapur, Berar, Bidar, and Daulatabad. Each taraf was governed by a Tarafdar, who managed administration, military affairs, and revenue collection. This decentralization allowed the Bahmani rulers to maintain control over a vast and diverse territory.

The original capital was **Gulbarga (modern Kalaburagi)**. In **1425 CE**, Ahmad Shah I Wali shifted the capital from Gulbarga to **Bidar** due to its strategic location and better resources. The statement about shifting the capital from Bidar to Gulbarga is incorrect.

The Bahmani rulers were strong patrons of **Persian culture and language**, which became central to their court life. Persian was the official language, and poets, scholars, and artists from Persia enriched the Bahmani court. Architectural styles like the tombs at Gulbarga and Bidar also exhibit Persian influences, reflecting their cultural patronage.

Thus, only the first and third statements are correct, making **(c) 1 and 3 only** the correct answer.

14. (d)

Detailed A. Banabhatta - Harsha

- ♦ Banabhatta was a prominent court poet and chronicler in the court of **Emperor Harsha (Harshavardhana)**.
- ♦ He authored the **Harshacharita**, a biographical account of Harsha, and **Kadambari**, a renowned Sanskrit prose work.

B. Rajashekhar - Mahendrapala I

- ♦ Rajashekhar was a celebrated Sanskrit poet and dramatist in the court of **Mahendrapala I** of the Gurjara-Pratihara dynasty.
- ♦ His famous works include **Kavyamimamsa, Balabharata, and Bhuvanakosha**.
- ♦ He also served as a teacher to the Pratihara king and was associated with the revival of Sanskrit literature.

C. Harisena - Samudragupta

- ♦ Harisena was a court poet and minister in the court of **Samudragupta**, one of the greatest rulers of the Gupta Empire.
- ♦ He composed the **Allahabad Pillar Inscription**, which glorifies Samudragupta's conquests and achievements.

D. Kamban - Rajaraja Chola I

- ♦ Kamban was a Tamil poet in the court of **Rajaraja Chola I**, known for his masterpiece, the **Kamba Ramayanam**, which is a Tamil adaptation of the Ramayana.
- ♦ His work is regarded as one of the greatest contributions to Tamil literature and reflects the cultural richness of the Chola court.

15. (b)

He implemented the Dagh system to brand horses for military purposes.

Alauddin Khilji (1296–1316 CE) introduced several administrative reforms to strengthen the Delhi Sultanate, particularly in military and economic governance.

Dagh system was implemented to ensure the quality of horses in the Sultanate's army. Under this system, horses were branded to prevent corruption and substitution with inferior animals. This measure was part of his broader military reforms, which also included strict recruitment and maintenance protocols.

Diwan-i-Arz was responsible for military affairs, including recruitment and training, but market control was directly overseen by Alauddin, with officials like the **Shahna-i-Mandi** enforcing his market regulations. Revenue administration was managed by the **Diwan-i-Wizarat**, not the **Diwan-i-Insha**, which dealt with royal correspondence and diplomatic matters. While Alauddin's land revenue reforms reduced the power of **Iqta holders** by ensuring stricter regulation and direct tax collection, the **Iqta system** was not abolished.

16. (b)

Sarasvati-Kanthabharana

Raja Bhoja of the **Paramara dynasty** (1010–1055 CE), a celebrated ruler and scholar, was known for his patronage of art, literature, and science. He himself was an accomplished writer and is credited with several literary works.

- **Sarasvati-Kanthabharana** is a treatise on Sanskrit grammar and poetics attributed to Raja Bhoja. It reflects his profound understanding of linguistics and literary aesthetics and remains an important work in the field of Sanskrit scholarship.

Other Options:

1. **Rajatarangini:**
 - Authored by **Kalhana** in the 12th century, this historical chronicle narrates the history of Kashmir. It is unrelated to Raja Bhoja.
2. **Natyashastra:**
 - Attributed to **Bharata**, this ancient treatise on dramaturgy and performing arts predates Raja Bhoja and is unrelated to him.
3. **Lilavati:**
 - A mathematical treatise by **Bhaskara II**, focusing on arithmetic and geometry. It is unrelated to Raja Bhoja.

17. (d)

Naqshbandi order emphasized strict adherence to Sharia.

Sufism in India developed as a mystical and spiritual Islamic movement emphasizing devotion, love, and service to God. Different **Sufi orders (silsilas)** arrived and flourished in India, each with unique characteristics. Let's analyze the options:

Chishti Order

- The **Chishti order** was one of the most prominent Sufi orders in India.
- It emphasized **love for humanity, simplicity, and tolerance** while engaging in devotional practices like music (*sama*) and public service.
- While meditation was practiced, the Chishtis were not restricted to **seclusion only**; they actively interacted with the common people.
- Chishti order emphasized both meditation and engagement with society.

Suhrawardi Order

- The **Suhrawardi order**, founded by Sheikh Shihabuddin Suhrawardi, emphasized **wealth and state service**, rather than poverty or simplicity.
- Suhrawardi Sufis often served as advisers in royal courts and did not live ascetically like the Chishtis.

Qadiri Order

- The **Qadiri order**, founded by Sheikh Abdul Qadir Jilani, was introduced in India much earlier than Akbar's reign.
- It gained prominence during the rule of the Delhi Sultanate and expanded further during the Mughal period.

Naqshbandi Order

- The **Naqshbandi order** emphasized **strict adherence to the Sharia** and rejected practices like *sama* (music) and visiting shrines, which were common in other Sufi orders.
- It was introduced in India by **Khwaja Bahauddin Naqshband** and further expanded by **Sheikh Ahmad Sirhindi**, who emphasized puritanical Islamic practices and the reassertion of orthodox Islam.

18. (c)

1. **Al-Beruni:** Al-Beruni, a Persian scholar, came to India in the early 11th century during the invasions of **Mahmud of Ghazni**, not Muhammad Ghuri. He is renowned for his work **Kitab-ul-Hind**, which provides a comprehensive account of Indian society, religion, culture, and scientific advancements of the time. Al-Beruni studied Sanskrit texts and interacted with Indian scholars to understand the local traditions. Muhammad Ghuri, however, came later in the 12th century and had no connection with Al-Beruni.
2. **Marco Polo:** Marco Polo, the Venetian traveler, visited South India in the late 13th century (around 1292 CE) during the reign of the **Pandyan rulers**. He described the Pandyan kingdom as a prosperous region with abundant resources and vibrant trade connections, particularly in pearls. His travelogue, **The Travels of Marco Polo**, is one of the earliest European accounts of South India, emphasizing the wealth, culture, and administration of the Pandyas.
3. **Abdur Razzaq:** Abdur Razzaq, a Persian ambassador from the court of Shah Rukh (Timurid Empire), visited India in the mid-

15th century (1440 CE) during the reign of **Devaraya II**, a ruler of the Vijayanagara Empire. His account highlights the grandeur of the Vijayanagara Empire, its efficient administration, flourishing economy, and architectural magnificence. He also observed religious tolerance and the vibrant cultural life of the empire.

4. Francois Bernier: Francois Bernier, a French traveler and physician, came to India during the reign of **Aurangzeb** in the late 17th century, not Jahangir. His work, **Travels in the Mughal Empire**, offers detailed insights into the Mughal court, the socio-economic conditions, and the administration of the time. Bernier's writings are particularly valuable for understanding the Mughal Empire's decline and its rigid economic structure.

19. (a)

Bahmani Kingdom, established in 1347 CE, broke away from the **Tughlaq dynasty** of the Delhi Sultanate. Its foundation marked the beginning of an independent Muslim kingdom in the Deccan region, ending Delhi's control over the area.

- The kingdom was founded by **Alauddin Bahman Shah (Hasan Gangu)**, a former noble under Muhammad bin Tughlaq. The oppressive and overly centralized policies of Muhammad bin Tughlaq, along with his campaigns to shift the capital from Delhi to Daulatabad (Deccan), led to widespread dissatisfaction among the nobles and governors in the southern regions.
- Taking advantage of this unrest, Alauddin Bahman Shah declared independence in the **Deccan region** and established the Bahmani Sultanate with its first capital at **Gulbarga** (later shifted to Bidar).
- The Bahmani Kingdom became a significant power in South India, often clashing with the Vijayanagara Empire and influencing the political and cultural landscape of the region.

20. (a)

A. Pattachitra: Pattachitra is a traditional painting style native to **Odisha** and also practiced in parts of West Bengal. The word "Pattachitra" is derived from Sanskrit, where *Patta* means "cloth" and

Chitra means "painting." These paintings are known for their vibrant colors, intricate detailing, and mythological themes, particularly those centered around **Lord Jagannath** and the stories from the **Ramayana** and **Mahabharata**. The tradition is closely associated with the Jagannath Temple in Puri, where these paintings are used in rituals. Pattachitra is typically executed on cloth or dried palm leaves using natural dyes and pigments.

B. Manjusha : Manjusha art is a traditional painting form from **Bihar**, specifically associated with the **Anga region**. It is also known as "Snake Painting" because of its themes derived from the **Bihula-Bishari folklore**, a tale of devotion to the serpent goddess **Manasa Devi**. Manjusha paintings are characterized by their box-like structure, repetitive patterns, and the use of bright colors such as pink, green, and yellow. The art is an integral part of Bihar's cultural heritage.

C. Kalamkari : Kalamkari is a unique painting tradition that originates from **Andhra Pradesh** and Telangana. The name comes from the Persian words *Kalam* (pen) and *Kari* (craftsmanship), reflecting the intricate hand-painted or block-printed designs created using natural dyes. Kalamkari paintings often depict scenes from **Hindu mythology**, such as episodes from the Ramayana and Mahabharata, and are traditionally made on fabric. Two main styles exist: the **Srikalahasti style**, which is entirely hand-painted, and the **Machilipatnam style**, which uses block printing. The art is deeply rooted in temple culture and storytelling traditions.

D. Warli: Warli painting is a tribal art form practiced by the **Warli community** in **Maharashtra**, not Rajasthan. This art form employs simple geometric shapes—circles, triangles, and lines—to depict nature, rituals, daily life, and festivals. Warli art is usually done on mud walls using a paste made from rice and water. It is characterized by its minimalistic style and monochromatic palette, with a focus on harmony between humans and nature.

21. (c)

Indian Councils Act of 1892

Charter Act of 1853

Charter Act of 1853 was significant for introducing an open competitive examination for the recruitment of civil servants in India. It also marked the beginning of a more structured legislative process by creating a legislative council for India. However, it did not introduce the principle of elections.

Indian Councils Act of 1861

Indian Councils Act of 1861 marked the beginning of legislative devolution in British India. It allowed Indian representation in legislative councils by nominating Indian members. While this act provided for the inclusion of Indians in the legislative process, the members were nominated, not elected.

Indian Councils Act of 1892

Indian Councils Act of 1892 formally introduced the **principle of elections** for the first time in British India, though the term “election” was not explicitly used. Instead, it provided for **indirect elections**, where representatives were “nominated” based on recommendations by organizations such as chambers of commerce and municipal boards. This act marked the beginning of limited and controlled participation of Indians in the legislative process.

Government of India Act of 1919

Government of India Act of 1919 introduced **dyarchy** in provincial governments, dividing subjects into “reserved” and “transferred” categories. It expanded the electoral process further and introduced direct elections for certain constituencies. However, the principle of elections had already been introduced earlier by the Indian Councils Act of 1892.

22. (a)

Hunter Commission of 1882, formally known as the Indian Education Commission, was appointed by the British Government under the chairmanship of Sir William Hunter to review the progress of education since the implementation of Wood’s Despatch (1854) and suggest improvements, especially in primary and secondary education.

Hunter Commission recommended that **primary education** be transferred to the control of **local self-governing bodies**, such as municipalities and district boards, to decentralize the education system and make it more accessible. This was in line with the broader objective of promoting local self-governance.

The commission strongly advocated for **women’s education**, emphasizing the need for instruction in **vernacular languages** to ensure wider accessibility and cultural compatibility. It recognized the role of education in improving the status of women and fostering social progress.

The commission supported the use of **vernacular languages** as the medium of instruction at the **primary level** to make education accessible to the masses. English was to be retained only at the **higher levels** of education, particularly for secondary and collegiate instruction, to cater to administrative and professional needs.

23. (b)

The **Revolt of 1857**, also referred to as India’s First War of Independence, unfolded as a series of localized uprisings that eventually coalesced into a larger rebellion against British rule. The following events occurred during its initial stages:

1. The execution of Mangal Pandey at Barrackpore
 - ♦ **Date: April 8, 1857**
 - ♦ Mangal Pandey, a sepoy in the Bengal Native Infantry, played a pivotal role in igniting the revolt by attacking British officers at Barrackpore. His actions were driven by resentment over the introduction of the Enfield rifle cartridges rumored to be greased with cow and pig fat.
 - ♦ He was captured and executed by the British, making him one of the first martyrs of the revolt.
2. The proclamation of Bahadur Shah Zafar as Emperor of India
 - ♦ **Date: May 11, 1857**
 - ♦ After the outbreak of the revolt in Meerut on May 10, 1857, the rebels marched to Delhi and proclaimed the Mughal Emperor **Bahadur Shah Zafar** as the symbolic leader of the

uprising. This act unified many Indian princely states and rebel groups under his nominal leadership.

3. The siege of Kanpur by Nana Sahib
 - ♦ **Date: June 5, 1857**
 - ♦ **Nana Sahib**, the adopted son of the deposed Peshwa Baji Rao II, led the siege of Kanpur as part of the revolt. This was one of the bloodiest confrontations during the rebellion, as Nana Sahib sought to reclaim his power and avenge British injustices.

24. (a)

Public health and sanitation

Government of India Act, 1919, also known as the **Montagu-Chelmsford Reforms**, introduced the system of **dyarchy** at the provincial level. Dyarchy divided the subjects of provincial administration into two categories: **“Transferred”** and **“Reserved”**.

Transferred Subjects

“Transferred List” included subjects that were administered by elected Indian ministers who were responsible to the provincial legislature. These subjects were of local importance and required public involvement. Some of the key subjects under this list were:

- **Public health and sanitation**
- **Education**
- **Agriculture**
- **Local self-government**
- **Industries**

These subjects aimed at increasing Indian participation in governance, albeit in areas with limited financial and administrative power.

Reserved Subjects

“Reserved List” included subjects that remained under the control of the Governor and his executive council, composed of British officials. These were critical for maintaining law and order and the economic foundation of the provinces. Reserved subjects included:

- **Irrigation**
- **Railways**
- **Finance**
- **Law and order**
- **Police**
- **Land revenue**

The reserved list ensured that the British retained significant authority over critical areas of governance.

25. (d)
1932, 147 seats

Poona Pact was signed on **September 24, 1932**, between **Dr. B.R. Ambedkar** and **Mahatma Gandhi**, following intense negotiations over the issue of separate electorates for the Scheduled Castes (then referred to as Depressed Classes).

- **Communal Award of August 1932**, announced by British Prime Minister Ramsay MacDonald, proposed separate electorates for various communities, including Scheduled Castes.
- **Mahatma Gandhi** opposed separate electorates for Scheduled Castes, believing it would fragment Hindu society, and undertook a fast-unto-death in Yerwada Jail to protest the decision.
- **Dr. B.R. Ambedkar**, representing the Scheduled Castes, initially supported separate electorates as a safeguard for the political rights of the community.
- A compromise was reached in the form of the **Poona Pact**, which replaced separate electorates with **reserved seats** in joint electorates.

Key Provisions of the Poona Pact:

1. **Reserved Seats for Scheduled Castes:**
 - The agreement reserved **147 seats** for Scheduled Castes in the provincial legislatures, significantly increasing the number from the 71 seats proposed under the Communal Award.
2. **Joint Electorates:**
 - The concept of separate electorates was replaced by **joint electorates**, wherein Scheduled Castes would vote along with other communities but could still elect representatives from their own community.
3. **Representation in Other Institutions:**
 - Adequate representation was also agreed upon in government jobs and other institutions for the upliftment of Scheduled Castes.

26. (a)

Calcutta, 1901

Mahatma Gandhi's First Appearance in a Congress Session:

Mahatma Gandhi made his first-ever appearance at a session of the **Indian National Congress in Calcutta in 1901**. This was during the early phase of his political involvement, after his initial activism in South Africa but before his full-fledged participation in Indian politics.

Calcutta Session of 1901:

- Presided over by **Dinshaw Wacha**, this session was significant for discussions on self-governance and political reforms.
- Gandhi attended this session to observe the Congress's functioning and connect with other political leaders.
- At this stage, Gandhi was not a major political figure in India and primarily focused on his activism in South Africa.

Later Involvement:

- After returning to India in **1915**, Gandhi's active role in Congress began under the mentorship of Gopal Krishna Gokhale.
- His participation became pivotal from the **Lucknow Session of 1916**, where Congress and the Muslim League signed the historic Lucknow Pact.

27. (a)

Both A and R are true, and R is the correct explanation of A.

Provincial Elections of 1937 were held under the Government of India Act, 1935, which provided for provincial autonomy.

- The elections were significant because they highlighted the growing divergence between the **Indian National Congress** and the **Muslim League**.
- Congress emerged victorious in most provinces, forming ministries in **7 out of 11 provinces**. The **Muslim League**, however, performed poorly, managing to secure only 109 out of 482 Muslim seats, undermining its claim to represent all Muslims.
- Congress's overwhelming success and its approach to governance deepened the political divide, making the elections a turning point in their relationship.

- Muslim League sought participation in Congress-led provincial ministries to enhance its influence and assert its position as the representative of Muslims.
- However, the Congress refused this request, arguing that it would work with individuals and not with parties. This decision alienated the Muslim League further, leading to resentment and an eventual hardening of its stance towards the Congress.
- This refusal was perceived by the League as a denial of its political legitimacy, exacerbating tensions and contributing to the polarization between Hindus and Muslims.
- Congress's refusal to include the Muslim League in its ministries directly contributed to the deterioration of relations between the two organizations. This decision is a critical factor in understanding why the elections of 1937 marked a turning point.
- Therefore, both **A** and **R** are true, and **R** is the correct explanation of **A**.

28. (c)

Restrict the participation of students in political movements.

Carlyle Circular, issued in **1905** by **R.W. Carlyle**, the Chief Secretary to the Government of Bengal, was aimed at suppressing the rising nationalist sentiment among students in Bengal. This period was marked by growing discontent against the **Partition of Bengal (1905)** and increasing student involvement in the **Swadeshi Movement**.

Objective of the Carlyle Circular:

- The circular specifically targeted **students' participation in political movements** and attempted to curb their involvement in anti-British activities.
- It directed school and college authorities to prevent students from engaging in political gatherings, protests, or boycotts.
- Educational institutions were required to monitor and control their students' activities to ensure that they remained focused on academics and refrained from associating with nationalist organizations.

29. (b)

Nana Patil

Nana Patil – The “Lion of Satara”

- **Nana Patil**, also known as **Krantisinh Nana Patil**, was a prominent leader of the **Quit India Movement (1942)** in Maharashtra.
- He is popularly referred to as the “**Lion of Satara**” due to his leadership in establishing the “**Prati Sarkar**” (**Parallel Government**) in the Satara district of Maharashtra during the Quit India Movement.
- The Prati Sarkar functioned as an alternative government to the British administration, with its own administrative machinery, courts, and revenue collection system. It became a symbol of resistance and self-rule.

Other Personalities:

1. **Babu Genu:**

- ♦ A textile mill worker and a freedom fighter from Maharashtra, Babu Genu is known for his martyrdom during protests against British rule in **1930**, particularly against the import of foreign cloth.
- ♦ He was killed while trying to stop a truck carrying foreign goods.

2. **Keshav Baliram Hedgewar:**

- ♦ The founder of the **Rashtriya Swayamsevak Sangh (RSS)** in 1925, Hedgewar was an important nationalist figure but was not directly associated with the Quit India Movement or the events in Satara.

3. **Achyut S. Patwardhan:**

- ♦ A socialist leader and an active participant in the Quit India Movement, Patwardhan played a significant role in organizing underground resistance against British rule.

30. (a)

Abolition of child marriage

Sarda Act, formally known as the **Child Marriage Restraint Act, 1929**, was a landmark legislation in the history of social reform in

India. It aimed to curb the practice of child marriage, which was prevalent in Indian society at the time.

Key Features of the Sarda Act:

- **Enactment:** The act was introduced by **Harbilas Sarda**, a member of the Central Legislative Assembly, and came into force in **1930**.
- **Age Limits:**
 - ♦ The Act set the minimum age of marriage at **14 years for girls and 18 years for boys**. (These ages were later revised in subsequent amendments.)
- **Objective:**
 - ♦ The primary goal was to reduce the number of child marriages, which were associated with high mortality rates, poor health, and lack of education among women.
- **Enforcement:**
 - ♦ The act imposed penalties on adults involved in performing or promoting child marriages, including parents, priests, and guardians.

Impact:

- Though the Act faced significant resistance from conservative sections of society, it was a milestone in the fight against child marriage and laid the foundation for subsequent reforms to protect women and children.

31. (c)

Workers and Peasants Party (WPP) played a significant role in the spread of **Marxist ideology** and the mobilization of workers and peasants in the pre-independence period. Let’s analyze each statement:

- WPP was founded in the mid-1920s to promote Marxist ideas and organize the working class and peasants in their struggles against colonial exploitation and feudal oppression.
- It emerged as an umbrella organization to propagate socialist ideals before the establishment of a full-fledged communist party in India.
- WPP was **not closely affiliated with the Indian National Congress**, although its

leaders often worked within the Congress and participated in its movements to propagate Marxist ideas.

- The party maintained its distinct identity and ideological differences, emphasizing class struggle and Marxist principles, unlike the broader nationalist agenda of the Congress
- **S.A. Dange** (a key Marxist leader in India) and **Muzaffar Ahmed** (a co-founder of the Communist Party of India) were prominent leaders of the WPP.
- They used the WPP as a platform to organize labor unions and mobilize peasants, playing a critical role in the early Marxist movement in India.

32. (d)

Lord Lytton

The first-ever **Famine Commission in India**, known as the **Strachey Commission**, was established in **1878** under the viceroyalty of **Lord Lytton**.

Strachey Commission (1878):

- **Formation:** The first official Famine Commission, led by **Sir Richard Strachey**, was appointed in 1878 by **Lord Lytton**, following the devastating **Great Famine of 1876–1878**.
- **Key Recommendations:**
 - ♦ Creation of a **Famine Fund** for relief measures.
 - ♦ Development of **irrigation projects** to prevent crop failures.
 - ♦ Establishment of a **Famine Code**, which outlined guidelines for relief operations.
 - ♦ Implementation of railways to improve food transportation during emergencies.
- **Impact:**
 - ♦ The Strachey Commission marked the beginning of structured famine policy in British India, but its relief measures were criticized for being inadequate and profit-driven.

33. (b)

Repeal of specific discriminatory laws in South Africa

Gandhi-Smuts Agreement was signed in **1914** between **Mahatma Gandhi** and **General Jan Smuts**, the then Prime Minister of the Union of South Africa. This agreement addressed the grievances of the Indian community in South Africa, which faced racial discrimination and restrictive laws.

- **Indian Community in South Africa:**
 - ♦ Indians, including indentured laborers and traders, faced severe discrimination under apartheid-like policies.
 - ♦ Laws such as the **Asiatic Registration Act** and restrictions on movement, trade, and residence severely affected the Indian population.
- **Gandhi's Struggle:**
 - ♦ Gandhi, during his 21-year stay in South Africa (1893–1914), led **Satyagraha campaigns** against these discriminatory laws.
 - ♦ His leadership highlighted issues like the **poll tax**, restrictions on marriages, and the general lack of civil rights for Indians.

Key Provisions of the Gandhi-Smuts Agreement:

1. Repeal of the £3 poll tax imposed on Indian indentured laborers.
2. Recognition of Indian marriages performed under their traditional rites.
3. Suspension of forced registration of Indians under the **Asiatic Registration Act**.
4. Permission for Indians to move freely within Natal and Transvaal regions.

34. (a)

Both A and R are true, and R is the correct explanation of A.

- Indigo Revolt, also known as the Nil Bidroho, took place in Bengal in 1859-60 and is considered one of the earliest organized peasant movements in India.
- It involved mass resistance by indigo cultivators against the exploitation by European planters. The revolt was significant because it united peasants across communities and marked a collective effort to resist colonial oppression.

- European indigo planters coerced Indian peasants into growing indigo instead of food crops under the oppressive Tinkathia system, which required peasants to dedicate three-twentieths (or 3 katha out of 20) of their land to indigo cultivation.
- The planters paid the cultivators meager prices for their indigo while retaining the profits for themselves. The system left peasants in extreme poverty, unable to grow essential food crops.
- The exploitation by European planters directly caused the Indigo Revolt, as the peasants organized themselves to resist this oppression.
- Therefore, R correctly explains A.

35. (d)

Rajendra Prasad

The book “**India Divided**” was written by **Dr. Rajendra Prasad**, the first President of India and a prominent leader of the Indian National Movement. The book, published in **1946**, provides a detailed critique of the demand for the partition of India and the two-nation theory proposed by the All-India Muslim League under the leadership of Muhammad Ali Jinnah.

36. (a)

Opposing the idea of separate electorates for Muslims

Ahrar Movement, formally known as the **Majlis-e-Ahrar-e-Islam**, was a political organization founded in **1929** in pre-independence India. It primarily emerged as a response to the rising communal politics represented by the **All-India Muslim League** and other separatist tendencies.

Key Features of the Ahrar Movement:

1. **Opposition to Separate Electorates:**

- ♦ The movement strongly opposed the concept of **separate electorates for Muslims**, introduced by the British through the **Morley-Minto Reforms (1909)** and later expanded in the **Communal Award (1932)**.
- ♦ Ahrar leaders believed that separate electorates would fragment Indian society and undermine national unity.

2. **Anti-Partition Stance:**

- ♦ The Ahrar Movement rejected the **two-nation theory** proposed by the Muslim League and opposed the idea of Pakistan.
- ♦ They advocated for a unified India, where Muslims and Hindus could coexist.

3. **Focus on Religious and Social Reform:**

- ♦ The Ahrar leaders sought to revive Islamic values while emphasizing national unity.
- ♦ They also criticized British policies that promoted communal divisions.

4. **Prominent Leaders:**

- ♦ Leaders like **Maulana Ataullah Shah Bukhari** and **Maulana Habib-ur-Rehman Ludhianvi** were key figures of the movement.
- ♦ The movement found support primarily among Muslims in Punjab and North India.

37. (b)

S.A. Dange (Shripad Amrit Dange):

S.A. Dange was a prominent figure in India’s communist and trade union movements. He played a significant role in the growth of Marxist ideology in India and was deeply involved in the labor movement.

- Congress Socialist Party (CSP) was founded in 1934 as a socialist wing of the Indian National Congress, spearheaded by leaders like Jayaprakash Narayan, Acharya Narendra Deva, and Ram Manohar Lohia.
- S.A. Dange was not involved in the formation of the CSP. He was associated with the Communist Party of India (CPI), which pursued a more radical Marxist approach, distinct from the Congress Socialist Party’s agenda.
- In 1921, Dange authored the famous pamphlet “Gandhi vs. Lenin”, which compared Gandhian non-violence with Lenin’s revolutionary approach.
- The pamphlet became influential in introducing Marxist ideas in India and marked Dange’s entry into the communist movement.

- All-India Trade Union Congress (AITUC), founded in 1920, was the first national trade union in India. While Dange was not a founding member, he became one of its prominent leaders in the subsequent years.
- He worked extensively to organize labor strikes and champion workers' rights, making significant contributions to the growth of the labor movement in India.

38. (c)

Automobiles

Index of Eight Core Industries (ICI) represents the performance of key infrastructure sectors in India. These eight sectors together constitute around **40.27%** of the weight of the items included in the **Index of Industrial Production (IIP)**.

Sectors Included in the Index of Eight Core Industries:

1. Coal
2. Crude Oil
3. Natural Gas
4. Refinery Products
5. Fertilizers
6. Steel
7. Cement
8. Electricity

These sectors are considered critical for the industrial and economic growth of India.

Automobiles:

- The **automobile sector** is **not included** in the Index of Eight Core Industries. While it is an important sector for industrial growth and employment, it does not form part of the core infrastructure sectors that the index tracks.

39. (c)

Deflation refers to a sustained decrease in the general price level of goods and services in an economy over time. It is the opposite of inflation and can lead to reduced consumer spending and economic slowdown.

- Stagflation is an economic condition characterized by stagnant economic growth, high unemployment, and persistent

inflation. It presents a unique challenge as typical solutions for inflation (like reducing money supply) can worsen unemployment.

- Disinflation refers to a decrease in the rate of inflation, meaning prices are still rising but at a slower pace than before. It should not be confused with deflation, where prices actually fall.
- Hyperinflation is a situation where prices increase at an extremely fast and unsustainable rate, often exceeding 50% per month. It typically occurs during periods of economic crisis or political instability.

40. (c)

Sovereign Gold Bonds

India's **foreign exchange reserves (Forex Reserves)** are assets held by the Reserve Bank of India (RBI) in foreign currencies, which serve to cushion the economy during external shocks. These reserves are composed of the following components:

1 Foreign Currency Assets (FCA):

- ♦ The largest component of India's Forex Reserves.
- ♦ FCA consists of foreign currencies, primarily held in US dollars, but also includes other major global currencies like the euro, yen, and pound.

2 Gold Reserves:

- ♦ Gold held by the RBI as part of the Forex Reserves.
- ♦ It serves as a hedge against currency fluctuations and is valued in US dollars.

3 Special Drawing Rights (SDR):

- ♦ SDRs are an international reserve asset created by the International Monetary Fund (IMF).
- ♦ They represent a claim to currency held by IMF member countries and contribute to India's Forex Reserves.

4 Reserve Tranche Position (RTP):

- ♦ It is the portion of India's quota in the IMF that can be accessed without additional conditions.



- ♦ RTP is also included in the calculation of India's Forex Reserves.

Sovereign Gold Bonds (SGBs):

- **Not a component of Forex Reserves.**
- SGBs are a financial instrument issued by the Government of India as an alternative to physical gold investment.
- While backed by gold, SGBs are domestic financial assets and are not counted as part of the Forex Reserves.

41. (d)

Marginal Standing Facility (MSF) is a tool introduced by the Reserve Bank of India (RBI) in 2011 as part of its monetary policy framework. It allows banks to borrow funds overnight from the RBI against approved government securities during times of tight liquidity.

- **MSF rate** is set **higher than the repo rate** to discourage banks from depending excessively on it for funds.
- It acts as a penal rate for borrowing beyond the repo facility and signals the RBI's intent to manage liquidity strictly.
- Under the MSF, banks can pledge their **approved government securities** as collateral to borrow funds overnight.
- It provides banks with an additional funding option when they have exhausted other borrowing mechanisms like the Liquidity Adjustment Facility (LAF).
- The MSF is designed to address **short-term liquidity mismatches** in the banking system, ensuring that banks have access to emergency funds when needed.
- It helps stabilize the money market and prevent extreme volatility in overnight rates.

42. (a)

Both A and R are true, and R is the correct explanation of A.

In recent Union Budgets, India has emphasized capital expenditure (Capex) to enhance long-term economic growth. For instance, the Union Budget 2023-24 allocated ₹10 lakh crore for Capex, marking a significant rise. This shift is aimed at infrastructure development, job creation, and economic resilience.

- Capital expenditure, such as spending on infrastructure, creates productive assets that enhance economic output over time. It has a higher growth multiplier because it boosts demand, employment, and private investments, generating long-term benefits. Revenue expenditure, on the other hand, primarily focuses on operational and immediate needs like salaries and subsidies, which do not directly contribute to asset creation or sustainable growth.
- The shift toward capital expenditure is motivated by its higher growth multipliers. By focusing on Capex, the government aims to stimulate the economy through the creation of durable infrastructure and increased private sector participation.

Thus, **R is the correct explanation of A**, making **option (a)** the correct choice.

43. (a)

Treasury Bills (T-Bills) are short-term debt instruments issued by the Government of India to meet short-term funding requirements.

- They are part of the money market as they have a maturity period of less than one year (typically 91 days, 182 days, or 364 days).
- T-Bills are considered one of the safest instruments as they are backed by the government.
- Commercial Papers (CPs) are unsecured short-term instruments issued by corporations to raise funds for working capital requirements.
- They are part of the money market but are not secured. The absence of collateral makes CPs riskier compared to secured instruments like Treasury Bills.
- Debentures are debt instruments issued by companies to raise long-term funds.
- They are not traded in the money market because the money market deals only with short-term instruments (maturity less than one year).
- Debentures are typically part of the capital market, which handles medium to long-term financial instruments.

44. (c)

1. **Global Innovation Index (GII)**
 - **Publisher: World Intellectual Property Organization (WIPO)**

- This index ranks countries based on their innovation performance and capabilities. It is a collaborative effort by WIPO, Cornell University, and INSEAD.

2. **Global Gender Gap Index**

- **Publisher: World Economic Forum (WEF)**
- This index measures gender-based disparities across four dimensions: economic participation, educational attainment, health and survival, and political empowerment.

3. **Logistics Performance Index (LPI)**

- **Publisher: World Bank**
- This index evaluates countries on the efficiency of international trade logistics, focusing on aspects like customs, infrastructure, and tracking.

4. **Global Liveability Index**

- **Publisher: Economist Intelligence Unit (EIU)**
- This index assesses cities worldwide on their liveability, which includes stability, healthcare, culture and environment, education, and infrastructure.

45. (c)

Goods and Services Tax (GST) is a **destination-based tax**, meaning the tax is collected in the state where the goods or services are **consumed**, not where they are produced.

- It ensures that the benefits of taxation go to the consuming state.
- **Integrated GST (IGST)** is collected by the **Central Government**, not the state, when goods or services are supplied across state borders (interstate transactions).
- The collected IGST is then apportioned between the central government and the state where the goods or services are consumed.
- Currently, **petroleum products** (such as crude oil, petrol, diesel, aviation turbine fuel, and natural gas) are **excluded from GST**. These items are taxed under the existing excise and VAT framework, which is outside the GST system.

46. (a)

Directive Principles of State Policy (DPSPs), enshrined in **Part IV** of the Indian Constitution, are **non-justiciable**, meaning they cannot be enforced by the courts.

- They are guidelines for the state to establish a welfare society and aim to ensure socio-economic justice.
- The DPSPs were inspired by the **Irish Constitution**, which itself was influenced by the ideas of socio-economic justice in the Spanish Constitution.
- The concept of **Concurrent List** in the Indian Constitution, however, was borrowed from the Australian Constitution.
- **Supreme Court of India**, in the landmark case of **Minerva Mills v. Union of India (1980)**, clarified that the **Fundamental Rights** and **DPSPs** are complementary and must be balanced.
- However, in case of a direct conflict, **Fundamental Rights prevail** over DPSPs.

47. (c)

Article **74(1)** of the Indian Constitution mandates that the **President shall act in accordance with the advice of the Council of Ministers** with the Prime Minister at its head.

- **42nd Amendment Act (1976)** made this explicitly binding by adding the phrase “the President shall act in accordance with such advice.”
- **39th Amendment Act (1975)** was primarily focused on protecting the election of the President, Vice President, Prime Minister, and Speaker of the Lok Sabha from judicial review.
- It had no connection with the binding nature of the Council of Ministers’ advice to the President, which was clarified and enforced by the **42nd Amendment Act (1976)**.

48. (d)

The amendments mentioned relate to significant changes in the Indian Constitution. Their chronological order is as follows:

1. **Inclusion of the Ninth Schedule:**

- ♦ **Amendment: First Amendment Act, 1951**

- ♦ The Ninth Schedule was introduced to protect certain laws, especially related to land reforms and socio-economic legislation, from judicial review under Fundamental Rights.

2. Abolition of Privy Purses:

- ♦ **Amendment:** **Twenty-sixth Amendment Act, 1971**
- ♦ This amendment abolished **privy purses** and privileges granted to the erstwhile rulers of princely states, formally ending their special status.

3. Right to Property Removed as a Fundamental Right:

- ♦ **Amendment:** **Forty-fourth Amendment Act, 1978**
- ♦ **Right to Property** was removed from the list of Fundamental Rights under Article 19 and reclassified as a constitutional right under Article 300A.

4. Lowering the Voting Age from 21 to 18 Years:

- ♦ **Amendment:** **Sixty-first Amendment Act, 1988**
- ♦ This amendment reduced the minimum voting age for elections to the Lok Sabha and State Legislative Assemblies from 21 to 18 years, broadening the electoral base.

49. (b)

1. Public Accounts Committee (PAC)

- ♦ **Function:** PAC scrutinizes the **Comptroller and Auditor General's (CAG)** reports on the accounts of the government. It ensures that public funds are used efficiently and as authorized by the Parliament.
- ♦ It focuses on **post-expenditure audit**, ensuring compliance with the budget.

2. Estimates Committee

- ♦ **Function:** The Estimates Committee examines the **budget estimates** presented to the Parliament.
- ♦ It suggests ways to **economize** expenditure and improve efficiency in resource allocation.

3. Committee on Public Undertakings (COPU)

- ♦ **Function:** COPU evaluates the **working and performance of public sector undertakings (PSUs)**.
- ♦ It reviews the accounts and reports of PSUs and suggests measures for their better management and performance.

4. Departmental Standing Committee

- ♦ **Function:** Departmental Standing Committees analyze and report on the policies, programs, and functioning of specific ministries and departments.
- ♦ They play a critical role in providing policy oversight and ensuring accountability.

50. (a)

Part V of the Indian Constitution:

- Part V of the Indian Constitution is titled **"The Union"** and deals with the structure, powers, and functioning of the Union Government.
- **Chapter IV** of Part V specifically deals with the **Union Judiciary**, including provisions for the Supreme Court of India, its composition, jurisdiction, and powers.

Key Articles Related to the Union Judiciary:

- **Article 124:** Establishment and composition of the Supreme Court.
- **Article 125:** Salaries, allowances, and privileges of Supreme Court judges.
- **Article 126:** Appointment of acting Chief Justice of India.
- **Article 131:** Original jurisdiction of the Supreme Court.
- **Article 136:** Special leave to appeal.
- **Article 141:** Binding nature of the Supreme Court's decisions on all courts in India.

51. (c)

Certain provisions of the Indian Constitution can be amended by a **simple majority of Parliament**, meaning a majority of members present and voting, without the requirement of a special majority or state ratification.

1. Creation of new states

- ♦ **Can be amended by a simple majority.**
- ♦ The creation of new states, alteration of state boundaries, or renaming of

states is governed by **Article 3** of the Constitution.

- ♦ Parliament can enact such changes through a simple majority, provided the affected state's legislature is consulted.

2. Abolition or creation of Legislative Councils in states

- ♦ **Can be amended by a simple majority.**
- ♦ As per **Article 169**, Parliament can abolish or create Legislative Councils in states through a simple majority, following a resolution passed by the respective state legislature by a special majority.

3. Representation of states in the Rajya Sabha

- ♦ **Cannot be amended by a simple majority.**
- ♦ The representation of states in the Rajya Sabha is governed by **Articles 80 and 81**. Changes to this provision affect the federal structure and therefore require a **special majority of Parliament** and ratification by at least half of the state legislatures, as per **Article 368**.

4. Delimitation of constituencies

- ♦ **Can be amended by a simple majority.**
- ♦ The process of delimiting constituencies is carried out by the **Delimitation Commission** under the provisions of the **Delimitation Act**, enacted by Parliament through a simple majority.

52. (b)

Article 249:

- Article **249** of the Indian Constitution empowers Parliament to make laws on a subject enumerated in the **State List** if the **Rajya Sabha** passes a resolution, supported by at least **two-thirds of its members present and voting**, declaring that it is necessary in the **national interest** to legislate on such a subject.
- Such a resolution remains valid for a period of **one year** and can be extended by another year through a similar resolution.

Other Options:

1. Article 248:

- ♦ Article 248 deals with the **residuary powers of legislation**, giving Parliament the exclusive power to make laws on subjects not enumerated in the Union List, State List, or Concurrent List.

2. Article 250:

- ♦ Article 250 empowers Parliament to legislate on matters in the **State List** during a **Proclamation of Emergency**.
- ♦ Laws made under this provision cease to operate six months after the emergency is lifted.

3. Article 256:

- Article 256 relates to the obligation of states to ensure compliance with the laws made by Parliament and the executive power of the Union to give directions to states.

53. (d)

The **Attorney General of India (AGI)** is appointed under **Article 76** of the Constitution and serves as the **highest law officer of the country**.

- The AGI is the **chief legal advisor to the Government of India** and represents the Union in cases before the Supreme Court and high courts where the government is a party.
- The AGI must be qualified to be appointed as a **judge of the Supreme Court**, meaning they must have been a judge of a high court for five years, an advocate of a high court for ten years, or an eminent jurist.
- Under **Article 88**, the AGI has the right to participate in the proceedings of both the **Lok Sabha** and the **Rajya Sabha**, as well as in any of their joint sittings or committees.
- However, the AGI **does not have voting rights**, as they are not an elected member of Parliament.
- This special provision ensures that the AGI can provide legal opinions and assist

Parliament during debates or discussions on matters of national importance that involve legal complexities.

- The AGI is not a member of the **Union Cabinet** or the **Council of Ministers**.
- The AGI is an officer of the government and functions as an independent legal advisor rather than a policymaker or minister.
- While the AGI works closely with the executive, they do not have any decision-making powers or responsibilities in Cabinet matters.

Role and Responsibilities of the Attorney General:

1. **Legal Advisor:**

- ♦ Advises the Union government on legal matters and provides opinions on constitutional or legal questions referred to them by the President.

2. **Representation in Courts:**

- ♦ Represents the government in key cases before the Supreme Court and high courts.

3. **Parliamentary Role:**

- ♦ Participates in parliamentary proceedings to provide legal clarity but does not vote.

54. (a)

First National Emergency in India:

- India declared its **first National Emergency** on **October 26, 1962**, due to the **Chinese aggression** during the Sino-Indian War.
- This emergency was proclaimed under **Article 352** of the Constitution, which allows the President to declare a National Emergency in case of external aggression or war.

Role of the Lok Sabha:

- The **Third Lok Sabha** (1962–1967) was in session during this period and endorsed the declaration of the emergency.
- During a National Emergency, the legislative and executive powers of

the Union are expanded, and certain Fundamental Rights can be curtailed.

Fifth Lok Sabha (1971–1977):

- The **second National Emergency** (1971) was declared during this period due to the **India-Pakistan war**.
- The **third National Emergency** (1975–1977), declared during the **Indira Gandhi era**, was based on “internal disturbances.”

55. (b)

The **National Human Rights Commission (NHRC)** was established in **1993** under the provisions of the **Protection of Human Rights Act, 1993**.

- It is a statutory body tasked with protecting and promoting human rights in India.
- Justice **Ranganath Misra**, a former Chief Justice of India, was appointed as the first chairperson of the NHRC in **1993**.
- Justice **M.N. Venkatachaliah**, a former Chief Justice of India, did not serve as the first chairperson of the NHRC.
- The first chairperson was Justice **Ranganath Misra**.

56. (d)

(A) **52nd Amendment Act - Anti-defection law**

- ♦ **52nd Amendment Act (1985)** added the **Tenth Schedule** to the Constitution, introducing provisions to combat **defection** by members of the legislature.
- ♦ It laid down the grounds for disqualification of legislators who switch parties after elections.

(B) **56th Amendment Act – Granted statehood to Goa**

- ♦ **56th Amendment Act (1987)** granted **statehood to Goa**, making it the 25th state of India.
- ♦ Goa was earlier a Union Territory, and this amendment reorganized its status while keeping **Daman and Diu** as a Union Territory.

(C) **58th Amendment Act – Provided for authoritative Hindi texts of the Constitution**

- ♦ **58th Amendment Act (1987)** provided for the publication of the **authoritative text of the Constitution in Hindi**, ensuring that the Hindi version carries the same legal validity as the English version.

(D) 61st Amendment Act – Lowered the voting age to 18 years

- ♦ **61st Amendment Act (1989)** amended **Article 326**, reducing the minimum voting age from **21 years to 18 years** for elections to the Lok Sabha and State Legislative Assemblies.
- ♦ This amendment aimed to increase youth participation in the democratic process.

57. (a)

The **federal features** of the Indian Constitution reflect the distribution of powers and responsibilities between the **Union** and the **States**. However, it is important to note that India has a unique **quasi-federal structure**, combining elements of both federalism and unitarism.

1. A written Constitution:

- ♦ A written Constitution is a hallmark of a federal system as it clearly defines the structure, powers, and functions of both the Union and State governments.
- ♦ The Indian Constitution is a **lengthy, detailed, and written document**, which serves as the supreme law of the land, ensuring clarity and rigidity in the federal framework.

2. Dual polity consisting of the Union and the States:

- ♦ A dual polity implies the existence of two levels of government: the **Union Government** and the **State Governments**, each functioning within its own sphere of authority.
- ♦ This division of governance is a key characteristic of federalism.

3. Single citizenship:

- ♦ **Not a Federal Feature:** Single citizenship, as provided by the Indian Constitution, is a **unitary feature**.

- ♦ Unlike in federal systems like the United States, where individuals have dual citizenship (national and state), Indians are citizens of the **Union only**, regardless of their state of residence.

4. Distribution of legislative powers between the Centre and the States:

- ♦ The Constitution clearly distributes legislative powers between the Union and States through the **Seventh Schedule**, which includes:
 - **Union List** (Subjects for the Union Government).
 - **State List** (Subjects for State Governments).
 - **Concurrent List** (Subjects on which both can legislate).

58. (b)

1. Guillotine

- ♦ The term “guillotine” in parliamentary procedure refers to a method used to expedite legislative business, particularly during the passage of the budget.
- ♦ It involves ending further debate or discussion on outstanding demands for grants and putting them to **vote without detailed scrutiny**.
- ♦ This procedure is commonly used at the end of the budget session when there is a time constraint, and several demands for grants remain undiscussed.

2. Closure

- ♦ Closure refers to a specific parliamentary procedure to **curtail ongoing discussions** on a motion or bill.
- ♦ Once a **member requests closure**, and if it is approved by the presiding officer, the House proceeds to vote on the matter under debate.
- ♦ It does not **completely stop all discussions** in the House, as discussions on other motions or topics can continue afterward.
- ♦ Closure is a tool to ensure that debates are not unduly prolonged.

3. Zero Hour

- ♦ Zero Hour is a period in the Indian Parliament that starts **immediately after Question Hour** and allows members to raise **urgent matters of public importance** without prior notice.
- ♦ It is an informal procedure not mentioned in the Constitution or the Rules of Procedure but has become a significant part of parliamentary functioning.
- ♦ Zero Hour allows members to address pressing issues or seek accountability from the government on unexpected developments or policy concerns.

4. Adjournment Motion

- ♦ An Adjournment Motion is not aimed at censuring the Speaker but is a tool to **bring attention to a matter of urgent public importance**.
- ♦ It seeks to suspend the normal business of the House to discuss a specific issue that demands immediate attention, often related to the government's failure or mismanagement.
- ♦ The motion requires the approval of the Speaker and is considered a censure motion against the government, not the Speaker.
- ♦ For example, an Adjournment Motion might be used to discuss a major incident like a natural disaster or a serious policy failure.

2. If the President, based on other sources of information, believes that constitutional governance has failed in the state.

- ♦ While the Governor's recommendation is the usual basis for the proclamation of President's Rule, it is **not mandatory**.
- ♦ The President can act **suo moto** or based on other credible information indicating a failure of constitutional machinery in the state.
- ♦ For example, a constitutional emergency may be declared even in situations like a political crisis or breakdown of law and order without a Governor's recommendation.
- ♦ The initial proclamation of President's Rule is valid for **six months** and can be extended for up to **three years**, with the approval of Parliament every six months.
- Extensions beyond **one year** require meeting the following **additional conditions**:
 1. A **Proclamation of National Emergency** (Article 352) must be in force.
 2. The Election Commission must certify that holding elections in the state is **not feasible** due to extraordinary circumstances.
- Under Article 356, the President assumes **executive powers** of the state government, effectively placing the state under direct control of the Union.
- Specific actions the President can take:
 1. Dissolve or suspend the **State Legislative Assembly**.
 2. Authorize **Parliament** to legislate on matters in the **State List**.
 3. Directly administer the state through the **Governor**, who acts as the President's agent.
- The President, however, **cannot interfere in the judiciary** or alter the federal structure beyond constitutional limits.
- The proclamation of President's Rule is subject to **judicial review**.
- In the landmark case of **S.R. Bommai v. Union of India (1994)**, the Supreme Court laid down the following principles:

59. (c)

The President can assume all the powers of the State Government.

Constitutional Emergency under Article 356:

Article 356 of the Indian Constitution empowers the President to impose **President's Rule** in a state when there is a **failure of constitutional machinery**. This is also referred to as a **State Emergency** or **Constitutional Emergency**. It is invoked under the following circumstances:

1. When the **Governor of a state** submits a report to the President stating that the government of the state cannot function according to the provisions of the Constitution.

- ♦ The validity of a proclamation can be challenged if it is found to be based on **mala fide intentions** or irrelevant grounds.
- ♦ The Court has the authority to reinstate a dissolved state government if it finds that President's Rule was unjustifiably imposed.
- ♦ Judicial review ensures that federalism, a basic feature of the Constitution, is protected.

60. (b)

Environment Protection Act, 1986, enacted in the wake of the **Bhopal Gas Tragedy (1984)**, serves as an umbrella legislation for the protection and improvement of the environment. It empowers the central government to take measures to address environmental pollution, regulate hazardous substances, and protect ecosystems.

- The primary objective of the Environment Protection Act is to **protect and improve the environment** by controlling pollution and mitigating environmental hazards.
- Under **Section 3**, the central government is empowered to:
 - ♦ Take measures to prevent, control, and reduce environmental pollution.
 - ♦ Formulate policies and guidelines for the protection of natural resources, including air, water, and soil.
- It also provides for the establishment of standards for the quality of air, water, and other environmental factors under **Section 6**.
- The Act imposes **penalties for non-compliance** with its provisions or environmental standards.
- Under **Section 15**, any individual, industry, or organization found guilty of discharging hazardous substances into the environment or violating pollution control norms faces:
 - ♦ **Imprisonment** of up to **5 years** and/or
 - ♦ **Fines** up to ₹1 lakh, with additional fines for continued violations.
- It holds industries accountable for environmental damage and pollution.
- The Act emphasizes **inter-governmental coordination** for effective implementation.

- **Section 3(2)(ii)** empowers the central government to:
 - ♦ Appoint **authorities** to coordinate with state governments.
 - ♦ Delegate powers to state governments for addressing region-specific environmental challenges.
- This ensures uniformity in environmental protection measures across India while allowing flexibility for local conditions.
- The **National Green Tribunal (NGT)** was **not established** under the Environment Protection Act, 1986. Instead, it was constituted under the **National Green Tribunal Act, 2010**.
- While the 1986 Act provides the legal framework for environmental regulation, it does not include provisions for a dedicated judicial mechanism like the NGT.

61. (c)

The **Arctic Ocean**, the smallest and shallowest of the world's oceans, receives inflows from numerous rivers in the Arctic region. Among the options provided, only the **Ob River** flows into the Arctic Ocean.

- **Ob River** is one of the major rivers of Siberia in Russia. It flows northward and drains into the **Kara Sea**, part of the Arctic Ocean, making it a prominent Arctic river system.
- **Amur River**, one of the major rivers in East Asia, flows along the border between Russia and China and empties into the **Sea of Okhotsk** in the Pacific Ocean, not the Arctic Ocean.
- **Volga River**, the longest river in Europe, flows entirely within Russia and drains into the **Caspian Sea**, which is an enclosed inland water body, not connected to the Arctic Ocean.
- **Don River** flows through the southwestern part of Russia and empties into the **Sea of Azov**, which is connected to the Black Sea, not the Arctic Ocean.

62. (a)

It is located in a rain shadow region of the Andes Mountains.

Atacama Desert, located along the western coast of South America primarily in northern

Chile, is considered one of the driest places on Earth. The extreme aridity of the Atacama Desert is explained by several factors, but the **rain shadow effect** caused by the **Andes Mountains** plays the most critical role.

Atacama lies on the western side of the Andes Mountains, which block moist winds coming from the Amazon Basin on the east.

- As these moist winds rise over the Andes, they lose moisture through orographic rainfall, leaving the western side (Atacama) dry and arid.
- This **rain shadow effect** is the primary reason for the Atacama's extreme dryness.

63. (c)

1. **Zagros Mountains**

- **Zagros Mountains** stretch across western Iran and parts of Iraq.
- This range acts as a natural barrier between the Iranian Plateau and the Mesopotamian Plains.
- It is significant for its rugged terrain, oil reserves, and historical trade routes.

2. **Drakensberg Mountains**

- **Drakensberg Mountains** are located in **South Africa** and Lesotho.
- This range is the highest in Southern Africa, with peaks exceeding 3,000 meters.
- It is a major watershed and an important area for biodiversity.

3. **Carpathian Mountains**

- **Carpathian Mountains** are located in **Eastern Europe**, spanning countries like Romania, Slovakia, Ukraine, and Poland.
- These mountains form an arc and are significant for their forests, biodiversity, and cultural importance.

4. **Andes Mountains**

- **Andes Mountains** are located in **South America**, extending along the western coast from Venezuela to Chile.
- They are the longest continental mountain range in the world.

- North Africa does not have a mountain range named the Andes.

64. (b)

Democratic Republic of Congo, Kenya, Colombia, Indonesia



65. (b)

A **strait** is a narrow passage of water connecting two larger bodies of water. Let's analyze each pair of straits and their regions:

1. **Sunda Strait**

- **Sunda Strait** lies between the Indonesian islands of **Java** and **Sumatra**.
- It connects the **Java Sea** (to the north) with the **Indian Ocean** (to the south).
- It is an important maritime route and also the location of the infamous **Krakatoa volcano**.

2. **Dover Strait**

- **Dover Strait** lies between **England** and **France**, connecting the **North Sea** with the **English Channel**.
- The strait between **Denmark** and **Sweden** is the **Öresund Strait**, not the Dover Strait.

3. **Davis Strait**

- **Davis Strait** lies between **Greenland** (to the west) and **Canada's Baffin Island** (to the east).
- It connects the **Greenland Sea** with the **Labrador Sea** and is an important route for Arctic icebergs and cold currents.

66. (a)

1. **Vienna**

- ♦ Vienna, the capital of Austria, is located on the **Danube River**, one of Europe's major rivers.
- ♦ The Danube flows through several Central and Eastern European countries.

2. **Paris**

- ♦ Paris, the capital of France, is situated on the **Seine River**.
- ♦ The Seine is a major waterway in northern France, flowing through Paris and into the English Channel.

3. **Prague**

- ♦ Prague, the capital of the Czech Republic, is located on the **Vltava River**.
- ♦ The Vltava is the longest river in the Czech Republic.

4. **Rome**

- ♦ Rome, the capital of Italy, is built along the banks of the **Tiber River**.
- ♦ The Tiber is historically significant as it runs near the ancient city of Rome.

67. (d)

1. **Greenland:**

- ♦ Area: **2,166,086 sq km**.
- ♦ It is the largest island in the world (if Australia is considered a continent).

2. **New Guinea:**

- ♦ Area: **785,753 sq km**.
- ♦ It is the second-largest island in the world and is located in the Pacific, divided between Papua New Guinea and Indonesia.

3. **Borneo:**

- ♦ Area: **748,168 sq km**.
- ♦ The third-largest island in the world, shared by Malaysia, Indonesia, and Brunei.

4. **Madagascar:**

- ♦ Area: **587,041 sq km**.

- ♦ It is the fourth-largest island in the world and located off the southeastern coast of Africa.

The correct order is **Greenland > New Guinea > Borneo > Madagascar**, which corresponds to **(d) 1-2-4-3**.

68. (b)

Spain and Morocco

• **Spain:**

- ♦ Spain borders the **Atlantic Ocean** along its northern and northwestern coast (Bay of Biscay and Galician coast).
- ♦ It also has a Mediterranean coastline in its eastern and southern regions (e.g., Catalonia and Andalusia).

• **Morocco:**

- ♦ Morocco borders the **Atlantic Ocean** along its western coastline and the **Mediterranean Sea** in its northern region near the Strait of Gibraltar.

Thus, both Spain and Morocco share borders with **both the Atlantic Ocean and the Mediterranean Sea**.

69. (a)

The **Caspian Sea**, the largest enclosed inland water body, is bordered by five countries.

Countries bordering the Caspian Sea are **Kazakhstan, Turkmenistan, Russia, Iran and Azerbaijan**.



1. **Uzbekistan:**

- ♦ Uzbekistan is a **landlocked country** and does not border the Caspian Sea.

2. **Armenia:**

- ♦ Armenia is a **landlocked country** and does not border the Caspian Sea.

70. (b)

A. **Atacama Desert**

- ♦ **Atacama Desert** is located along the western coast of **South America**, primarily in northern **Chile**.
- ♦ It is one of the driest places on Earth due to the rain shadow effect of the Andes Mountains and the cold Humboldt Current.

B. **Kalahari Desert**

- ♦ **Kalahari Desert** is situated in **southern Africa**, spanning parts of **Botswana, Namibia, and South Africa**.
- ♦ It is a semi-arid region characterized by vast sandy expanses.

C. **Gobi Desert**

- ♦ **Gobi Desert** is located in **Central Asia**, covering parts of **China and Mongolia**.
- ♦ It is a cold desert, known for its harsh climate and significant historical importance along the Silk Road.

D. **Great Victoria Desert - (4) Australia**

- ♦ The **Great Victoria Desert** is located in **Australia**, stretching across **Western Australia and South Australia**.
- ♦ It is the largest desert in Australia, with a landscape of dunes, salt lakes, and arid plains.

71. (d)

The major aluminium companies in India and the locations of their primary production facilities are as follows:

1. **National Aluminium Company Limited (NALCO):**

- ♦ **Location:** Angul, Odisha.
- ♦ **Details:** NALCO operates a significant aluminium smelting plant in Angul, which began operations in 1987.

2. **Bharat Aluminium Company Limited (BALCO):**

- ♦ **Location:** Korba, Chhattisgarh.
- ♦ **Details:** BALCO's Korba plant is among the largest aluminium production facilities in the world, with plans to expand its capacity to 1 million tonnes per annum.

3. **Hindalco Industries Limited (HINDALCO):**

- ♦ **Location:** Renukoot, Uttar Pradesh.
- ♦ **Details:** Established in 1958, the Renukoot plant is a major aluminium manufacturing unit, sourcing bauxite from Jharkhand and Madhya Pradesh.

4. **Madras Aluminium Company Limited (MALCO):**

- ♦ **Location:** Mettur, Tamil Nadu.
- ♦ **Details:** MALCO's plant is situated at the Mettur Dam complex and has a smelter capacity of 40,000 tonnes per annum.

72. (b)

Andhra Pradesh

- ♦ **Araku Valley** is a scenic hill station located in the **Eastern Ghats of Andhra Pradesh**, near the border with Odisha.
- ♦ It is part of the **Visakhapatnam district** and is renowned for its natural beauty, tribal culture, and coffee plantations.

Araku Valley:

1. **Coffee Plantations:**

- ♦ The valley is famous for its organic coffee production, particularly by the local tribal communities.
- ♦ It has gained international recognition for its **Araku Coffee**, which is exported globally.

2. **Tourism:**

- ♦ Araku is a popular tourist destination for its pleasant climate, waterfalls, caves (e.g., **Borra Caves**), and lush green landscapes.
- ♦ It is also known for tribal festivals and cultural heritage.

3. **Altitude and Climate:**

- ♦ Located at an altitude of around **900–1400 meters**, the valley experiences a cool and pleasant climate, making it an ideal hill station.

73. (c)

Bay of Bengal receives water from numerous rivers originating in peninsular India. Let's examine each river to determine if it flows into the Bay of Bengal:

1. **Pennar River**

- ♦ **Pennar River** originates in the **Nandi Hills** in Karnataka and flows through Andhra Pradesh.
- ♦ It drains into the Bay of Bengal near **Nellore**, Andhra Pradesh.

2. **Periyar River**

- ♦ **Periyar River**, the longest river in Kerala, flows into the **Arabian Sea**, not the Bay of Bengal.

3. **Palar River**

- ♦ **Palar River** originates in Karnataka and flows through Tamil Nadu and Andhra Pradesh before draining into the Bay of Bengal.

4. **Ponniyar River**

- ♦ **Ponniyar River** (also known as South Pennar) originates in the **Nandi Hills** in Karnataka and flows through Tamil Nadu before emptying into the Bay of Bengal near **Cuddalore**.

74. (a)

Regur soil, also known as **black soil**, is predominantly found in the **Deccan Plateau** of India. This type of soil is rich in minerals like iron, lime, calcium, and magnesium, and is known for its moisture-retaining capacity, which makes it highly fertile.

Regur soil is ideal for the cultivation of crops such as cotton, groundnut, soybeans, and tobacco, which thrive in the warm climate and good water retention of this soil. The soil is typically dark in color due to the presence of **black basaltic rock** that is rich in iron content, and it is commonly associated with volcanic activities in the region.

75. (c)

- Olericulture is a branch of horticulture that focuses on the **cultivation and study of vegetables**, such as tomatoes, carrots, and spinach.
- Viticulture is the science and practice of **growing grapes**, particularly for the production of **wine**
- Pomology is a branch of horticulture that deals with the **cultivation, improvement, and study of fruits**, such as apples, oranges, and mangoes.
- Apiculture is the **practice of beekeeping**, primarily for the production of honey, wax, and other bee-related products.

76. (c)

1. **Khardung La (Ladakh):**

- ♦ **Location:** In the Union Territory of **Ladakh**, near Leh.
- ♦ **Elevation:** Approximately **5,359 meters** (17,582 feet), it is one of the highest motorable roads in the world.
- ♦ **Significance:**
 - Khardung La is the gateway to the **Shyok and Nubra Valleys**.
 - It is of strategic importance as it serves as a route to the **Siachen Glacier**, the world's highest battlefield.

2. **Lipulekh Pass (Uttarakhand):**

- ♦ **Location:** Situated in the **Pithoragarh district** of Uttarakhand.
- ♦ **Elevation:** Approximately **5,200 meters** (17,060 feet).
- ♦ **Significance:**
 - It is an important pass for the **Kailash Mansarovar Yatra**, connecting India with **Tibet (China)**.
 - The pass is also strategically important as it lies near the tri-junction of India, Nepal, and China.
 - The region is subject to **territorial disputes** between India and Nepal.

3. **Nathu La (Sikkim):**

- ♦ **Location:** In the state of **Sikkim**, connecting India with **Tibet (China)**.
- ♦ **Elevation:** Approximately **4,310 meters** (14,140 feet).
- ♦ **Significance:**
 - A crucial trade route between India and China under the 2006 bilateral trade agreement.
 - The pass also holds military significance as it connects to the Chinese town of **Yadong** in Tibet.
 - Historically, it was part of the **ancient Silk Route**.

4. **Bomdi La (Arunachal Pradesh):**

- ♦ **Location:** In the state of **Arunachal Pradesh**, part of the Eastern Himalayas.
- ♦ **Elevation:** Approximately **2,415 meters** (7,923 feet).
- ♦ **Significance:**
 - Provides access to the **Tawang region**, a culturally and historically significant area due to its Tibetan Buddhist heritage.
 - It was a strategic location during the **Sino-Indian War of 1962**.

77. (b)

Duduma Falls:

- **Location:** Duduma Falls is located in the **Koraput district of Odisha** and partially in **Andhra Pradesh**.
- It is formed by the **Machkund River**, a tributary of the Godavari River system.
 - ♦ Duduma Falls is one of the **highest waterfalls in India**, with a height of approximately **175 meters (574 feet)**.

78. (d)

1. **National Institute of Ocean Technology (NIOT)**

- ♦ **National Institute of Ocean Technology (NIOT)** is located in **Chennai, Tamil Nadu**, not Vishakhapatnam.

- ♦ It is involved in the development of technologies related to ocean engineering and resources.

2. **Indian Institute of Petroleum (IIP)**

- ♦ **Indian Institute of Petroleum (IIP)**, under the Council of Scientific and Industrial Research (CSIR), is located in **Dehradun, Uttarakhand**.
- ♦ It conducts research in petroleum refining, petrochemicals, and related technologies.

3. **Central Food Technological Research Institute (CFTRI)**

- ♦ **Central Food Technological Research Institute (CFTRI)** is located in **Mysuru, Karnataka**.
- ♦ It focuses on research in food science and technology, developing innovations in food processing and preservation.

4. **Central Marine Fisheries Research Institute (CMFRI)**

- ♦ **Central Marine Fisheries Research Institute (CMFRI)** is headquartered in **Kochi, Kerala**.
- ♦ It conducts research on marine fisheries, including fishery resources, aquaculture, and marine biodiversity.

79. (a)

To arrange the mountain ranges in India from **north to south**, let's consider their geographic locations:

1. **Karakoram Range:**

- ♦ **Location:** The **northernmost** mountain range in India, extending across Ladakh (Union Territory) and bordering **China** and **Pakistan**.
- ♦ It includes **K2 (Mount Godwin-Austen)**, the second-highest peak in the world.

2. **Zaskar Range:**

- ♦ **Location:** South of the Karakoram Range, running through **Ladakh** and **Himachal Pradesh**.
- ♦ It acts as a barrier between the Indus River valley in Ladakh and the valleys of Himachal Pradesh.

3. Pir Panjal Range:

- ♦ **Location:** Lies further south of the Zaskar Range, mainly in **Jammu and Kashmir** and extending into Himachal Pradesh.
- ♦ It forms part of the **Outer Himalayas** and is known for its scenic valleys and passes such as the **Banihal Pass**.

4. Vindhya Range:

- ♦ **Location:** The **southernmost** range among the listed options, located in central India.
- ♦ It runs across parts of **Madhya Pradesh, Uttar Pradesh, and Chhattisgarh**, forming a natural divide between northern and southern India.

80. (a)

1. Singrauli Thermal Power Plant

- ♦ Singrauli Thermal Power Plant is located in **Singrauli district**, Madhya Pradesh.
- ♦ It is one of the oldest and largest thermal power plants in India and is operated by **NTPC (National Thermal Power Corporation)**.

2. Talcher Thermal Power Plant

- ♦ Talcher Thermal Power Plant is located in **Angul district**, Odisha.
- ♦ It is one of the major thermal power plants in the eastern region and contributes significantly to Odisha's power supply.

3. Korba Thermal Power Plant

- ♦ Korba Thermal Power Plant is located in the **Korba district**, Chhattisgarh.
- ♦ It is one of the largest coal-fired power plants in India and is operated by **NTPC** and other entities.

4. Neyveli Thermal Power Plant

- ♦ Neyveli Thermal Power Plant is located in **Neyveli, Tamil Nadu**.
- ♦ It is operated by **NLC India Limited (formerly Neyveli Lignite Corporation)** and primarily uses lignite as fuel.

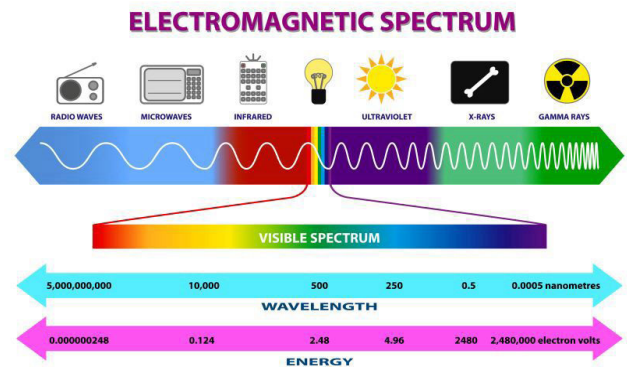
81. (b)

Total Internal Reflection (TIR):

- Total internal reflection occurs when a light ray traveling in a **denser medium** strikes the boundary of a **rarer medium** at an angle greater than the **critical angle**, causing the light to be completely reflected back into the denser medium.

This principle is widely used in **optical fibers**, where light is guided through the core by total internal reflection.

82. (d)



Electromagnetic waves are categorized by their **wavelengths**, which determine their energy and frequency. The order of increasing wavelength corresponds to **decreasing frequency and energy**.

1. X-rays

- ♦ **Wavelength:** Extremely short, ranging from **0.01 to 10 nanometers (nm)**.
- ♦ Among the shortest wavelengths, X-rays are used in medical imaging and crystallography.

2. Ultraviolet (UV)

- ♦ **Wavelength:** Slightly longer than X-rays, ranging from **10 nm to 400 nm**.
- ♦ Found just beyond the visible spectrum, UV rays are known for causing sunburns.

3. Infrared (IR)

- ♦ **Wavelength:** Much longer than ultraviolet, ranging from **700 nanometers to 1 millimeter**.

- IR is commonly associated with heat and is used in remote controls and thermal imaging.

4. Microwaves

- ♦ **Wavelength:** Among the longest in the electromagnetic spectrum, ranging from **1 millimeter to 1 meter**.
- ♦ Found in communication technologies like mobile phones and microwave ovens.

The correct order of increasing wavelength is **X-rays** → **Ultraviolet** → **Infrared** → **Microwaves**, corresponding to (d) 1-2-4-3.

83. (c)

Bernoulli's Principle

The design of swept-back wings on airplanes is primarily explained by **Bernoulli's Principle**, which deals with the relationship between the velocity and pressure of a fluid.

Bernoulli's Principle:

- This principle states that as the **velocity** of a fluid (such as air) increases, its **pressure** decreases.
- In the case of an airplane:
 - ♦ The airflow over the **curved, swept-back wings** increases in velocity compared to the airflow below.
 - ♦ This creates a **pressure difference**, with lower pressure above the wing and higher pressure below, generating **lift**, which helps the plane stay in the air.

84. (b)

Virtual, erect, and magnified

A **concave mirror** produces different types of images depending on the position of the object relative to the mirror. When the object is placed **between the focus (F) and the pole (P)** of the mirror, the following characteristics of the image are observed:

Nature of the Image:

1. Virtual:

- ♦ The image cannot be projected onto a screen because it is formed by the **apparent intersection of rays** that do not actually meet.

- ♦ This happens because the reflected rays diverge, and their extensions appear to meet behind the mirror.

2. Erect:

- ♦ The image formed is **upright**, maintaining the same orientation as the object.

3. Magnified:

- ♦ The image appears **larger than the object**, as the reflected rays spread out more widely.

Image Formation Process:

- When the object is placed between the focus (F) and the pole (P), the incident rays reflect and diverge.
- The diverging reflected rays are extended backward, forming a **virtual image behind the mirror**.

Comparison with Other Positions:

- **Beyond the center of curvature (C):** Real, inverted, and diminished.
- **Between C and F:** Real, inverted, and magnified.
- **At F:** No image is formed as reflected rays are parallel.
- **At infinity:** A highly diminished, real, and inverted point image is formed at F.

85. (a)

1. Capacitance

- ♦ **SI unit of capacitance** is the **Farad (F)**.
- ♦ Capacitance measures the ability of a system to store electric charge.
 - **1 Farad = 1 Coulomb per Volt.**

2. Magnetic Field Strength

- ♦ **SI unit of magnetic field strength** is the **Tesla (T)**.
- ♦ It measures the intensity of the magnetic field.
 - **1 Tesla = 1 Weber per square meter.**

3. Electrical Resistance

- ♦ **SI unit of electrical resistance** is the **Ohm (Ω)**.
- ♦ Resistance quantifies how strongly a material opposes the flow of electric current.
 - **1 Ohm** = 1 Volt per Ampere.

4. Magnetic Flux

- ♦ **SI unit of magnetic flux** is the **Weber (Wb)**.
- ♦ Magnetic flux measures the total magnetic field passing through a given area.
 - **1 Weber** = Magnetic flux through an area when 1 Tesla magnetic field acts perpendicular to it.

86. (a)

Edward Teller:

- Edward Teller, a Hungarian-American physicist, is known as the “**Father of the Hydrogen Bomb**” for his significant contributions to the development of the thermonuclear weapon.
- The **hydrogen bomb**, or H-bomb, is based on **nuclear fusion**, where lighter nuclei (e.g., isotopes of hydrogen) fuse together to release immense energy.

Robert Oppenheimer:

- Known as the “**Father of the Atomic Bomb**”, he led the Manhattan Project.
- He was not directly involved in the development of the hydrogen bomb.

87. (b)

The **apparent weight** of a person standing in a lift (elevator) is the normal force (**N**) exerted by the floor of the lift on the person. This apparent weight depends on the acceleration of the lift.

Key Concept:

When a lift is **accelerating downwards**, the normal force (apparent weight) is reduced because the lift and the person inside are both accelerating in the same direction as gravity.

- **Apparent weight = True weight - Force due to downward acceleration of the lift**
- Mathematically: $N=m(g-a)$ Where:
 - ♦ **N**: Apparent weight
 - ♦ **m**: Mass of the person
 - ♦ **g**: Acceleration due to gravity
 - ♦ **a**: Downward acceleration of the lift

When the lift accelerates **downwards**, the apparent weight **decreases**, making the correct answer **(b) Apparent weight decreases**.

88. (b)

Nitrous Oxide

- **Chemical Formula:** N_2O
- **Common Name:** “Laughing gas.”
- Nitrous oxide is a **colorless, non-flammable gas** with a slightly sweet odor and taste.
- It is named “laughing gas” because it can produce feelings of **euphoria** and uncontrollable laughter when inhaled in small quantities.

Properties of Nitrous Oxide:

- 1. Physical Properties:**
 - ♦ Sweet-smelling and non-irritating.
 - ♦ Easily liquefied under pressure for storage in gas cylinders.
- 2. Physiological Effects:**
 - ♦ When inhaled, it temporarily reduces the brain’s perception of pain and can cause mild sedation.
 - ♦ At low concentrations, it produces feelings of relaxation and euphoria, often accompanied by laughter.
 - ♦ At higher concentrations or prolonged exposure, it can cause dizziness, disorientation, and oxygen deprivation.

89. (d)

1. Sodium bicarbonate ($NaHCO_3$)

- ♦ Sodium bicarbonate, also known as **baking soda**, is commonly used as an **antacid** to neutralize stomach acid.
- ♦ It is also used in baking, cleaning, and fire extinguishers.

2. Calcium carbonate (CaCO_3)

- ♦ Calcium carbonate is a key component in the **cement industry**, where it is used to manufacture lime and cement.
- ♦ It is also used in the production of chalk, marble, and as a dietary calcium supplement.

3. Ammonium nitrate (NH_4NO_3)

- ♦ Ammonium nitrate is widely used as a **fertilizer** due to its high nitrogen content, which is essential for plant growth.
- ♦ It is also used in explosives in mining and construction industries.

4. Sulfuric acid (H_2SO_4)

- ♦ Sulfuric acid is commonly referred to as **battery acid** because it is used in lead-acid batteries found in cars and other vehicles.
- ♦ It is also used in the manufacture of fertilizers, chemicals, and cleaning agents.

90. (b)

Haber process is a method used for the industrial synthesis of **ammonia (NH_3)** from **nitrogen (N_2)** and **hydrogen (H_2)** gases.

Role of Iron as a Catalyst:

- **Iron** is used as the primary catalyst in the Haber process.
- The iron catalyst is typically promoted with small amounts of other substances such as **potassium oxide** and **aluminum oxide**, which enhance its activity and longevity.

91. (b)

- **Neoprene** (polychloroprene) is a type of synthetic rubber produced by the polymerization of chloroprene. It is widely used for:
 - ♦ Industrial belts
 - ♦ Hoses
 - ♦ Wetsuits
 - ♦ Adhesives
- Neoprene is valued for its **resistance to oils, chemicals, and weathering**.

Other Options:

1. Polyethylene:

- ♦ A type of plastic, used in packaging (e.g., plastic bags and bottles).

2. Polystyrene:

- ♦ A polymer used in lightweight materials like disposable cups and insulation.

3. Teflon:

- ♦ A fluoropolymer used in non-stick coatings for cookware.

92. (a)

- **Uranium** is the heaviest naturally occurring metal with an atomic number of **92** and an atomic mass of **238 g/mol**.
- It is used in:
 - ♦ Nuclear reactors as fuel
 - ♦ Nuclear weapons
 - ♦ Radiometric dating of rocks.

Other Options:

1. Chromium:

- ♦ Atomic number: 24
- ♦ Much lighter than uranium; used for electroplating and alloys.

2. Vanadium:

- ♦ Atomic number: 23
- ♦ Relatively light; used in steel alloys.

3. Platinum:

- ♦ Atomic number: 78
- ♦ Heavy but lighter than uranium; known for its catalytic and ornamental uses.

93. (b)

- **Malaria** is caused by the protozoan parasites of the genus **Plasmodium** (e.g., *Plasmodium falciparum*, *P. vivax*, *P. malariae*, *P. ovale*).
- These parasites are transmitted to humans through the bites of infected **female Anopheles mosquitoes**.

Other Options:

1. **Tuberculosis:**

- ♦ Caused by **Mycobacterium tuberculosis**, a bacterium.

2. **Influenza:**

- ♦ Caused by the **influenza virus**.

3. **Dengue:**

- ♦ Caused by the **dengue virus**, transmitted by **Aedes mosquitoes**.

94. (c)

- The **hypothalamus**, located in the brain, acts as the body's **thermostat**.
- It regulates body temperature through mechanisms such as:
 - ♦ Sweating to cool the body.
 - ♦ Shivering to generate heat.
 - ♦ Adjusting blood flow to the skin.

95. (a)

1. **Bryophytes**

- ♦ **Bryophytes** (e.g., mosses, liverworts) are non-vascular plants.
- ♦ They lack xylem and phloem (vascular tissues).
- ♦ Their life cycle is dominated by the **gametophyte stage** (haploid).
- ♦ Water is essential for fertilization as sperm must swim to reach the egg.

2. **Pteridophytes**

- ♦ **Pteridophytes** (e.g., ferns, horsetails) are vascular plants.
- ♦ They have xylem and phloem for water and nutrient transport.
- ♦ They reproduce via **spores** and do not produce seeds.

3. **Gymnosperms**

- ♦ **Gymnosperms** (e.g., pine, cedar) produce seeds that are **naked**, meaning they are not enclosed within fruits.
- ♦ The seeds are usually borne on cones or similar structures.

4. **Angiosperms**

- ♦ **Angiosperms** (flowering plants) are characterized by seeds that are **enclosed within fruits**.

- ♦ They have a highly developed vascular system and are the most diverse group of plants.

96. (c)

Parathyroid hormone (PTH) is produced by the parathyroid glands and plays a key role in regulating the concentration of calcium in the blood. When blood calcium levels are too low, PTH is released into the bloodstream. PTH increases blood calcium levels through the following mechanisms:

1. **Stimulating the release of calcium from bones:** PTH activates osteoclasts, cells that break down bone tissue, releasing calcium into the bloodstream.
2. **Increasing calcium reabsorption by the kidneys:** PTH promotes the kidneys' ability to reabsorb calcium from urine, thereby reducing calcium loss.
3. **Stimulating the activation of vitamin D:** Vitamin D helps the intestines absorb calcium from food. PTH increases the production of the active form of vitamin D, which enhances calcium absorption from the digestive tract.

This regulation is crucial for maintaining stable calcium levels, which are essential for muscle function, nerve signaling, and bone health.

97. (b)

1. **Vitamin B3**

- ♦ Vitamin B3, also known as **Niacin**, is essential for:
 - Energy production through cellular respiration.
 - Maintaining healthy skin and nerves.
 - Deficiency leads to **pellagra**.

2. **Vitamin B6**

- ♦ Vitamin B6, also called **Pyridoxine**, is important for:
 - Protein metabolism and the synthesis of neurotransmitters.
 - Maintaining hemoglobin levels.
 - Deficiency can cause **anemia, depression, and confusion**.

3. **Vitamin B7**

- ♦ Vitamin B7, also known as **Biotin**, is crucial for:
 - Fatty acid synthesis and metabolism.
 - Maintaining healthy hair, skin, and nails.
 - Deficiency is rare but can lead to **dermatitis and hair loss**.

98. (c)

During DNA replication, the **helicase** enzyme plays a crucial role in “unzipping” the DNA double helix to allow replication to occur.

Function of Helicase:

1. **Unzipping the Double Helix:**

- ♦ Helicase breaks the **hydrogen bonds** between the complementary base pairs (adenine-thymine and guanine-cytosine), separating the two strands of DNA.

2. **Formation of the Replication Fork:**

- ♦ This unzipping creates the **replication fork**, which is the site where the DNA strands are unwound and replication proceeds.

Roles of Other Enzymes:

1. **DNA Polymerase:**

- ♦ Adds nucleotides to the growing DNA strand during replication.
- ♦ It synthesizes DNA in the **5’ to 3’ direction** but does not unwind the double helix.

2. **RNA Primase:**

- ♦ Synthesizes **RNA primers**, which provide a starting point for DNA polymerase to begin replication.

3. **Ligase:**

- ♦ Joins **Okazaki fragments** on the lagging strand by forming covalent bonds between adjacent DNA fragments.

99. (a)

RNA plays an essential role in protein synthesis, with each type of RNA performing

specific tasks to ensure the accurate translation of genetic information into proteins.

1. **mRNA (Messenger RNA)**

♦ **Function:**

- mRNA acts as a **messenger** by transferring the genetic instructions from **DNA** in the nucleus to the **ribosomes** in the cytoplasm, where proteins are synthesized.
- It is synthesized during **transcription**, a process where the DNA sequence is copied into RNA by RNA polymerase.
- The sequence of nucleotides in mRNA determines the sequence of amino acids in a protein, following the genetic code.

♦ **Process:**

- Each set of three bases on mRNA, called a **codon**, corresponds to a specific amino acid or a stop signal during protein synthesis.

2. **tRNA (Transfer RNA)**

♦ **Function:**

- tRNA is responsible for delivering **amino acids** to the ribosome during the process of translation.
- Each tRNA molecule has two critical sites:
 1. **Anticodon site:** A set of three bases complementary to a codon on the mRNA.
 2. **Amino acid attachment site:** Binds to a specific amino acid.

♦ **Process:**

- tRNA reads the mRNA codon and ensures that the correct amino acid is incorporated into the growing polypeptide chain.

♦ **Key Role:**

- Ensures that the translation process is precise, as each tRNA is specific to one amino acid.

3. rRNA (Ribosomal RNA)

- ♦ **Function:**
 - rRNA is a major structural and functional component of ribosomes, which are the cellular “machines” where protein synthesis occurs.
 - Ribosomes are made of two subunits:
 - ❖ **Large subunit:** Contains rRNA and proteins that catalyze peptide bond formation.
 - ❖ **Small subunit:** Contains rRNA that helps align the mRNA and tRNA during translation.
- ♦ **Process:**
 - During translation, rRNA ensures the proper alignment of mRNA and tRNA and catalyzes the formation of **peptide bonds** between amino acids, creating the polypeptide chain.

100. (b)

Zymase is a complex of enzymes found in yeast cells that is responsible for converting glucose into ethanol (alcohol) and carbon dioxide during the process of fermentation. This is the central biochemical pathway in alcoholic fermentation, which occurs in the absence of oxygen.

The process begins with **glucose** (a six-carbon sugar), which is broken down through a series of enzymatic steps into **pyruvate**. Zymase then converts pyruvate into **ethanol** and **carbon dioxide** as a way for the yeast to generate energy under anaerobic (oxygen-free) conditions.

Other enzymes:

- **Amylase:** Breaks down starch into simpler sugars, but it does not directly convert glucose to ethanol.
- **Invertase:** Breaks down sucrose (a disaccharide) into glucose and fructose.
- **Maltase:** Breaks down maltose (a disaccharide) into two glucose molecules.

Zymase is crucial for the production of ethanol in brewing and winemaking processes, where fermentation is used to create alcoholic beverages.

101. (b)

Fairs/ Festivals	Description
Kumbh and Ardh Kumbh	<ul style="list-style-type: none"> • Kumbh is held in Prayagraj at the confluence of three rivers: Ganga, Yamuna and Saraswati. • Ardh Kumbh is also held in the 6th year between Maha Kumbh fair at the confluence of the three mentioned rivers. • UNESCO inscribed the Kumbh Fair on the representative list of Intangible Cultural Heritage of Humanity.
Kampil Fair, Kampil	<ul style="list-style-type: none"> • This is a Jain fair • Kampilya Kasganj Pradesh. • This city is known as the 13th Tirthankara Brahmin Vimalnath. • It is a five-day fair held in March on the banks of the river Ganga.
Ramlila	<ul style="list-style-type: none"> • Ramlila is famous for the story of Lord Rama based on the holy epic of the great saint Tulsidas’s Ramcharitmanas.
Janmashtami Fair, Mathura	<ul style="list-style-type: none"> • Krishna Janmashtami, also known simply as Janmashtami or Gokulashtami, is an annual Hindu Fair that celebrates the birth of Krishna, the eighth avatar of Vishnu.
Bateshwar Fair	<ul style="list-style-type: none"> • Agra, Named after Bateshwar Mahadev (Lord Shiv). • Largest cattle fair of UP.
Kailash Fair	<ul style="list-style-type: none"> • Agra

Rambarat	• Agra
Deva Mela	• Barabanki
Ganga Mahotsav	• Varanasi
Barsana Holi	• Mathura

102. (c)

Styles	Description
Dhrupad	<ul style="list-style-type: none"> • Performed by male. • Instruments- tambura and pakhawaj. • Famous singer- Tansen, • Other forms- Dhamar, sung during Holi. • Major Gharanas- Dagari, Darbhanga, Betiah and Talwandi Gharanas.
Khayal	<ul style="list-style-type: none"> • Originator- Amir Khusro • Popularised by - Mughal Emperor Muhammad Shah this form through his court musicians Sadarang, Adarang and Manarang. • Major Gharanas- Gwalior, Kirana, Patiala and Agra Gharana.
Thumri	<ul style="list-style-type: none"> • Originated in the court of Nawab Wajid Ali Shah. • Main gharanas- Banaras, Lucknow and Patiala Ghazal.
Ghazal	<ul style="list-style-type: none"> • During the Mughal rule, the Persian ghazal became the most common poetic form in the Urdu language. • Popularised- Mir Taqi Mir, Ghalib, Daag, Zauk and Sauda. • famous persons associated with Ghazals are Muhammad Iqbal, Mirza Ghalib, Rumi, and Hafiz.

103. (a)

Language/ dialect of UP	Regions
Khadi dialect	East Delhi, Meerut, Baghpat, Muzaffar Nagar, Shamli, Saharanpur , Ghaziabad, Hapur, Gautam Buddha Nagar, Bulandshahr, Bijnor, Amroha, Moradabad, Sambhal and Rampur.
Brajbhasha	Mathura, Aligarh , Hathras, Kasganj, Etah, Agra, East Firozabad, Mainpuri, Badaun, Bareilly.
Kannauji	Kannauj, Etawah, Auraiya, Farrukhabad, Shahjahanpur, Hardoi, Pilibhit, Kanpur Dehat, Kanpur.
Awadhi	Faizabad, Gonda, Balrampur, Shrivasti, Bahraich, Lakhimpur, Sitapur, Lucknow, Barabanki, Unnao, Rae Bareli , Amethi, Sultanpurnpur, Pratapgarh, Fatehpur, Kaushambi, Allahabad, Mirzapur.
Bhojपुरi	Mirzapur, Chandauli, Sant Ravidas Nagar, Varanasi, Jaunpur, Ghazipur, Mau, Ballia, Azamgarh, Ambedkar Nagar, Deoria, Kushinagar, Gorakhpur, Maharajgani, Sant Kabir Nagar, Siddharth Nagar.
Bundeli	Jhansi, Lalitpur, Jalaun, Hamirpur, Mahoba , Banda, Chitrakoot.
Bagheli	Banda, Chitrakoot, Allahabad, Mirzapur and Sonbhadra

104. (d)

Major Historical and Tourist sites of UP

Site	City	Site	City
Taj Mahal	Agra	Gola Gokarana Nath Temple	Lakhimpur Kheri
Khangah Rashidiya	Mainpuri	Mughal Ghat	Farrukhabad
Daantirth (Hastinapur)	Meerut	Bhrigu Temple	Ballia
Vyas Tila and Narsingh Tila	Jalaun	Chakratirth Naimisharanya	Sitapur
Vindhyavasini Temple	Mirzapur	Augarnath Temple	Meerut
Bhagwan Varah Temple	Soron (Kasganj)	Anand Bhawan	Prayagraj
Lodheshwar Mahadev Temple	Barabanki	Jayasi Memorial	Raebareli
Rumi Darwaza	Lucknow	Kadak Shah ka Mazar	Kaushambi
Shrine of Ashfaq Ullah Khan	Sahjahanpur	Digambar Jain Statues	Etawah
Bawani Imali Shaheed Sthal	Fatehpur	Shukla Talab	Kanpur dehat
China Temple	Shravasti	Rani Mahal	Jhansi
Fansi Imali Shaheed Sthal	Prayagraj	Makarbai Temple	Mahoba
Shaheed Sthal Chhawani	Basti	Kamadgiri Mountain	Chitrakoot
Kanak Bhawan	Ayodhya	Kalinjar Fort	Banda
Devkali Temple	Auraiya	Masjid Lal Darwaja	Jaunpur

105. (d)

Item	Description
Largest District Area-wise	Lakhimpur khiri > Sonbhadra > Hardoi > Sitapur
Smallest District Area-wise	Shamli < Bhadohi< Ghaziabad< Hapur
NCR District (8)	Ghaziabad, Meerut, Bhagpat, Hapur, Gautumbudh Nagar, Shamli, Muzaffarnagar, Bulandshahr
Districts sharing boundaries with Nepal (7).	Pilibhit, Lakhimpur, Bahraich, Shravasti, Balrampur, Siddharth Nagar, Maharajganj
Districts sharing boundaries with Uttarakhand (7)	Saharanpur, Muzaffarnagar, Bijnor, Moradabad, Rampur, Bareilly, Pilibhit
District sharing boundaries with the highest number of states	Sonbhadra (Bihar, Jharkhand, Chhattisgarh, MP)
District surrounded on three sides by Madhya Pradesh	Lalitpur
UP share the smallest boundary with	Himachal Pradesh
UP shares the longest boundary with	Madhya Pradesh
District touching the border of Delhi	Gautam Budh Nagar and Ghaziabad
The Only district sharing boundaries with Himachal Pradesh	Saharanpur
Districts Sharing Border with Bihar	Maharajganj, Kushinagar, Deoria, Ballia, Ghazipur, Chandauli, Sonbhadra

Districts sharing boundaries with MP (11)	Agra, Etawah, Jalaun, Jhansi, Lalitpur, Mahoba, Banda, Chitrakoot, Prayagraj, Mirzapur, Sonbhadra
District sharing Border with Chhattisgarh	Sonbhadra
Districts sharing boundaries with Rajasthan	Mathura, Agra
Districts sharing boundaries with Haryana	Saharanpur, Shamli, Baghpat, Gautam Budh Nagar, Aligarh, Mathura
District shares boundaries with the highest number of districts of UP.	Badaun (9)

106. (d)

The Betwa or Betravati is a tributary of the Yamuna River in Northern India. The Betwa, also known as the Vetravati, rises in the Vindhya Range just north of Hoshangabad in Madhya Pradesh and flows north-east through Madhya Pradesh and Orchha before reaching Uttar Pradesh. The Malwa Plateau runs through nearly half of its route, which is not navigable.

The river has 14 major tributaries, 11 of which are entirely in Madhya Pradesh and three of which are partially in both Madhya Pradesh and Uttar Pradesh. The confluence of the Betwa and Yamuna rivers is located near Orchha in Uttar Pradesh's Hamirpur district. In Uttar Pradesh, it flows through three districts i.e., Hamirpur, Jalaun, and Lalitpur

107. (a)

Lake of UP	Location
Ramgarh Taal	Gorakhpur
Bakhira Jheel	Sant Kabir Nagar
Nawabganj Jheel, Kundra Samundra	Unnao
Payag Jheel	Bahraich
Parvati Arga Lake	Gonda
Bhugetaal and Visaitataal	Raebareli
Lilour Jheel	Bareilly
Thithaura Jheel, Morai Taal	Fatehpur
Beti, Ajgara and Nuiya Jheel	Pratapgarh
Surah Taal	Balia
Gaur Jheel	Rampur
Shukrataal	Muzzafanagar
Raam Taal	Meerut
Keetham Lake	Agra
Sheikh Jheel	Aligarh
Govind Ballabh Pant Sagar (Artificial Lake)	Sonbhadra
Alwara Jheel	Kaushambi
Aundhi Taal	Varanasi
Bhojpur Taal	Sultanpur
Darwan Jheel	Faizabad

Lakshmi Taal, Baruasagar and Bhasneh	Jhansi
Sagar Taal	Badaun
Madan Sagar, Belasagar Tal	Mahoba
Pangaili Fulhar or Gomti Taal	Pilibhit
Dahar Jheel, Bhijwaan Jheel	Hardoi
Bhakha Jheel	Etawah
Nauh Jheel	Mathura
Moti Jheel	Kanpur
Chittora Lake	Bahraich

108. (a)

Minerals	District of UP
Diamond	Banda, Mirzapur
Gold	In the range of Sharda and Ramganga, Parish area (Sonbhadra), Berwar (Lalitpur)
Uranium	Lalitpur
Limestone	Guruma-Kanaach-Basahari (Mirzapur), Kajrahat (Sonbhadra)
Bauxite	Banda, Varanasi, Lalitpur
Potash salts	Allahabad, Chandauli, Banda, Jhansi, Sonbhadra
Dolomite	Bari (Sonbhadra), Banda, Mirzapur
Glass sand	Shankargarh, Prayagraj, Bargarh (Banda), Aligarh, Chitrakoot
Andalusite	Sonbhadra, Mirzapur
Soapstone	Hamirpur, Jhansi
Pyrites	Sonbhadra
Rock phosphate	Lalitpur
Ocher	Banda
Sillimanite	Sonbhadra
China clay	Sonbhadra, Banda
Calcite	Mirzapur
Iron ore	Lalitpur
Granite	Banda, Hamirpur, Lalitpur, Mahoba
Diaspore	Jhansi, Mahoba, Lalitpur, Hamirpur
Sandstone	Mirzapur
Gypsum	Jhansi, Hamirpur
Asbestos	Mirzapur, Jhansi
Marble	Mirzapur, Sonbhadra
Feldspar	Jhansi

109. (b)

organisations	Year of establishment	Headquarter
Uttar Pradesh Industrial Cooperative Association Limited (UPICA)	1952	Kanpur
Uttar Pradesh Financial Corporation	1954	Kanpur
UP Small Industries Corporation Limited	1958	Lucknow
State Industrial Development Corporation	1961	Kanpur
Up Export Corporation Limited	1966	Lucknow
Pradeshya Industrial and Investment Corporation (PICUP)	1972	Lucknow
UP State Leather Development & Marketing Corporation	1974	Agra
Uttar Pradesh Electronics Corporation Limited	1974	Lucknow

110. (d)

Nicknames	City
Sangam City, Kumbha Nagari, Tirthraj, Abode of God	Prayagraj (Allahabad)
Amla City	Pratapgarh
City of Mangoes	Malihabad (Lucknow)
Gorakh-Dham, Nath Nagar, Geeta Press Nagar	Gorakhpur
Leather City, Udyog Nagar, Manchester of northeast India	Kanpur
Chhota Delhi, Udyog Nagari	Ghaziabad
Ramnagar, Ram Janmabhumi, Ramcharita Manas Janmbhumi, Bhu-Baikunth, Awadh, Saket Dham	Ayodhya Dham
Bhagwat Katha Nagar	Shukratal
Scissor Nagar, Kranti Nagar	Meerut
Kashi of Jainism	Hastinapur (Meerut)
Itranagri, the city of fragrances	Kannauj
Sister of Kashi	Ghazipur
Bowl of Rice	Chandauli
City of nawabs, city of knives	Rampur
Taj Nagari, Petha Nagari	Agra
Laddu Nagari	Sandila (Hardoi)
Suhag Nagari, Bangles City	Firozabad
Heeng or Gulal Nagari	Hathras
Lock City	Aligarh
Sonanchal, Power Capital of India	Sonbhadra
Surma Nagari	Bareilly
City of Nawab, City of Gardens, City of Najakat Nafasat	Lucknow
Bundeli Kashmir	Charkhari Kasba (Mahoba)

Mini Khajuraho	Ganeshbagh (Karbi
Brass City, Vessels City	Moradabad
Vishwanath Nagari, Shiva Nagari, Mukti Nagar, Mukti Kshetra, City of Pandas, City of Ghats	Varanasi
Shiraz-e-Hind	Jaunpur

111. (b)

Item	City
Defence Park	Agra, Aligarh, Chitrakoot, Jhansi, Lucknow and Kanpur
Aerospace Park	Lucknow, Kanpur, Agra, Meerut and Gautam Buddha Nagar
Defence Industrial Corridor	Aligarh, Agra, Jhansi Chitrakoot, Kanpur and Lucknow
Regional Science City	Lucknow
Knowledge park	Greater Noida
Tronica City	Ghaziabad
Plastic City	Dibiyapur, Auraiya
Leather Park	Agra
Export Promotion Industrial Park	Greater Noida, Agra
Textile and Hosiery Park	Kanpur
Science Park	Sandila (Hardoi)
Leather Technology Park	Banthar (Unnao)
Apparel (Textile) Park	Tronica City, Ghaziabad
Mega Food Park	Baheri (Bareilly)
Cyber City	Kanpur
Software Technology	NOIDA
Lion Safari Park	Etawah
Night Safari Park	Greater NOIDA
Science and Technology	Kanpur
Biotechnology Park	Lucknow
Electronic City	NOIDA
Theme Park (Tourism Related)	Agra
Medi City	Chakganjariya, Lucknow
Web city	Ghaziabad
Toy City	Greater NOIDA
Agro Park	Barabanki and Varanasi
Buddha Theme Park	Sarnath (Varanasi)
Solar City Programme	Agra, Prayagraj and Moradabad
Perfume Park	Kannauj

112. (c)

Item/base	Description
Most populous district	Prayagraj [59,54,391]
Least populous district	Mahoba
Top five most populated districts	Prayagraj>Moradabad>Ghaziabad>Azamgarh>Lucknow
At least five populous districts	Mohoba<Chitrakoot<Hamirpur<Shravasti<Lalitpur
Most literate district	Gautam Buddh Nagar.
Top five most literate district	G.B. Nagar>Kanpur Nagar>Auraiya>Etawah>Ghaziabad.
Least literate district	Shravasti
Least five literate districts	Shravasti<Bahraich<Balrampur<Badaun<Rampur
The top three districts with the highest population density	Ghaziabad (3971)>Varanasi(2395)>Lucknow(1816)
Three districts with the least population density	Lalitpur (242)<Sonbhadra(270)<Hamirpur(275)
The top three districts with the highest sex ratio	Jaunpur (1024)>Azamgarh (1019) >Deoria (1017)
Three districts with the lowest sex ratio	Gautam Budh Nagar<Baghpat<Hamirpur

113. (d)

Tribes	Information
Tharu	Balrampur, Bahraich, Lakhimpur and Pilibhit
Agaria	Lalitpur
Baiga	Sonbhadra
Buksa	Sonbhadra.
Ghasia	Sonbhadra and Mirzapur
Gond	Mirzapur, Sonbhadra, and Chandauli.
Kol	Balrampur, Gonda, Basti, and Siddharthnagar
Kharwa	Mirzapur, Sonbhadra, and Chandauli i
Sahariya	Jhansi and Lalitpur

114. (b)

Area-wise	Sonbhadra (2436.75 sq km)	Lakhimpur Kheri (1272.56 sq km)	Mirzapur (746.11 sq km)	Pilibhit (685.73 sq km)	Chitrakoot (631.69 sq km)
Percentage-wise	Sonbhadra -35.29%	Chandauli- 21.78%	Chitrakoot- 19.64%	Pilibhit- 18.60%	Shravasti- 17.40%

115. (c)

Species	IUCN Status	habitat
Indian Rhinoceros	Vulnerable	<ul style="list-style-type: none"> • Terai region of UP • Dudhwa National Park
Gharial	Critically endangered	<ul style="list-style-type: none"> • Chambal river • Ghaghara river
Bengal Tiger	Endangered	<ul style="list-style-type: none"> • Pilibhit Tiger Reserve • Dudhwa National Park
Indian Pangolin	Endangered	All over UP
Sarus crane	Vulnerable	All over UP
Indian Vulture Species	Critically Endangered	All over UP
Great Indian Bustard	Critically endangered	UP's grasslands
Ganges River Dolphin	Endangered	Ganges and its tributaries
Hoolock Gibbon	Endangered	Northeastern parts of UP
Himalayan Musk Deer	Endangered	Northern UP
Great Indian Hornbill	Vulnerable	Foothills of Himalaya
Four Horned Antelope	Vulnerable	Terai region
Indian Softshell Turtle	Critically endangered	Rivers and wetlands of UP.

116. (b)

It is located in the state of Uttar Pradesh. And spread over Meerut, Muzaffarnagar and Ghaziabad districts of UP.

It lies alongside the northern tip of the River Ganga, flowing through the districts of Muzaffarnagar and Bijnore.

It has a variety of landforms and is a mixture of different habitats such as wetlands, marshes, dry sand beds and gently sloping ravines.

Fauna: Swamp Deer, Leopard, Wild Cats, Wild Otter, Pythons etc.

Under Crocodile Breeding Projects, baby crocodiles are released in the Ganga River near Hastinapur.

Under the aegis of the World Wide Fund (WWF) the Turtle Rehabilitation Program also has its centre near the Hastinapur Sanctuary.

It is a part of the “Asia Flyway” project and many migratory Birds, both local and foreign flock in numbers near the numerous water bodies present in the region.

117. (d)

Item	Rank of UP in India
Milk production	1 st
Food grain production	1 st
Sugarcane production	1 st
Inland fish production	3 rd
Processed meat export	1 st
Textile production	3 rd
Silk production	5 th

Handmade carpet production	1 st
Handmade carpet export	1 st
Domestic tourist footfall	2 nd
Forien tourist footfall	3 rd
SME base	1 st
Consumer electronics export	2 nd

118. (a)

Tamil Nadu is the **top exporter** of electronics in India, while Uttar Pradesh (UP) is the second largest: Tamil Nadu In 2023, Tamil Nadu was the top exporter of electronics in India, with exports worth \$5.37 billion. This was due in part to increased iPhone exports from Foxconn and Pegatron. Uttar Pradesh In 2023, UP was India’s second-largest electronics exporter, with exports worth \$4.90 billion.

UP is a major manufacturing hub for electronics and IT, with over 60% of India’s mobile phone and component manufacturing units located in the state.

The state is also home to around 2.5 million handicraft artisans.

UP is the largest exporter of consumer electronics in India.

55% of India’s Mobile component manufacturing units present operate from UP.

26 % of mobile manufacturing units operate from UP.

UP has highest number of airports (5 international and 16 domestic)

UP has highest network of expressways, railway networks, and highways

119. (c)

Receipt	2024-25 Budgeted	change in %
State’s Own Tax	2,56,351	27%
State’s Own Non-Tax	24,435	108%
Share in Central Taxes	2,18,817	10%
Grants-in-aid from Centre	1,07,200	-5%
Revenue Receipts	6,06,802	16%
Non-debt Capital Receipts	3,299	-0.4%
Net Receipts	6,10,101	15%

120. (a)

State Animal	<ul style="list-style-type: none"> The state animal of Uttar Pradesh is Barasingha. Also known as Swamp Deer. Scientific Name: Rucervus Duvaucelii
State Flower	<ul style="list-style-type: none"> The state flower of Uttar Pradesh is Palash. Scientific Name: Butea Monosperma
State Tree	<ul style="list-style-type: none"> The state tree of Uttar Pradesh is Ashoka. Scientific name: Saraca Asoca. It is a plant belonging to the Caesalpinioideae subfamily of the legume family. It is also considered a symbol of peace and is often planted near temples or in sacred groves
State bird	<ul style="list-style-type: none"> The state bird of Uttar Pradesh is Sarus (Crane). Scientific Name: Grus Antigone.

121. (c)

- Every year, World Nature Conservation Day is celebrated on July 28. On this day, people raise awareness about the importance of nature conservation.
- This day provides an opportunity for individuals, organisations, and governments to come together and make a difference.
- The theme of World Nature Conservation Day 2024 is “Connecting People and Plants, Exploring Digital Innovation in Wildlife Conservation”

122. (b)

General elections were held in South Africa on 29 May 2024 to elect a new National Assembly as well as the provincial legislature in each of the nine provinces.

On 14 June 2024, the African National Congress (ANC), the Democratic Alliance (DA), the Inkatha Freedom Party (IFP) and the Patriotic Alliance (PA), agreed to form a national unity government, with Cyril Ramaphosa being re-elected President of South Africa.

123. (c)

19th ASIAN GAMES 2022, Hangzhou (CHINA)

Theme: “Enduring Memories of Hangzhou”

Motto: “Heart to Heart, @Future”

Emblem: “Surging Tides”

Mascot: “Trio of Robots: Chenchen, Congcong, Linlian”

Sr. No.	Country	Gold	Silver	Bronze	Total
1	People’s Republic of China (China)	201	111	71	383
2	Japan	52	67	69	188
3	Republic of Korea	42	59	89	190
4	India	28	38	41	107

124. (d)

Paris Olympics 2024 Highlights

Particular	Details
Official Name	- Games of the XXXIII Olympiad Edition- 33rd Summer Olympics
Opening Ceremony	- July 26, 2024
Closing Ceremony	- August 11, 2024
Slogan	- Games Wide Open
Total events	- 329 events
Number of Sports	- 32 sports (including the 4 additional sports)
Expected Athletes	- Approximately 10,500
Athletes From	- 200 NOCs and the IOC Refugee Olympic Team
Host City	- Paris, France
India’s Participation	- 0117 athletes
India’s Total rank	- 71 st
India’s Total medals	- 6 (5 bronze + 1 Silver)

125. (a)

The 2024 G20 Rio de Janeiro summit was the nineteenth meeting of Group of Twenty (G20), a Heads of State and Government meeting held at the Museum of Modern Art in Rio de Janeiro from 18–19 November 2024.

It was the first G20 summit to be hosted in Brazil.

Additionally, It marked the **first full G20 summit** with the **African Union** as a member, following its inclusion during the previous summit in 2023.

126. (a)

As of October 2024, 157 railway stations in Uttar Pradesh have been identified for modernization under the Amrit Bharat Station Scheme.

The Amrit Bharat Station Scheme aims to improve the passenger experience by redeveloping railway stations across the country. The scheme will focus on the stations' usage for the next 50 years. The selected stations will receive amenities such as

- Better lighting
- Coach guidance system
- Train display boards
- Digital clock
- Passenger announcement system
- Escalators
- Food court
- Wider foot over bridges
- Rooftop solar plants
- Water cooler

127. (a)

There are several types of vaccines that have been developed and used to combat COVID-19. Each type uses a different approach to stimulate the immune system. Here's a brief overview of the main types:

1. mRNA Vaccines:

- ♦ **Example:** Pfizer-BioNTech, Moderna
- ♦ **Mechanism:** These vaccines use messenger RNA (mRNA) to instruct cells to produce the spike protein found on the surface of the virus. The immune system then recognizes this protein as foreign and creates antibodies to fight it.

2. Viral Vector Vaccines:

- ♦ **Example:** AstraZeneca-Oxford, Johnson & Johnson (Janssen), Sputnik V

- ♦ **Mechanism:** These vaccines use a harmless virus (not the coronavirus) as a vector to deliver genetic material from the coronavirus into human cells. This triggers an immune response.

3. Protein Subunit Vaccines:

- ♦ **Example:** Novavax
- ♦ **Mechanism:** These vaccines contain harmless pieces of the virus (spike proteins) that stimulate the immune system to recognize and fight the actual virus if it is encountered.

4. Inactivated or Attenuated Virus Vaccines:

- ♦ **Example:** Sinovac-CoronaVac, Sinopharm
- ♦ **Mechanism:** These vaccines use a killed (inactivated) or weakened (attenuated) version of the virus to stimulate an immune response without causing the disease.



128. (b)

The Guru Ghasidas-Tamor Pingla Tiger Reserve in Chhattisgarh was declared India's 56th tiger reserve in 2024.

The reserve is located in Manendragarh-Chirmiri-Bharatpur, Korea, Surajpur, and Balrampur. It has a total area of 2,829.38 sq. km, with a core tiger habitat of 2,049.2 sq. km and a buffer zone of 780.15 sq. km.

129. (a)

Orbital by British author Samantha Harvey won the 2024 Booker Prize for fiction.

All books which received the Booker Prize in 2024

Author	- Name of Book
Samantha Harvey	- Orbital
Percival Everett	- James
Rachel Kushner	- Creation Lake
Anne Michaels	- Held
Yael van der Wouden	- The Safekeep
Charlotte Wood	- Stone Yard Devotional
Colin Barrett	- Wild Houses
Rita Bullwinkel	- Headshot
Hisham Matar	- My Friends

Claire Messud	- This Strange Eventful History
Tommy Orange	- W a n d e r i n g Stars
Sarah Perry	- Enlightenment
Richard Powers	- Playground

Faculty: The campus has faculties recruited from across the world

Admission: Admissions are done via an entrance exam and interview

Tuition: The fee for the UG course is set at around \$12,000/year

130. (b)

Sela Tunnel

- Prime Minister Narendra Modi inaugurated the Sela Tunnel, the world’s longest (1595 meter) twin-lane tunnel, Situated at an altitude of 13,000 feet in Arunachal Pradesh.
- It connects Tezpur, Assam to Tawang in the West Kameng district of Arunachal Pradesh.
- It is developed by BRO.

131. (c)

Explanation

- India’s first “Gasoline and Diesel Reference Fuels” produced by Indian Oil’s Paradip & Panipat Refineries has been launched by Minister of Petroleum & Natural Gas and Housing & Urban Affairs Shri Hardeep Singh Puri.
- It is a high-value product crucial for automobile calibration and testing and has a **higher octane number than petrol and diesel.**
- A high octane number for a fuel means that it is more stable and resistant to premature ignition and combustion in an engine. This makes it a more efficient fuel.

132. (c)

The Indian Institute of Technology (IIT) Madras became the first IIT to establish an international campus in Tanzania’s Zanzibar on November 6, 2023

Location: The campus is located on the island of Zanzibar in Tanzania

Programs: The campus offers a four-year Bachelor of Science degree in Data Science and AI and a two-year Master of Technology degree in Data Science and AI

Students: The campus has 50% Indian students and the rest from various African countries

133. (a)

• **Employment Distribution by Sector**

- ♦ **Agriculture: 45%** of the workforce.
- ♦ **Manufacturing: 11.4%** of the workforce.
- ♦ **Services: 28.9%** of the workforce.
- ♦ **Construction: 13%** of the workforce.

Employment Status

• **Breakdown of Employment Status**

- ♦ **Self-Employed: 57.3%** of the total workforce.
- ♦ **Unpaid Workers in Household Enterprises: 18.3%.**
- ♦ **Casual Labour: 21.8%.**
- ♦ **Regular Wage/ Salaried Workers: 20.9%.**

134. (b)

War is a nonfiction book authored by journalist Bob Woodward and published by Simon & Schuster on October 15, 2024. In War, Woodward compares the presidencies of Donald Trump and Joe Biden, concluding that Trump is worse than Richard Nixon.

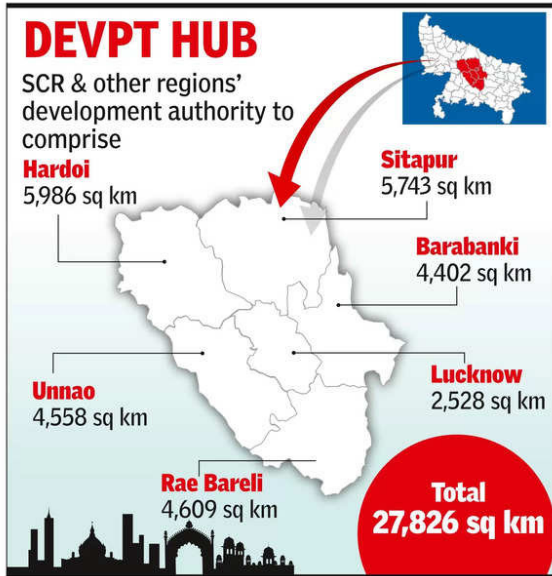
135. (c)

On 24 January 2024, at around 11:15 MSK, a Russian Air Force Ilyushin Il-76 military transport plane crashed near the Ukrainian border in Russia’s Korochansky district in Belgorod Oblast, killing everyone on board.

136. (b)

The Uttar Pradesh Assembly has passed a new bill aimed at developing the region surrounding the state capital, Lucknow, based on a model similar to that of the National Capital Region centred around New Delhi. In July this year, the Yogi Adityanath government issued a notification for the formation of the State Capital Region (SCR) which would include Lucknow and five other adjoining districts — **Hardoi,**

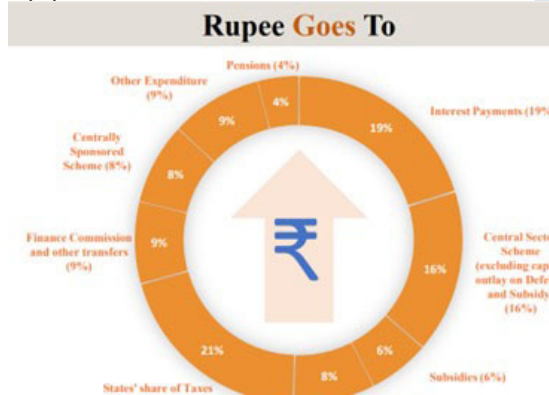
Sitapur, Unnao, Rae Bareli and Barabanki.



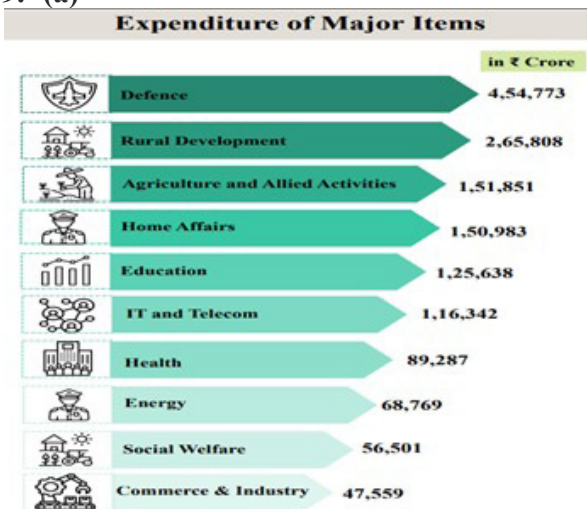
137. (c)

India's para-athletes delivered their best-ever performance at the Paris Games, earning an incredible 29 medals—7 gold, 9 silver, and 13 bronze—securing an 18th-place finish in the overall medal tally.

138. (d)



139. (a)



140. (b)

France became the first country in the world to enshrine the right to abortion in its Constitution.

141. (d)

The following novels won the Sahitya Akademi Award in 2023:

Requiem in Raga Janki: By Neelum Saran Gour in the English language

Mujhe Pahachaano: By Sanjeev in the Hindi language

Jaler Upar Pani: By Swapnamay Chakrabarti in the Bengali language

Rajdev Ki Amrai: By Sadiqa Nawab Sahar in the Urdu language

The Sahitya Akademi Award is given to books that were first published within five years of the award year. The award ceremony was held on March 12, 2024, at the 'Sahityotsav' event. The ceremony coincided with the 70th anniversary of the National Academy of Letters.

142. (b)

Bangladesh experienced massive protests against the 30% quota in government jobs for descendants of freedom fighters, leading to Prime Minister Sheikh Hasina's resignation and departure from the country. Muhammad Yunus has since taken over as the chief advisor of the interim government.

143. (c)

External Affairs Minister S. Jaishankar inaugurated India's first overseas Jan Aushadi Kendra in Mauritius, expanding access to affordable medicines.

144. (b)

Russia successfully launched the Angara-A5, a heavy-lift rocket capable of carrying payloads exceeding 20 tonnes into orbit, from the Vostochny Cosmodrome.

145. (a)

Daniel Kahneman: A Nobel laureate in economics who integrated psychological research into economic science.

Life: Born in Tel Aviv in 1934, Kahneman immigrated to Palestine after World War II. He served in the Israel Defense Forces and trained as a psychologist.

Contribution: Kahneman's research used cognitive psychology to understand how

people make economic decisions. His work on decision-making under uncertainty led to the development of prospect theory, a new branch of economics.

146. (a)

India, France to hold 7th edition of the ‘Shakti’ exercise in Meghalaya. India and France will conduct the 7th edition of the Joint Military Exercise ‘Shakti’ from May 13-26 2024, in the Umroi region of Meghalaya.

147. (a)

Kashmiri Folk Dance Rouf: In Baramulla, 10,000 young women set a world record for the largest performance of the Kashmiri folk dance Rouf at the Kashur Riwaaj festival

148. (d)

The 2023 Saraswati Samman was awarded to Malayalam poet **Prabha Varma** for his 2022 work **Roudra Sathwikam**.

About Saraswati Samman Award: It is given annually for outstanding literary works in 22 Indian languages in the last 10 years. It is among the highest recognitions in the field of Indian literature. The selection follows a rigorous three-tier process leading up to a final decision by Chayan Parishad It was instituted by the K.K. Birla Foundation. (the Vyas Samman and the Bihari Puraskar are other literary awards instituted by the foundation.) It carries a citation, a plaque and prize money of 15 lakh rupees.

149. (a)

- Overall SDG score for the country is 71 for 2023-24, a significant improvement from 66 in 2020-21 and 57 in 2018 (Baseline report).
- Scores for States range from 57 to 79 in 2023-24, marking a substantial improvement from the year 2018 range of 42 to 69.
- Significant progress in Goals 1 (No Poverty), 8 (Decent Work and Economic Growth), 13 (Climate Action) and 15 (Life on Land) Goal 13 (Climate Action) records the highest increase in score from 54 in 2020-21 to 67 in 2023-24 followed by Goal 1 (No Poverty) from 60 to 72 A graph showing the number of the country’s score Description automatically generated
- 32 States and UTs in the front-runner category with 10 new entrants -Arunachal Pradesh, Assam, Chhattisgarh, Madhya Pradesh, Manipur, Odisha, Rajasthan, Uttar Pradesh, West Bengal, and Dadra and Nagar Haveli and Daman and Diu Between 2018 and 2023-24,
- **Fastest moving States** are Uttar Pradesh (increase in score by 25), followed by J&K (21), Uttarakhand (19), Sikkim (18), Haryana (17), Assam, Tripura and Punjab (16 each), Madhya Pradesh and Odisha (15 each).

150. (d)

India commissioned its second nuclear-powered ballistic missile submarine (SSBN), the INS Arighaat, on August 29, 2024.

