All India Civil Services Coaching Centre

(Under the aegis of Government of Tamil Nadu)

General Studies – Paper - I

Answer Key Explanation

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

1. Ans. (c)

- Most of the east and north east margins of the continents are covered by temperate evergreen and deciduous trees (we will learn the reasons in 11th and 12th NCERTs).
- The west and south west margins of the continents are different.
- They have Mediterranean vegetation. It is mostly found in the areas around the Mediterranean sea in Europe, Africa and Asia, hence the name.
- This kind of vegetation is also found outside the actual Mediterranean region in California in the USA, south west Africa, south western South America and South west Australia.
- These regions are marked for hot dry summers and mild rainy winters.
- Citrus fruits such as oranges, figs, olives and grapes are commonly cultivated here because people have removed the natural vegetation in order to cultivate what they want to.
- Source: Page 41-42: Our Environment 7th NCERT

2. Ans. (c)

- A behavioural adaptation used by desert animals is to remain inactive during the hot daylight hours.
- These nocturnal desert animals keep cool by being active at night, whereas some other desert animals get away from the sun's heat by digging underground burrows.
- Other common adaptations seen in desert animals include big ears, light-coloured coats, humps to store fat, and adaptations that help conserve water.
- Some animals have developed salt glands, a physical adaptation that allows the secretion of salt without the loss of water.
- The absence of sweat glands, and the concentration of urine are other physical adaptations made by desert animals.
- Because fat intensifies heat, a unique physical adaptation of some desert animals is the storage of fat in humps or tails, rather than throughout the entire body.
- Big ears serve a dual purpose: they are great for listening for bugs to eat that may be moving around underground, but they are also loaded with blood vessels, allowing the animals to dissipate excess body heat.
- For a fox, for instance, they are good radiators during hot days.
- Source: AR: Ch 9: 6th NCERT – Science

3. Ans. (c)

- S1: Temperate grass is short and nutritious, not longer than Savannah.
- Savannah is Grassland characterized by scattered trees that are not able to form a canopy.
- As there is no canopy, the surface gets sufficient light, and the area supports grasses.

- S2: Temperate grasslands are characterized by grasses of different types with no trees and only a few types of shrubs.
- The reason for no trees lies in the fact that temperate grasslands receive lesser rainfall and are drier.
- S3: These grow on either side of the equator and extend till the tropics.
- This vegetation grows in the areas of moderate to low amount of rainfall.
- Temperate Grasslands are found in the mid latitudinal zones and in the interior part of the continents.
- Source: AR: Page 43: Geography NCERT 7th: Our Environment.

4. Ans. (a)

- Option a is correct.
- The whole period of Harappan civilization is in fact divided into three phases: Early Harappan phase (3500 BC–2600 BC) –some town-planning in the form of mud structures, elementary trade, arts and crafts, etc.
- Mature Harappan phase (2600 BC–1900 BC) –well-developed towns with burnt brick structures, inland and foreign trade, crafts of various types, etc. Late Harappan phase (1900 BC–1400 BC) – decline phase.
- Option 1 is correct: The Harappan people were aware of almost all the metals except iron.
- They manufactured gold and silver objects.
- The gold objects include beads, armlets, needles and other ornaments.
- The use of silver was more common than gold.
- A large number of silver ornaments, dishes, etc. have been discovered.
- A number of copper tools and weapons have also been discovered.
- The common tools included axe, saws, chisels, knives, spearheads and arrowheads.
- Copper was brought mainly from Khetri in Rajasthan.
- Gold might have been obtained from the Himalayan river-beds and Kolar Gold Fields (South India), and silver from Mesopotamia.

5. Ans. (d)

- Option d is correct.
- The Mauryan Empire, which formed around 321 B.C.E. and ended in 185 B.C.E., was the first pan-Indian empire, an empire that covered most of the Indian region.
- Statement 1 is correct: Mauryan empire was a largely a centralized bureaucratic empire.
- According to the historians, the metropolitan state of Magadha was the area of maximum centralized administration.
- Then there were the core areas, which were less under central control but central polity exerted influence.
- Afterwards, peripheral areas supplied economic resources without being altered much.
- Statement 2 is correct: Regional variations and diversities were accommodated by the Mauryan rulers into their polity.
- While an empire accommodates and integrates these diversities on the one hand, at the same time, it also favors homogeneity as a binding force.
- In the case of Mauryan empire, the State attempted cultural homogeneity through the introduction of the policy of Dhamma.
- Statement 3 is correct: The Arthashastra mentions use of different kinds of iron.
- Iron was a crucially important metal for agriculture.
- Two factors — control over iron and manpower — laid the foundations of a strong economy during the Mauryan period.

6. Ans. (d)

- Green manures are crops grown specifically for building and maintaining soil fertility and

structure, though they may also have other functions.
- They are normally incorporated back into the soil, either directly, or after removal and composting. So, statement 1 is correct.

Green manures are crops grown for the purposes of:
- building soil organic matter and soil structure
- preventing leaching of soluble nutrients from the soil
- providing ground cover to prevent damage to soil structure
- bringing crop nutrients up from lower soil profiles
- smothering weeds and preventing weed seedling growth. So, statement 2 is not correct.

The advantages of green manure:
- Green manure can be a great substitute for chemical nitrogenous fertilizers.
- Once mixed in the soil, green manures slowly decompose & release other great micro & macronutrients like nitrogen as well. So, statement 3 is correct.
- This manure significantly improves the quality of soil by increasing its overall humus/biomass content.
- The addition of green manures strengthens the water holding capacity of soil.
- Due to green manures, the population of friendly microorganisms in soil increases.
- Green manuring is growing in the field plants usually belonging to the leguminous family and incorporated into the soil after sufficient growth.
- The plants that are grown for green manure are known as green manure crops.
- The most important green manure crops are sunnhemp, dhaincha, pillipesara, clusterbeans and Sesbania rostrata. So, statement 4 is correct.
- Therefore, option (d) is the correct answer.
- Relevance: Punjab Government is promoting the cultivation of green manure by giving subsidies.

7. Ans. (b)
- The Medical Termination of Pregnancy (Amendment) Act, 2021, raised the upper gestation limit from 20 to 24 weeks for particular groups of women which include rape survivors, incest victims, and other vulnerable women (such as differently-abled women, minors), among others. So, statement 1 is not correct.
- The Medical Termination of Pregnancy (Amendment) Act, 2021, eliminated the requirement of permission from courts.
- The Act, however, provides for all state and union territory governments to constitute a Medical Board.
- The Board will decide if pregnancy may be terminated after 24 weeks due to substantial foetal abnormalities. So, statement 2 is not correct.
- The Supreme Court of India has, in many cases, established that reproductive choice is personal liberty guaranteed under Article 21 of the Indian Constitution. So, statement 3 is correct.
- Therefore, option (b) is the correct answer.
- Relevance: The United States Supreme Court has overturned the 'Roe v. Wade', the court's landmark 1973 judgment that made abortion a constitutional right.

8. Ans. (c)
- "Operation Satark" was launched with an objective of taking action against illicit liquor/fake illegal currency notes/illegal tobacco products/unaccounted gold/cash/precious items/ any other items being transported through railway network for the purpose of tax evasion/smuggling/commission of crime/acts of terror.

- Under the ‘‘Operation Amanat’’, the Railway Protection Force has taken a novel initiative to make it easier for the passengers to get back their lost luggage.
- “Operation AAHT” is aimed to take stringent action against human trafficking through rail to rescue victims of Human Trafficking from the clutches of traffickers.
- “Operation Upalabdh” was launched by the Railway Protection Force to curb the activities of touts substantially and make railway tickets available to the common man.
- Therefore, option (c) is the correct answer.
- Relevance: The Railway Protection Force has recently launched “Operation Satark”.

9. Ans. (b)

- Statement 1 is incorrect: It is the force per unit area exerted against a surface by the weight of the air above that surface.

Atmospheric Pressure

- Atmospheric pressure is the weight of a column of air contained in a unit area from the mean sea level to the top of the atmosphere.
- Therefore, at a place, if the air is dense for instance near the Earth’s surface (due to Gravity), the atmospheric pressure will be more.
- It is expressed in atm (Atmosphere), mb (millibar) and Pa (Pascal).
- It is measured with the help of a mercury barometer or the aneroid barometer.
- At sea level, the average atmospheric pressure is 1 atm or 1,013.2 mb or 1,013.2 h Pa(kilo Pascal).
- Variations of Atmospheric Pressure As the Pressure depends on the number of air molecules present at any place, it varies both vertically as well as horizontally.
- This variation of the Atmospheric Pressure has been playing a very important role in Weather and Climate.
- Its variation is the main cause of air motion/ wind.

Vertical Variation

- The pressure decreases with height because air gets thinner.
- The average decrease is about 1 mb per each 10m increase in elevation, subject to other factors such as Temperature, local topography, closeness to the sea, etc.
- Therefore, if the surface Atmospheric Pressure at any place is 1,000 mb, then the Pressure at 1 km above the surface will be (1000 – 100) mb i.e. 900mb.
- Despite high vertical pressure gradient, there is weak upward wind because the pressure gradient gets weakened by the Gravitational force.

Horizontal Variation

- The horizontal variation of the Pressure depends on the differential heating (insolation) of the surface which causes the differential air volumes.
- These variations are highly signifi cant in terms of wind direction and speed.
- Though the direction and speed depend also on Frictional force and Coriolis force.
- Horizontal distribution of pressure is studied by drawing isobars (lines connecting places having equal pressure) at constant levels.

10. Ans. (d)

- All statements are correct

Evidence in Support of the Continental Drift

The Matching of Continents (Jig-Saw- Fit)

- The shorelines of Africa and South America facing each other have a remarkable and unmistakable match.
- A map produced using a computer program to find the best fi t of the Atlantic margin was presented by Bullard in 1964.

- The match was tried at 1,000- fathom line instead of the present shoreline.

Rocks of same age across the oceans

- The radiometric dating methods developed in the recent period have facilitated correlating the rock formation from different continents across the vast ocean.
- The belt of ancient rocks of 2,000 million years from the Brazil coast matches with those from western Africa.
- The earliest marine deposits along the coastline of South America and Africa are of the Jurassic age. This suggests that the ocean did not exist prior to that time.

Tillite

- It is the sedimentary rock formed out of deposits of glaciers.
- The Gondwana system of sediments from India is known to have its counterparts in six different landmasses of the Southern Hemisphere.
- At the base, the system has thick tillite indicating extensive and prolonged glaciation.
- Counterparts of this succession are found in Africa, Falkland Island, Madagascar, Antarctica and Australia besides India.
- The overall resemblance of the Gondwana type sediments clearly demonstrates that these landmasses had remarkably similar histories.
- The glacial tillite provides unambiguous evidence of palaeoclimates and also of drifting of continents.

Placer Deposits

- The occurrence of rich placer deposits of gold in the Ghana coast and the absolute absence of source rock in the region is an amazing fact.
- The gold-bearing veins are in Brazil and it is obvious that the gold deposits of Ghana are derived from the Brazil plateau when the two continents lay side by side.

Distribution of Fossils

- When identical species of plants and animals adapted to living on land or in freshwater are found on either side of the marine barriers, a problem arises regarding accounting for such distribution.
- The observations that Lemurs occur in India, Madagascar, and Africa led some to consider a contiguous landmass “Lemuria” linking these three landmasses.
- Mesosaurus was a small reptile adapted to shallow brackish water.
- The skeletons of these are found only in two localities: the Southern Cape province of South Africa and Iraver formations of Brazil.
- The two localities presently are 4,800 km apart with an ocean in between them.

11. Ans. (c)

- Option (c) is correct

Laterite Soil

- Laterite has been derived from the Latin word ‘Later’ which means brick.
- The laterite soils develop in areas with high temperatures and high rainfall.
- These are the result of intense leaching due to tropical rain.
- With rain, lime and silica are leached away, and soils rich in iron oxide and aluminum compounds are left behind. Humus content of the soil is removed fast by bacteria that thrive well in high temperatures.
- These soils are poor in organic matter, nitrogen, phosphate, and calcium, while iron oxide and potash are in excess.
- Hence, laterites are not suitable for cultivation; however, the application of manures and fertilizers are required for making the soil fertile for cultivation.
- Red laterite soils in Tamil Nadu, Karnataka, Andhra Pradesh, and Kerala are more suitable for tree crops like cashew nuts.
- Laterite soils are widely cut as bricks for use in house construction.

- These soils have mainly developed in the higher areas of the peninsular plateau.
- The laterite soils are commonly found in Karnataka, Kerala, Tamil Nadu, Madhya Pradesh and the hilly areas of Odisha and Assam.

12. Ans. (b)

- Statement 3 happens in Sponges.
- Members of the Kingdom Fungi and simple plants such as algae reproduce through special asexual reproductive structures.
- The most common of these structures are zoospores that usually are microscopic motile structures.
- Other common asexual reproductive structures are conidia (Penicillium), buds (Hydra) and gemmules (sponge).
- More details are the Question Source.
- Source: Page 7: Biology NCERT 12th: Ch. 1

13. Ans. (d)

- Single-cell protein (SCP) refers to edible unicellular microorganisms.
- The biomass or protein extract from pure or mixed cultures of algae, yeasts, fungi or bacteria may be used as an ingredient or a substitute for protein-rich foods, and is suitable for human consumption or as animal feeds.
- Whereas industrial agriculture is marked by a high water footprint, high land use, biodiversity destruction, general environmental degradation and contributes to climate change by emission of a third of all greenhouse gases, production of SCP does not necessarily exhibit any of these serious drawbacks.
- Learning: As of today, SCP is commonly grown on agricultural waste products, and as such inherits the ecological footprint and water footprint of industrial agriculture.
- However, SCP may also be produced entirely independent of agricultural waste products through autotrophic growth.
- Source: Page 176: NCERT XIIth: Biology

14. Ans. (c)

- Cyanobacteria are autotrophic microbes widely distributed in aquatic and terrestrial environments many of which can fix atmospheric nitrogen, e.g. Anabaena, Nostoc, Oscillatoria, etc.
- In paddy fields, cyanobacteria serve as an important biofertiliser. Blue green algae also add organic matter to the soil and increase its fertility.
- Currently, in our country, a number of biofertilisers are available commercially in the market and farmers use these regularly in their fields to replenish soil nutrients and to reduce dependence on chemical fertilizers.
- Source: Page 188: 12th Biology NCERT

15. Ans. (c)

- In India, freedom of religion also includes the freedom of conscience.
- This means that a person may choose any religion or may choose not to follow any religion.
- Freedom of religion includes the freedom to profess, follow and propagate any religion.
- The government can impose restrictions on the practice of freedom of religion in order to protect public order, morality and health.
- This means that the freedom of religion is not an unlimited right.
- The Constitution has guaranteed the right to propagate one's religion.
- This includes persuading people to convert from one religion to another.
- However, this does not allow forcible conversions.
- It only gives us the right to spread information about our religion and thus attract others to it.
- The government can interfere in religious matters for rooting out certain social evils.

- For example, in the past, the government has taken steps banning practices like sati, bigamy or human sacrifice.
- Such restrictions cannot be opposed in the name of interference in the right to freedom of religion.
- Therefore, option (c) is the answer.

16. Ans. (b)

- To restrict a legislator who is elected on one party's ticket from 'defecting' to another Party, an amendment to the Constitution was made i.e., 52nd Amendment Act in 1985.
- This is known as anti-defection amendment.
- It has also been subsequently modified by the 91st Amendment of 2003.
- The presiding officer of the House is the authority who takes final decisions on all such cases.
- If it is proved that a member has 'defected', then such member loses the membership of the House.
- Besides, such a person is also disqualified from holding any political office like ministership, etc. So, statement 1 is not correct.
- If a member remains absent in the House when asked by the party leadership to remain present or votes against the instructions of the party or voluntarily leaves the membership of the party, it is deemed as defection. So, statement 2 is correct.
- Therefore, option (b) is the correct answer.

17. Ans. (c)

- National Investigation Agency (NIA) is an agency at the national level to investigate and prosecute offenses affecting the sovereignty, security and integrity of India, security of State, friendly relations with foreign States and offenses under Acts enacted to implement international treaties, agreements, conventions and resolutions of the United Nations, its agencies and other international organizations.
- It has the power to enter any state without permission from the respective State Government to investigate and arrest people. So, statement 1 is correct.
- Its jurisdiction extends to the whole of India and it applies also— to citizens of India outside India; to persons in the service of the Government wherever they may be; to persons on ships and aircrafts registered in India wherever they may be; and to persons who commit a Scheduled Offense beyond India against the Indian citizen or affecting the interest of India. So, statement 2 is not correct.
- If the Central Government is of the opinion that a Scheduled Offense has been committed which is required to be investigated under NIA Act, 2008, it may, suo motu, direct the Agency to investigate the said offense. So, statement 3 is correct.
- Scheduled Offences under the NIA Act, 2008 are the offences which are explicitly provided under the schedule of the act.
- Therefore, option (c) is the correct answer.
- Relevance: NIA has recently investigated cases in Russia related to an ISIS bomber.

18. Ans. (a)

- Section 295(A) of the Indian Penal Code (IPC), punishes any speech, writings, or signs that "with premeditated and malicious intent" insult citizens' religion or religious beliefs with a fine and imprisonment for up to three years.
- Section 295A is a cognizable offence, which means that the police are authorised to arrest accused persons without the need for a judicially sanctioned warrant. So, statement 1 is correct.
- The term 'Hate speech & Blasphemy' is not mentioned as reasonable restriction on the Fundamental Right to freedom of speech & expression.

- In 1957, the constitutionality of Section 295A was challenged in Ramji Lal Modi v State of Uttar Pradesh.
- The Supreme Court upheld the law on the grounds that it was brought in to preserve "public order".
- Public order is an exemption to the Fundamental Right to Freedom of Speech and Expression and the Right to Religion recognised by the Constitution. So, statement 2 is not correct.
- Therefore, option (a) is the correct answer.

The State can impose reasonable restrictions on the exercise of the Freedom of speech and Expression on the grounds of:

- Sovereignty and integrity of India
- Security of the state
- Friendly relations with foreign states
- Public order
- Decency or morality
- Contempt of court
- Defamation
- Incitement to an offence

Relevance: The co-founder of a news channel has been arrested for allegedly hurting religious sentiments.

19. Ans. (b)

- Statement 1 is correct: A Central Bank Digital Currency (CBDC) is the digital form of a central bank's fi at currency that is also a claim on the central bank.
- Statement 2 is incorrect: In contrast to cryptocurrencies, a central bank digital currency would be centrally controlled (even if it was on a distributed database), and therefore, a blockchain or other distributed ledger would likely not be required or useful.
- Statement 3 is incorrect: e-RUPI comes close to Central Bank Digital Currencies as they are paid for by the government but is not a CBDC as it is a digital token based on blockchain technology.
- Statement 4 is correct: One of the advantages of CBDC is that it can reduce the cost of printing, transporting and storing paper currency, which is important given India's relatively high currency-to- GDP ratio.

Central Bank Digital Currencies (CBDC)

- Instead of printing money, the central bank issues electronic coins backed by the full faith and credit of the government.
- It is assumed that it will be safe, effi cient and hold constant value (rather than fl uctuating in value like private cryptocurrencies).
- In contrast to cryptocurrencies, a central bank digital currency would be centrally controlled (even if it was on a distributed database), and therefore, a blockchain or other distributed ledger would likely not be required or useful.

Advantages of CBDC:

- Practically costless medium of exchange: If CBDC were account- based, the accounts (like bank accounts) could be held directly at the central bank itself or made available via public- private partnerships with commercial banks, hence the transaction will refl ect in the books of Central Bank which would eliminate the intermediaries and hence the cost of transaction will reduce drastically.
- Secure storage of value useful for investment: Interest-bearing CBDC could have a rate of return in line with risk-free assets such as short-term government securities.
- The CBDC interest rate would serve as the main tool to attract investment.
- Gradual obsolescence of paper currency: CBDC can be made widely available to the public, which will improve our cash to GDP ratio and boost digital payments and reduce tax evasion.

- True price stability: An effective monetary policy is possible if the real value of CBDC would remain stable over time.
- Such framework would encourage the systematic and transparent conduct and better transmission of monetary policy.
- National Payments Corporation of India (NPCI) recently launched a one-time payment mechanism called E-RUPI where users will be able to redeem the voucher without a card, digital payments app or internet banking access, at the merchants accepting e-RUPI.
- It will enable the government to provide fi nancial support in the healthcare, welfare, medical sectors.
- Although there are many similarities between e-RUPI and cryptocurrencies, they are entirely different as they are digital tokens based on blockchain technology.
- e-RUPI comes close to Central Bank Digital Currencies as it is a digital prepaid voucher that is paid for by the government.

20. Ans. (c)

- Statement 1 is correct : It is the rate at which the Reserve Bank is ready to buy or rediscount bills of exchange or other commercial papers.
- Statement 2 is correct : This rate has been aligned to the MSF rate.
- Statement 3 is incorrect : The current Bank Rate (as on 22 August) is 5.65%, 25 basis point above the Repo Rate.

Bank Rate

- It is the rate at which the Reserve Bank is ready to buy or rediscount bills of exchange or other commercial papers.
- This rate has been aligned to the MSF rate and, therefore, changes automatically as and when the MSF rate changes alongside policy repo rate changes.

Marginal Standing Facility (MSF)

- A facility under which scheduled commercial banks can borrow additional amount of overnight money from the Reserve Bank by dipping into their Statutory Liquidity Ratio (SLR) portfolio up to a limit at a penal rate of interest.
- This provides a safety valve against unanticipated liquidity shocks to the banking system.

Corridor

- The MSF rate and reverse repo rate determine the corridor for the daily movement in the weighted average call money rate.

21. Ans. (d)

- All statements are correct

Capital Adequacy Ratio (CAR)

- Capital Adequacy Ratio (CAR) is the ratio of a bank's capital in relation to its risk weighted assets and current liabilities.
- It is decided by central banks and bank regulators to prevent commercial banks from taking excess leverage and becoming insolvent in the process.
- It is measured as: Capital Adequacy Ratio = (Tier I + Tier II (Capital funds)) /Risk weighted assets.
- Tier I capital consists mainly of share capital and disclosed reserves and it is a bank's highest quality capital because it is fully available to cover losses.
- Tier II capital; on the other hand, consists of certain reserves and certain types of subordinated debt.
- The loss absorption capacity of Tier II capital is lower than that of Tier I capital.
- When returns of the investors of the capital issues are counter guaranteed by the bank, such investments will not be considered as Tier I/II regulatory capital for the purpose of capital adequacy.

- The risk weighted assets take into account credit risk, market risk and operational risk.
- The Basel III norms stipulated a capital to risk weighted assets of 8%.
- However, as per RBI norms, Indian scheduled commercial banks are required to maintain a CAR of 9% while Indian public sector banks are emphasized to maintain a CAR of 12%.

22. Ans. (a)

- Punch-marked coins made of silver and copper (c. sixth century BCE onwards) were amongst the earliest to be minted and used.
- These have been recovered from excavations at a number of sites throughout the subcontinent.
- Attempts made to identify the symbols on punchmarked coins with specific ruling dynasties, including the Mauryas, suggest that these were issued by kings.
- It is also likely that merchants, bankers and townspeople issued some of these coins.
- The first coins to bear the names and images of rulers were issued by the Indo- Greeks, who established control over the north - western part of the subcontinent c. second century BCE.
- The first gold coins were issued c. first century CE by the Kushanas.
- These were virtually identical in weight with those issued by contemporary Roman emperors and the Parthian rulers of Iran, and have been found from several sites in north India and Central Asia.
- Coins were also issued by tribal republics such as that of the Yaudheyas of Punjab and Haryana (c. first century CE). Hence, statement 3 is incorrect.

23. Ans. (b)

- Krishna Deva Raya himself authored a Telugu work, Amukthamalyadha and Sanskrit works, Jambavati Kalyanam and Ushaparinayam.
- Allasani Peddanna was the greatest and he was called Andhrakavita Pitamaga. His important works include Manucharitam and Harikathasaram.

24. Ans. (c)

- Greece and Turkey have had long- standing rival claims over the Aegean territory, even finding themselves on the brink of war over the issue in the past. In May 2022, Turkey warned Greece to demilitarize the Aegean Island.
- Turkey alleges that Greece has been building a military presence in violation of international treaties (Lausanne Treaty of 1923) that guarantee the unarmed status of the Aegean islands.
- Meanwhile, Greece maintains that Turkey has deliberately misinterpreted the treaties, adding that it has legal grounds to defend itself.
- The Aegean Sea is an arm of the Mediterranean Sea.
- It is located in the East Mediterranean Basin with the Greek peninsula to its west and Anatolia (consisting of the Asian side of Turkey) to its east.
- There are more than a thousand islands in the Aegean Sea, almost all Greek, and some within two kilometres of mainland Turkey or the Turkish west coast.
- Therefore, option (c) is the correct answer.
- Relevance: The Aegean Sea is in the news due to a dispute between Greece and Turkey.

25. Ans. (d)

- The Partners in the Blue Pacific (PBP) Initiative is a five-nation "informal mechanism" to support Pacific islands and to boost diplomatic, economic ties in the region.
- It was launched by the United States of America and its allies - Australia, New Zealand, Japan and the United Kingdom

amid China's aggressive push to increase its Pacific sphere of influence.
- The areas of cooperation for PBP include climate crisis; connectivity and transportation; maritime security and protection; and health, prosperity.
- Therefore, option (d) is the correct answer.
- Relevance: The USA and its allies have launched 'Partners in the Blue Pacific' for "effective and efficient cooperation" with the region's small island nations.

26. Ans. (c)
- Leaders of the Group of Seven (G7) most developed economies, who met in Germany for the 48th G7 Summit this month, have agreed to set up an international "climate club" for nations that want to take more decisive climate action and combat global warming.
- The G7, a group of developed nations that gets together every year to discuss global challenges, is made up of the US, the UK, Canada, France, Germany, Italy and Japan.
- The club, expected to be established by the end of this year, will be "open and inclusive in nature" to those committed to follow the 2015 Paris climate agreement.
- The idea of Climate Club was first floated by Yale economist and Nobel Prize winner William Nordhaus, who said the voluntary nature of existing climate agreements hasn't resulted in sufficient progress.
- Therefore, option (c) is the correct answer.
- Relevance: G7 in its 2022 summit have agreed to set up an international "climate club".

27. Ans. (b)
- Millets are a collective group of small seeded annual grasses that are grown as grain crops, primarily on marginal land in dry areas of temperate, sub-tropical and tropical regions thus known as the superfood of India. So, statement 1 is correct.
- India is now the 5th largest exporter of millet globally.
- The major millet producing states in India include Haryana, Uttar Pradesh, Chhattisgarh, Gujarat, Rajasthan, Madhya Pradesh, Maharashtra, Andhra Pradesh, Karnataka, Tamil Nadu and Telangana.
- Millets can grow in drought-prone regions of India, especially Maharashtra, Rajasthan and Karnataka.
- One rice plant requires nearly 2.5 times the amount of water required by a single millet plant of most varieties, according to the Crops Research Institute for the Semi-Arid Tropics (ICRISAT). So, statement 2 is not correct.
- Even though the yield of millets has increased post Green Revolution in India, there has been a consistent decrease in the area under cultivation. So, statement 3 is correct.
- The U.N. General Assembly in 2021 adopted a resolution, sponsored by India and supported by more than 70 countries, declaring 2023 as the International Year of Millets. So, statement 4 is correct.
- Therefore, option (b) is the correct answer.
- Relevance: Recently, the Union Minister of State of Food Processing Industries inaugurated the National Conference on Millets on the theme 'The Future Super Food for India' in New Delhi.

28. Ans. (c)
- Both statements are correct.

Sea Floor Spreading
- Seafloor spreading is a geologic process in which tectonic plates—large slabs of Earth's lithosphere—split apart from each other.
- Seafloor spreading and other tectonic activity processes are the result of mantle convection.

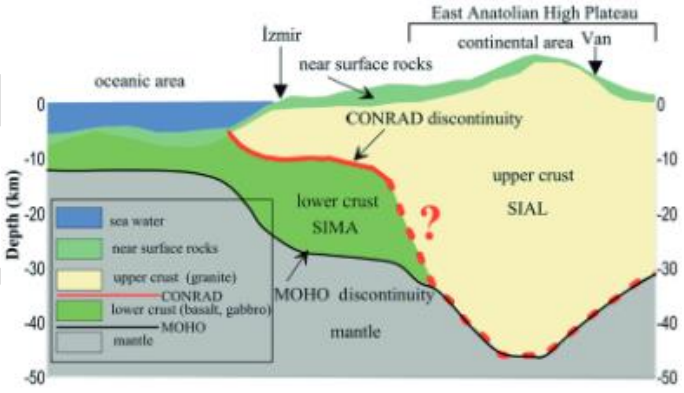
- Mantle convection is the slow, churning motion of Earth's mantle.
- Convection currents carry heat from the lower mantle and core to the lithosphere. Convection currents also "recycle" lithospheric materials back to the mantle.
- Seafloor spreading occurs at divergent plate boundaries.
- As tectonic plates slowly move away from each other, heat from the mantle's convection currents makes the crust more plastic and less dense.
- The less-dense material rises, often forming a mountain or elevated area of the seafloor.
- Eventually, the crust cracks. Hot magma fueled by mantle convection bubbles up to fill these fractures and spills onto the crust.
- This bubbled-up magma is cooled by frigid seawater to form igneous rock.
- This rock (basalt) becomes a new part of Earth's crust.
- Evidence for Seafloor Spreading Rocks on either side of the crest of oceanic ridges having equidistant locations from the crest were found to have similarities both in terms of their constituents, their age and magnetic orientation.
- Rocks closer to the mid-oceanic ridges have normal polarity and are the youngest and the age of the rocks increases as one move away from the crest (ridge).
- The rocks of the oceanic crust near the oceanic ridges are much younger than the rocks of the continental crust.

29. Ans. (a)

- Statement 1 is correct : Silicates are present in both sial and sima.
- They are the most abundant rocks and minerals in the crust.
- Statement 2 is correct : The granitic layer (continental crust) is referred to as sial, while the basaltic layer (oceanic crust) is referred to as sima.
- Statement 3 is incorrect : The transition zone between these two types of crust is called the Conrad discontinuity.
- Statement 4 is incorrect : Cratons are the oldest and most stable part of the continental lithosphere.

Earth's crust

- Earth's crust is divided into two types:
- oceanic crust and continental crust.
- The transition zone between these two types of crust is sometimes called the Conrad discontinuity (between sial and sima).
- Silicates (mostly compounds made of silicon and oxygen) are the most abundant rocks and minerals in both oceanic and continental crust.



Oceanic crust

- Oceanic crust, extending 5-10 kilometers beneath the ocean floor, is mostly composed of different types of basalts. Geologists often refer to the rocks of the oceanic crust as "sima."
- Sima stands for silicate and magnesium, the most abundant minerals in oceanic crust. Basalts are a sima rocks.
- Oceanic crust is dense, almost 3 grams per cubic centimetre.
- Oceanic crust is constantly formed at mid-ocean ridges, where tectonic plates are tearing apart from each other.

- As magma that wells up from these rifts in Earth's surface cools, it becomes young oceanic crust.
- The age and density of oceanic crust increases with distance from mid-ocean ridges.
- Just as oceanic crust is formed at mid- ocean ridges, it is destroyed in subduction zones.
- Subduction is the important geologic process in which a tectonic plate made of dense lithospheric material melts or falls below a plate made of less-dense lithosphere at a convergent plate boundary.

Continental crust

- Continental crust is mostly composed of different types of granites.
- Geologists often refer to the rocks of the continental crust as "sial." Sial stands for silicate and aluminum, the most abundant minerals in continental crust.
- Sial can be much thicker than sima (as thick as 70 kilometers), but also slightly less dense (about 2.7 grams per cubic).
- As with oceanic crust, continental crust is created by plate tectonics.
- At convergent plate boundaries, where tectonic plates crash into each other, continental crust is thrust up in the process of orogeny, or mountain-building.
- For this reason, the thickest parts of continental crust are at the world's tallest mountain ranges.
- Cratons are the oldest and most stable part of the continental lithosphere.
- These parts of the continental crust are usually found deep in the interior of most continents.
- Continental crust is almost always much older than oceanic crust.
- Because continental crust is rarely destroyed and recycled in the process of subduction, some sections of continental crust are nearly as old as the Earth itself.

30. Ans. (c)

- Statement 2 is incorrect: Type 1 poliovirus is found in Afghanistan and Pakistan only.

Polio

- Recently Africa has been declared free from wild polio by the independent body, the Africa Regional Certification Commission.
- Nigeria is the last African country to be declared free from wild polio (Type 1).
- Poliomyelitis (virus that cause Polio disease) is a virus that spreads from person to person, usually through contaminated water. It can lead to paralysis by attacking the nervous system.
- There are three wild types of poliovirus (WPV) – type 1, type 2, and type 3.
- Type 2 wild poliovirus was declared eradicated in September 2015, with the last virus detected in India in 1999.
- Type 3 wild poliovirus was declared eradicated in October 2019. It was last detected in November 2012.
- Only type 1 wild poliovirus remains. The disease is now only found in Afghanistan and Pakistan.

31. Ans. (c)

- Both statements are correct

Hypothermia

- Hypothermia is a medical emergency that occurs when your body loses heat faster than it can produce heat, causing a dangerously low body temperature.
- Normal body temperature is around 98.6 F (37 C). Hypothermia occurs as your body temperature falls below 95 F (35 C).
- When your body temperature drops, your heart, nervous system and other organs can't work normally.
- Left untreated, hypothermia can lead to complete failure of your heart and respiratory system and eventually to death.

- Hypothermia is often caused by exposure to cold weather or immersion in cold water How does alcohol reduce body temperature?
- Alcohol is a vasodilator, which means that it causes blood vessels to relax and dilate or open. So, after consuming alcohol, the volume of blood brought to the skin's surface increases, making you feel warmer as a result.
- As the body begins to believe that it is warm, body also start to sweat — a reaction that automatically reduces overall body temperature.
- Drinking copious amounts of alcohol may affect your body's ability to detect the cold properly, which is in place to protect you from frostbite and hypothermia.

32. Ans. (d)

- Polytetrafluoroethylene PTFE (Teflon) is best known for its use in coating non-stick frying pans and other cookware, as it is hydrophobic and possesses fairly high heat resistance.
- It is very non-reactive, and so is often used in containers and pipework for reactive and corrosive chemicals.
- When used as a lubricant, PTFE can reduce friction, wear, and energy consumption of machinery. (PTFE) is a synthetic. fluoropolymer of tetrafluoroethylene
- It is commonly used as a graft material in surgical interventions.

33. Ans. (d)

- Statement 1 is incorrect: Due Process of Law is not explicitly mentioned in the Article 21.
- Article 21 of the Indian Constitution Article 21 of the Indian Constitution is the cardinal source of protection of an individual's life and liberty.
- It lays down that no person shall be deprived of his life or personal liberty except according to procedure established by law.
- It is well known that the Indian Constitution is an amalgamation of various constitutions, including the Constitution of the United States.
- Article 21 is one such provision as it is analogous to the 5th Amendment of the US Constitution.
- The 5th Amendment of the US constitution states inter alia that "no person shall be deprived of his life, liberty or property, without due process of the law".
- The Draft Indian Constitution had contained the words 'due process of law' but they were later omitted and purposefully substituted with 'procedure established by law.
- The reason behind this omission was uncertainty over the meaning of 'due processes.
- In order to apply the tests contained in Articles 14 and 19 of the Constitution, we have to consider the objects for which the exercise of inherent rights recognised by Article '21 of the Constitution are restricted as well as the procedure by which these restrictions are sought to be imposed.
- Both substantive and procedural laws and actions taken under them will have to pass tests imposed by articles 14 and 19 whenever facts justifying the invocation of either of these articles may be disclosed.
- The judgement in Maneka Gandhi case is a landmark judgement which played the most significant role towards the transformation of the judicial view on Article 21 of the Constitution of India so as to imply many more fundamental rights from article 21.
- The power of Judicial Review is incorporated in Articles 226 and 227 of the Constitution insofar as the High Courts are concerned.
- In regard to the Supreme Court Articles 32 and 136 of the Constitution, the judiciary in India has come to control by judicial review every aspect of governmental and public functions.

34. Ans. (c)

- Option (c) is correct

Revocation of the President's Rule

- Any proclamation of emergency by the President can be revoked by the subsequent proclamation by the President, without the approval of the Parliament.
- President's rule can end by itself if not extended by both the houses of the Parliament every six months beyond the first 1 year of its duration up to the maximum period of three years.
- But, term ending is not the only way to revoke the President's rule, the President can revoke it by proclaiming the revocation of the President's Rule at any time without getting approval from the Parliament.

35. Ans. (d)

- Statement 1 is incorrect: President can issue an ordinance whenever parliamentary legislation is not possible i.e. any of the House of the Parliament is not in session.
- Statement 3 is incorrect: Any ordinance ceases to be operative six weeks after the reassembly of the both House of the Parliament unless it is passed by the Parliament within this duration.
- Limitations to the Ordinance-making power of the President He can promulgate an ordinance only when both or either of the two Houses of Parliament is not in session.
- An ordinance can also be issued when only one House is in session because a law can be passed by both the Houses and not by one House alone.
- An ordinance made when both the Houses are in session is void.
- Thus, the power of the President to legislate by ordinance is not a parallel power of legislation.
- He can make an ordinance only when he is satisfied that the circumstances exist that render it necessary for him to take immediate action.
- In the Cooper case, (1970), the Supreme Court held that the President's satisfaction can be questioned in a court on the ground of malafide.
- This means that the decision of the President to issue an ordinance can be questioned in a court on the ground that the President has prorogued one House or both Houses of Parliament deliberately intending to promulgate an ordinance on a controversial subject, so as to bypass the parliamentary decision and thereby circumventing the authority of the Parliament.
- The 38th Constitutional Amendment Act of 1975 made the President's satisfaction final and conclusive and beyond judicial review.
- But, this provision was deleted by the 44th Constitutional Amendment Act of 1978.
- Thus, the President's satisfaction is justiciable on the ground of malafide.
- His ordinance-making power is coextensive as regards all matters except duration, with the law-making powers of the Parliament.

This has two implications:

- An ordinance can be issued only on those subjects on which the Parliament can make laws.
- An ordinance is subject to the same constitutional limitation as an act of Parliament.
- Hence, an ordinance cannot abridge or take away any of the fundamental rights.
- Every ordinance issued by the President during the recess of Parliament must be laid before both the Houses of Parliament when it reassembles.
- If the ordinance is approved by both the Houses, it becomes an act.
- If Parliament takes no action at all, the ordinance ceases to operate on the expiry of

six weeks from the reassembly of Parliament.

- The ordinance may also cease to operate even earlier than the prescribed six weeks if both the Houses of Parliament pass resolutions disapproving it.
- If the Houses of Parliament are summoned to reassemble on different dates, the period of six weeks is calculated from the later of those dates.
- This means that the maximum life of an ordinance can be six months and six weeks, in case of non-approval by the Parliament (six months being the maximum gap between the two sessions of Parliament).
- If an ordinance is allowed to lapse without being placed before Parliament, then the acts done and completed under it, before it ceases to operate, remain fully valid and effective.

36. Ans. (b)

- Statement 2 is incorrect: Financial bills (II) does not require prior recommendation of President for its introduction.
- Statement 3 is incorrect: The legislative procedure of financial bills (I) is similar to a money bill as well as any an ordinary bill.
- Financial bills (II) are treated as an ordinary bill in all respects.

Financial Bills

- Financial bills are of three kinds: Money bills—Article 110; Financial bills (I)—Article 117 (1); Financial bills (II)—Article 117 (3).
- This classification implies that money bills are simply a species of financial bills.
- Hence, all money bills are financial bills but all financial bills are not money bills.
- A financial bill (I) is a bill that contains not only any or all the matters mentioned in Article 110, but also other matters of general legislation.
- A financial bill (I) is similar to a money bill as (a) both of them can be introduced only in the Lok Sabha and not in the Rajya Sabha and (b) both of them can be introduced only on the recommendation of the president.
- In all other respects, a financial bill (I) is governed by the same legislative procedure applicable to an ordinary bill.
- Hence, it can be either rejected or amended by the Rajya Sabha (except that an amendment other than for reduction or abolition of a tax cannot be moved in either House without the recommendation of the president).
- In case of a disagreement between the two Houses over such a bill, the president can summon a joint sitting of the two Houses to resolve the deadlock.
- A financial bill (II) contains provisions involving expenditure from the Consolidated Fund of India, but does not include any of the matters mentioned in Article 110.
- It is treated as an ordinary bill and in all respects; it is governed by the same legislative procedure which is applicable to an ordinary bill.
- Hence, financial bill (II) can be introduced in either House of Parliament and recommendation of the President is not necessary for its introduction.
- The only special feature of this bill is that it cannot be passed by either House of Parliament unless the President has recommended to that House the consideration of the bill.

37. Ans. (b)

- The greenhouse effect is the rise in the earth's global average temperature.
- The greenhouse effect occurs when gases in the Earth's atmosphere trap the Sun's heat.
- This process warms the Earth significantly more than it would be without an atmosphere.
- The Global Warming Potential (GWP) was developed to allow comparisons of the global warming impacts of different gases.

- Specifically, it is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time, relative to the emissions of 1 ton of carbon dioxide (CO2).
- The larger the GWP, the more that a given gas warms the Earth compared to CO2 over that time period.
- Methane (CH4) is estimated to have a GWP of 27-30 over 100 years Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and from the decay of organic waste in municipal solid waste landfills.
- Nitrous Oxide (N2O) has a GWP 273 times that of CO2 for a 100-year timescale. Nitrous oxide is emitted during agricultural and industrial activities, the combustion of fossil fuels and solid waste, as well as during the treatment of wastewater.
- Chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), hydrochlorofluorocarbons (HCFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6) are called high-GWP gases because, for a given amount of mass, they trap substantially more heat than CO2.
- Hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes.
- Therefore, option (b) is the correct answer.

38. Ans. (d)

- Reduced ozone levels as a result of ozone depletion mean less protection from the sun's rays and more exposure to ultraviolet B radiation (UVB) at the Earth's surface.

Following are the environmental impacts of ozone depletion:

- Laboratory and epidemiological studies demonstrate that UVB causes non melanoma skin cancer and plays a major role in malignant melanoma development.
- It has been linked to the development of cataracts, a clouding of the eye's lens. So, point 1 is correct.
- Increases in UVB radiation could affect terrestrial and aquatic biogeochemical cycles, thus altering both sources and sinks of greenhouse and chemically important trace gases (e.g., carbon dioxide, carbon monoxide, carbonyl sulfide, ozone, and possibly other gases). So, point 2 is correct.
- Phytoplankton forms the foundation of aquatic food webs.
- Phytoplankton productivity is limited to the euphotic zone, the upper layer of the water column in which there is sufficient sunlight to support net productivity.
- Exposure to solar UVB radiation has been shown to affect both orientation and motility in phytoplankton, resulting in reduced survival rates for these organisms. So, point 3 is correct.
- Synthetic polymers, naturally occurring biopolymers, as well as some other materials of commercial interest are adversely affected by UVB radiation.
- Increases in UVB levels will accelerate their breakdown, limiting the length of time for which they are useful outdoors. So, point 4 is correct.
- Therefore, option (d) is the correct answer.

39. Ans. (b)

- Wet bulb temperature is the lowest temperature to which air can be cooled by the evaporation of water into the air at a constant pressure.
- It is therefore measured by wrapping a wet wick around the bulb of a thermometer and the measured temperature corresponds to the wet bulb temperature.
- Wet bulb temperature has been used to measure exposure to extreme heat. So, statement 1 is correct.

- Humans usually regulate their internal body temperature by sweating, but above the wet-bulb temperature, we can no longer cool down this way, leading our body temperature to rise steadily.
- When the wet-bulb temperature, or the combination of heat and humidity, exceeds the temperature of the human body — around 97 degrees Fahrenheit or 36 degrees Celsius — sweat cannot evaporate and humans can no longer cool themselves down. So, statement 2 is not correct.
- The wet bulb temperature is lower than the dry bulb temperature, and the difference between the two increases dramatically as the air becomes dry. So, statement 3 is correct.
- The Dry Bulb temperature, usually referred to as air temperature, is the air property that is most common used.
- When people refer to the temperature of the air, they are normally referring to its dry bulb temperature.
- Therefore, option (b) is the correct answer.

Relevance: The IPCC report AR6 has emphasized that sustained exposures to wet bulb temperatures above 35°C are fatal to humans.

40. Ans. (c)

Tax system

- Progressive tax is the one where the tax rate increases with the taxpayer's income.
- The correct interpretation is that the tax liability for a taxpayer increases with his income in terms of proportion of income and in absolute amount.
- In the case of regressive tax, the tax rate decreases with increase in income.
- Here, the tax liability of the taxpayer decreases with increase in his income.
- Income tax, corporate tax, surcharge, estate tax, dividend distribution tax, securities transaction tax, fringe benefit tax, and wealth tax, etc. some of the types of progressive tax.
- However, the fuel tax, GST, etc. are generally considered as regressive tax in India.

41. Ans. (a)

- Option (a) is correct

Capital Receipts

- The Union Budget, which is presented by the Finance Minister of India, comprises Capital Budget and Revenue Budget.
- The Capital Budget is further categorized into capital receipts and capital expenditure.

What are Capital Receipts?

- Capital receipts are receipts that create liabilities or reduce fi nancial assets.
- They also refer to incoming cash flows.
- Capital receipts can be both non-debt and debt receipts.
- Loans from the general public, foreign governments and the Reserve Bank of India (RBI) form a crucial part of capital receipts.
- All capital receipts are tax-free, unless there is a proviso to tax it. Capital receipts can be both non-debt and debt receipts

Non-debt capital receipts

- Non-debt receipts are those which do not incur any future repayment burden for the government.
- Almost 75 per cent of the total budget receipts are non-debt receipts.

Examples of non-debt capital receipts:

- Recovery of loans and advances, disinvestment, issue of bonus shares, etc.

Debt capital receipts

- Debt Receipts have to be repaid by the government. Around 25 per cent of

government expenditure is financed through borrowing.

- A reduction in debt receipt (or borrowing) can be a big leap for the economy's fi nancial health.
- Most of the capital receipts of the government are debt receipts.
- Examples of debt capital receipts: Market loans, issuance of special securities to public- sector banks, issue of securities, short-term borrowings, treasury bills, securities against small savings, state provident funds, relief bonds, saving bonds, gold bonds, external debt, etc., are all example of debt capital receipts.

42. Ans. (b)

- Option (b) is correct
- Ministry of Statistics and Programme Implementation
- The Ministry of Statistics and Programme Implementation came into existence as an Independent Ministry on 15.10.1999 after the merger of the Department of Statistics and the Department of Programme Implementation.
- The Ministry has two wings, one relating to Statistics and the other Programme Implementation.
- The Statistics Wing called the National Statistical Office (NSO) consists of the Central Statistical Office (CSO), the computer centre and the National Sample Survey Office (NSSO).

The Programme Implementation Wing has three Divisions, namely,

1. Twenty Point Programme
2. Infrastructure Monitoring and Project Monitoring and
3. Member of Parliament Local Area Development Scheme.

- Besides these two wings, there is National Statistical Commission created through Resolution of Government of India (MOSPI) and one autonomous Institute, viz., Indian Statistical Institute declared as an institute of National importance by an Act of Parliament.

SAGY

- Saansad Adarsh Gram Yojana (SAGY) was launched on 11th October 2014 with the aim to translate the comprehensive vision of Mahatma Gandhi about an ideal Indian village into reality, keeping in view the present context.
- It is being implemented by the Ministry of Rural Development.

43. Ans. (b)

- Statement 3 is incorrect: Portrait sculptures made of bronze were made during the Vijayanagar period in Andhra Pradesh.

Indian Bronze Sculpture

- The Harappan civilization saw a wide- scale practice of bronze casting.
- The bronze statues were made using "lost wax technique" or "Cire Perdue".
- The Dancing Girl is the world's oldest bronze sculpture datable to 2500 BCE.
- Found in Mohenjo-Daro, this four-inch figure depicts a naked girl wearing only ornaments, which include bangles in the left arm, and amulet and bracelet on the right arm.
- She stands in a 'tribhanga' dancing posture with the right hand on her hip.
- A famous hoard of Jain bronzes was found at Akota, on the outskirts of Baroda, dated between 5 th - 7 th AD.
- These bronzes were often subsequently inlaid with silver and copper to bring out the eyes, crowns and details of the textiles on which the fi gures were seated.
- Many standing Buddha images with right hand in abhaya mudra were cast in North India, particularly Uttar Pradesh and Bihar, during the Gupta and Post-Gupta periods.

- Vakataka bronze images of the Buddha from Maharashtra are contemporary with the Gupta period bronzes.
- They show the influence of the Amaravati style of Andhra Pradesh in the 3rd AD.
- The additional importance of the Gupta and Vakataka bronzes is that they were portable and monks carried them from place to place for the purpose of individual worship or to be installed in Buddhist viharas.
- Himachal Pradesh and Kashmir regions also produced bronze images of Buddhist deities as well as Hindu gods and goddesses have a very distinct style in comparison with bronzes from other parts of India.
- A noteworthy development is the growth of different types of iconography of Vishnu images.
- Four-headed Vishnu, also known as Chaturanana or Vaikuntha Vishnu, was worshipped in these regions.
- While the central face represents Vasudeva, the other two faces are that of Narasimha and Varaha.
- The Narasimha avatar and Mahishasuramardini Durga images of Himachal Pradesh are among the very dynamic bronzes from that region.
- Among the Pallava Period bronzes of the eighth century is the icon of Shiva seated in ardhaparyanka asana (one leg kept dangling).
- The right hand is in the achamana mudra gesture, suggesting that he is about to drink poison.
- Some of the most beautiful and exquisite statues were produced during the Chola Period in Tamil Nadu from the 10th – 12 th CE.
- During the sixteenth century, known as the Vijayanagar Period in Andhra Pradesh, the sculptors experimented with portrait sculpture in order to preserve knowledge of the royal patron for posterity.
- For e.g. at Tirupati, life- size standing portrait statues were cast in bronze, depicting Krishnadevaraya with his two queens, Tirumalamba and Chinnadevi.

44. Ans. (c)

- Statement 2 is incorrect: Three prominent dynasties who made Vesara style temples are Chalukyas, Hoysalas and Rashtrakutas.

Vesara School of Architecture

- It is also known as the Karnataka School of architecture and was conceptualized under the later Chalukya rulers in the mid-seventh century A.D.
- It combined features of both Nagara School and Dravidian School and resulted in a hybridized style.

Some of its features are:

- Emphasis on vimana and mandapa Open ambulatory passageway.
- The pillars, doorways and the ceilings were decorated with intricate carvings.

Three prominent dynasties who made Vesara style temples are:

- Chalukyas of Badami and Kalyani. Rashtrakutas (750-983 AD).
- For Example, Kailashnath temple in Ellora, etc.
- Hoysala Dynasty (1050-1300 AD). For example, temples at Halebid, Belur etc.
- Influence of Nagara style is in Curvilinear Shikhara and square base of Vesara temples. Influence of Dravida style is seen in intricate carvings and sculptures, design of Vimana and Step or terraced Shikara of Vesara temples.
- In the Vesara style of temple, the shikhara and mandap are joined by the Antrala.
- So, they do not have ambulatory passageways around the Sanctum Sanctorum.

45. Ans. (d)

- Alluri Sitharama Raju is believed to have been born in present-day Andhra Pradesh in 1897 or 1898, and is known for leading guerrilla resistance against the British.
- The movement that took place in hill blocks of Rampa and Gudem was called the 'Rampa rebellion'.
- The Manyam or Rampa Rebellion went on from 1922 to 1924.
- During this time Raju often fought British troops, and got the title of "Manyam Veerudu" or the "Hero of Jungle".
- He began to organise Adivasis against the atrocities by the police, the forest and revenue officials and extensively toured the 'Manyam' area.
- He told them that they were the sole owners of the forest produce and prepared them to fight against the oppressive Madras Forest Act, 1882. So, statement 1 is correct.
- Alluri Sitarama Raju's revolt against the British gained momentum after he opposed the strict implementation of the Madras Forest Act, 1882 that makes the life of tribal peope miserable by prohibiting them from Podu cultivation (age-old-cultivation by the tribal where they cannot use the cultivation process of the plains). So, statement 3 is correct.
- Raju was inspired by the Non-Cooperation Movement and talked about the greatness of Mahatma Gandhi.
- He persuaded people to wear khadi and give up drinking.
- But at the same time, he asserted that India could be liberated only by the use of force, not non-violence. So, statement 2 is correct.
- Anti-government sentiments were brewing among the locals, and this was seen in the looting of police stations in 1922 by tribals under the leadership of Raju.
- Aided by local support, warfare was carried out in the next couple of years, but Raju was eventually captured by the British and executed in 1924.
- Therefore, option (d) is the correct answer.

46. Ans. (d)

- Zika virus is a mosquito-borne flavivirus that was first identified in Uganda in 1947 in monkeys.
- It was later identified in humans in Uganda and the United Republic of Tanzania. So, statement 1 is correct.
- Zika virus infection during pregnancy can cause infants to be born with microcephaly and other congenital malformations, known as congenital Zika syndrome.
- It also causes complications of pregnancy including preterm birth and miscarriage.
- An increased risk of neurologic complications is associated with Zika virus infection in adults and children, including Guillain-Barré syndrome, neuropathy and myelitis. So, statement 2 is correct.
- No vaccine is yet available for the prevention or treatment of Zika virus infection.
- Symptoms are treated and patients are advised to take precautions. So, statement 3 is correct.
- There are numerous reports of Dengue (DENV) and Zika Virus (ZIKV) co-infection and ZIKV and chikungunya virus (CHIKV) coinfection among humans. So, statement 4 is correct.
- Therefore, option (d) is the correct answer. Relevance: Zika virus has spread to several parts of India according to Indian Council of Medical Research (ICMR) of India.

47. Ans. (b)

- The Common Reporting Standard (CRS), developed in response to the G20 request and approved by the Organization for Economic Co-operation and Development (OECD) Council, calls on jurisdictions to obtain information from their financial

institutions and automatically exchange that information with other jurisdictions on an annual basis.

- It sets out the financial account information to be exchanged, the financial institutions required to report, the different types of accounts and taxpayers covered, as well as common due diligence procedures to be followed by financial institutions.

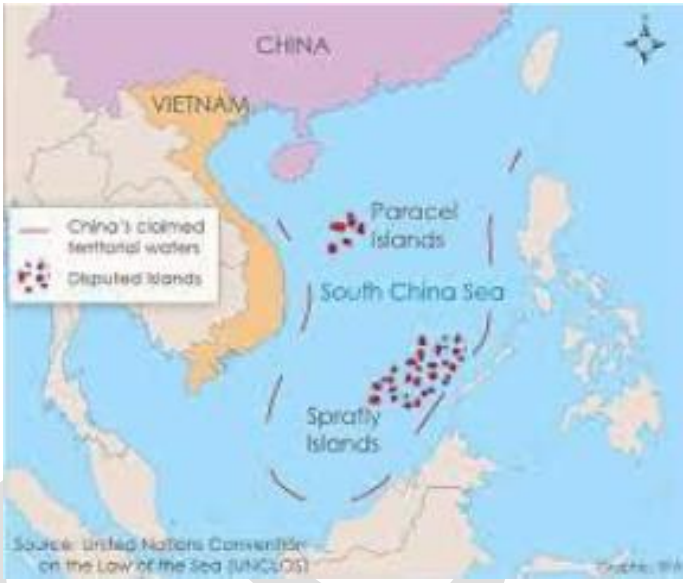
The Standard consists of the following four key parts:

- A model Competent Authority Agreement (CAA), providing the international legal framework for the automatic exchange of CRS information;
- The Common Reporting Standard;
- The Commentaries on the CAA and the CRS; and
- The CRS User Guide
- Therefore, option (b) is the correct answer.

Relevance: Finance Minister of India has said G20 should examine the feasibility of bringing non-financial assets like crypto into the ambit of automatic exchange of information among nations to check tax evasion.

48. Ans. (b)

- South China Sea (SCS) is a busy international waterway.
- There are a few hundred small islands in the SCS, a part of the western Pacific Ocean.
- Some of the main ones are Spratly Islands, Paracel Islands and Scarborough Shoal — the bone of contention between China and the Philippines.
- China claims most of these islands as its own. Vietnam, Malaysia, Brunei, the Philippines and Taiwan have rival claims.
- China has said it will not permit other nations to infringe on what it considers its sovereign rights in the strategically vital area.



- China laid claim to the SCS back in 1947. It demarcated its claims with a U-shaped line made up of eleven dashes on a map, covering most of the area.
- The Communist Party, which took over in 1949, removed the Gulf of Tonkin portion in 1953, erasing two of the dashes to make it a nine-dash line.
- Therefore, option (b) is the correct answer. Relevance: China has claimed it 'drove' away U.S. destroyer that sailed near disputed isles in the South China Sea.

49. Ans. (d)

- Option (d) is correct

Fluvial landforms

- Fluvial systems are dominated by rivers and streams. Stream erosion may be the most important geomorphic agent.
- Fluvial processes sculpt the landscape, eroding landforms, transporting sediment, and depositing it to create new landforms.
- Human civilization and ecosystems alike are dependent on fluvial systems.
- A river's delta is a feature created by deposition at the river's mouth.
- These are the wetlands that are created when rivers discharge their water and

sediment into another body of water, such as the ocean, a lake, or another river.

Bird's foot Delta

- On the basis of the shape:
- Delta 'Bird's foot' named from the claw- like shape of a bird foot.
- When the river flow is greater and the waves are smaller, this shape is produced.
- They were created as a result of river water depositing finer elements.
- The river is divided into smaller distributaries by deposited alluvial material.
- Due to the fact that the waves are frequently stronger than the river current, this Delta rarely occurs along ocean shores.
- These Deltas are also known as finger Deltas. American Mississippi River Delta as an example.
- Ganga-Brahmaputra delta, Mahanadi delta, Krishna delta, Godavari delta are examples of Bird foot delta in India.

50. Ans. (a)

- Option (a) is correct

Coastal landforms

- Coastal landforms can be either depositional or erosional.
- Beaches, spits and tombolo are examples of depositional landforms.
- Cliffs and caves are examples of erosional landforms.
- **Beaches:** Beaches are a common feature of a coastline.
- Beaches are made up of eroded material that has been transported from elsewhere and deposited by the sea.
- Constructive waves help to build up beaches.
- The material found on a beach (ie sand or shingle) depends on the geology of the area and wave energy.
- A cross-section of a beach is called a beach profile.
- The shingle ridges often found towards the back of a beach are called berms.
- **Spits:** Spits are also created by deposition. A spit is an extended stretch of beach material that projects out to sea and is joined to the mainland at one end.
- Spits are formed where the prevailing wind blows at an angle to the coastline, resulting in long shore drift.
- An example of a spit is Spurn Head, found along the Holderness coast in Humberside.

51. Ans. (a)

- Option (a) is correct

Mass wasting

- Mass wasting or mass movement is a process by which the weathered material moves downslope under the force of gravity.
- The weathered material is moved relatively for a short distance down the slopes under the influence of gravity with or without the assistance of running water called mass wasting or mass movement.
- There are several factors favoring mass wasting such as structure (closely spaced joints, faults, etc.), composition and permeability of rocks, topography (steep slopes and cliffs), climatic factors (large variations in temperature, heavy rainfall, etc.), vegetation cover, and also the role of slope gradient is another more important factor of mass wasting.
- Rugged young mountains are the sources where rapid mass wasting events can be observed.
- Generally, young mountains are eroded by rivers and glaciers into regions characterized by very steep and unstable slopes that result in sudden destructive slides and falls.
- When pores in the sediment are filled with water, they cause the materials slide past

one another due to loss of bonding among the sediment particles.]

- Normally water adds considerable weight to a mass of materials.
- When heavy rainfall occurs, the added weight sometimes may cause the material to slide or flow down slope.
- It is well known fact that the removal of plant cover triggers mass wasting.
- Due to an Earthquake and its aftershocks particularly faulting and jointed bed rocks can dislodge enormous volume of rock materials.

52. Ans. (c)

- Statement 3 is incorrect: Fold Mountains are composed primarily of sedimentary rock and metamorphic rock formed under high pressure and relatively low temperatures.

Fold Mountains

- Fold Mountains are created where two or more of Earth's tectonic plates are pushed together.
- At these colliding, compressing boundaries, rocks and debris are warped and folded into rocky outcrops, hills, mountains, and entire mountain ranges.
- Fold Mountains are often associated with continental crust.
- They are created at convergent plate boundaries, sometimes called continental collision zones or compression zones.
- Convergent plate boundaries are sites of collisions, where tectonic plates crash into each other.
- Compression describes a set of stresses directed at one point in a rock or rock formation.
- At a compression zone, tectonic activity forces crustal compression at the leading edge of the crust formation.
- For this reason, most fold mountains are found on the edge or former edge of continental plate boundaries.
- Rocks on the edge of the continental crust are often weaker and less stable than rocks found in the continental interior.
- This can make them more susceptible to folding and warping.
- Most Fold Mountains are composed primarily of sedimentary rock and metamorphic rock formed under high pressure and relatively low temperatures.
- Many fold mountains are also formed where an underlying layer of ductile minerals, such as salt, is present.
- Some examples of Fold Mountains are the Himalayas, the Rockies, The Alps, the Aravalli's, etc.

53. Ans. (c)

- Concave mirrors are commonly used in torches, searchlights and vehicles headlights to get powerful parallel beams of light.
- They are often used as shaving mirrors to see a larger image of the face.
- The dentists use concave mirrors to see large images of the teeth of patients.
- Large concave mirrors are used to concentrate sunlight to produce heat in solar furnaces.
- Convex mirrors are commonly used as rear-view (wing) mirrors in vehicles.
- These mirrors are fitted on the sides of the vehicle, enabling the driver to see traffic behind him/ her to facilitate safe driving. Convex mirrors are preferred because they always give an erect, though diminished, image.
- Also, they have a wider field of view as they are curved outwards.

54. Ans. (c)

- Atomic clocks are used to measure the distance between two objects in space by measuring very stable and precise frequencies of light emitted by specific atoms.

- These clocks remain ultra-stable for decades, however, their design is too bulky, power-hungry and sensitive to environmental variations.
- Due to their enormity, they have to be condensed for spaceflight operations and deep space explorations. So, statement 1 is correct.
- Atomic clock is a type of clock that uses certain resonance frequencies of atoms (usually cesium or rubidium) to keep time with extreme accuracy.
- The electronic components of atomic clocks are regulated by the frequency of the microwave electromagnetic radiation. So, statement 2 is correct.
- Without atomic clocks, GPS navigation would be impossible, the Internet would not synchronize, and the position of the planets would not be known with enough accuracy for space probes and landers to be launched and monitored.
- Atomic clocks are used onboard GPS satellites that orbit the Earth, but even they must be sent updates two times per day to correct the clocks' natural drift. So, statement 3 is correct.
- Atomic clocks are not radioactive because they do not rely on atomic decay.
- Simply, they have an oscillating mass and spring like an ordinary clock.
- The big difference between a standard clock in one's home and an atomic clock is that the oscillation in an atomic clock is between the nucleus of an atom and the surrounding electrons. So, statement 4 is not correct.
- Therefore, option (c) is the correct answer.

55. Ans. (a)

- In the frequency range from a few MHz up to 30 to 40 MHz, long distance communication can be achieved by ionospheric reflection of radio waves back towards the earth.
- This mode of propagation is called sky wave propagation. So, statement 1 is correct.
- Sky wave propagation is used by short wave broadcast services.
- The degree of ionisation varies with the height.
- The density of atmosphere decreases with height.
- At great heights the solar radiation is intense but there are few molecules to be ionised.
- Close to the earth, even though the molecular concentration is very high, the radiation intensity is low so that the ionisation is again low.
- However, at some intermediate heights, there occurs a peak of ionisation density.
- The ionospheric layer acts as a reflector for a certain range of frequencies (3 to 30 MHz).
- Electromagnetic waves of frequencies higher than 30 MHz penetrate the ionosphere and escape. So, statement 3 is not correct.
- A space wave travels in a straight line from transmitting antenna to the receiving antenna.
- Space waves are used for line-of-sight (LOS) communication as well as satellite communication.
- At frequencies above 40 MHz, communication is essentially limited to line of-sight paths.
- So, statement 2 is correct.
- In space wave communication, the antennas are relatively smaller and can be placed at heights of many wavelengths above the ground.
- Television broadcast, microwave links and satellite communication are some examples of communication systems that use space wave mode of propagation.
- Therefore, option (a) is the correct answer.

56. Ans. (c)

- Particles come in two types: the particles that make up matter, known as 'fermions',

and the particles that carry forces, known as 'bosons'.

- One essential parameter for classification of particles is their "spin" or intrinsic angular momentum.
- Fermions are particles which have half integer spin while particles with integer spin are called bosons. So, statement 1 is correct.
- The difference between fermions and bosons is that fermions take up space, while bosons can pile on top of one another.
- At low temperatures, bosons can behave very differently than fermions because an unlimited number of them can collect into the same energy state.
- The collection into a single state is called condensation, or Bose-Einstein condensation.
- It is responsible for the phenomenon of super fluidity in liquid helium.
- Coupled particles can also act effectively as bosons. In the Bardeen–Cooper–Schrieffer (BCS) theory of superconductivity, coupled pairs of electrons act like bosons and condense into a state which demonstrates zero electrical resistance. So, statement 2 is not correct.
- Fermions include electrons, protons, and neutrons while bosons include photons, gluons etc. So, statement 3 is correct.
- Therefore, option (c) is the correct answer.

57. Ans. (a)

- The roots of the formation of the Constituent Assembly and the framing of the Constitution are relevant to understand its philosophy and evolution.
- Statement 1 is not correct: The Constituent Assembly was formulated under the Cabinet Mission Plan prior to Independence.
- Statement 2 is correct: The elections to the Constituent Assembly were conducted under the system of separate electorate based on the community.
- After such an election too, it could not become a sovereign body. Thus its authority was limited in respect of the basic principles and procedure.
- The British Government brought it into existence in their process of conceding less and retaining the most of the authority with itself as counter strategy to the revolutionary raising.
- The Constituent Assembly was expected to work within the framework of the Cabinet Mission scheme alone.
- Statement 3 is correct: The Constituent Assembly became sovereign body after Indian Independence Act, 1947 was enacted and it was freed from limitations and restrictions imposed by British Parliament earlier under different Acts and plans. The sole task of the Constituent Assembly was framing of the Constitution for Independent India.

58. Ans. (c)

- Statement 2 is incorrect: In 1976, he was relieved of his responsibilities with regard to the compilation and maintenance of accounts of the Central Government.

The CAG

- The CAG is appointed by the president of India by a warrant under his hand and seal.
- The CAG, before taking over his office, makes and subscribes before the president an oath or affirmation same as of the Supreme Court Judges.
- He holds office for a period of six years or upto the age of 65 years, whichever is earlier.
- He can resign any time from his office by addressing the resignation letter to the president.
- He can also be removed by the president on same grounds and in the same manner as a judge of the Supreme Court.

- He audits the accounts related to all expenditure from the Consolidated Fund of India, consolidated fund of each state and consolidated fund of each union territory having a Legislative Assembly.
- He audits all expenditure from the Contingency Fund of India and the Public Account of India as well as the contingency fund of each state and the public account of each state.
- He audits all trading, manufacturing, profit and loss accounts, balance sheets and other subsidiary accounts kept by any department of the Central Government and state governments.
- He audits the receipts and expenditure of the Centre and each state to satisfy himself that the rules and procedures in that behalf are designed to secure an effective check on the assessment, collection and proper allocation of revenue.

He audits the receipts and expenditure of the following:

- All bodies and authorities substantially financed from the Central or state revenues.

Government companies.

- Other corporations and bodies, when so required by related laws.
- He audits all transactions of the Central and state governments related to debt, sinking funds, deposits, advances, suspense accounts and remittance business.
- He also audits receipts, stock accounts and others, with approval of the President, or when required by the President.
- He audits the accounts of any other authority when requested by the President or Governor.
- For example, the audit of local bodies.
- He advises the President with regard to prescription of the form in which the accounts of the Centre and the states shall be kept (Article 150).
- He submits his audit reports relating to the accounts of the Centre to President, who shall, in turn, place them before both the Houses of Parliament (Article 151).
- He submits his audit reports relating to the accounts of a state to governor, who shall, in turn, place them before the state legislature (Article 151).
- He ascertains and certifi es the net proceeds of any tax or duty (Article 279).
- His certificate is fi nal. The 'net proceeds' means the proceeds of a tax or a duty minus the cost of collection.
- He acts as a guide, friend and philosopher of the Public Accounts Committee of the Parliament.
- He compiles and maintains the accounts of state governments.
- In 1976, he was relieved of his responsibilities with regard to the compilation and maintenance of accounts of the Central Government due to the separation of accounts from audit, that is, departmentalization of accounts.
- He audits the accounts of Panchayati Raj Institutions and Urban Local Bodies but with the permission of the State government.
- The accounts of the District Council or, as the case may be, the Regional Council shall be kept in such form as the Comptroller and Auditor General of India may, with the approval of the President, prescribe
- The Comptroller and Auditor-General shall cause the accounts of the District and Regional Councils to be audited in such manner as he may think fit, and the reports of the Comptroller and Auditor-General relating to such accounts shall be submitted to the Governor who shall cause them to be laid before the Council.

59. Ans. (d)

- All statements are correct

Doctrine of Incidental or Ancillary Powers

- Ancillary or incidental powers mean those powers that support the powers that are expressly conferred.
- There are some express powers given to both the Central and State Governments through the three lists specified in the Seventh Schedule.
- The doctrine of ancillary or incidental powers means that these express powers to legislate on a matter also consist of the power to legislate on an incidental or ancillary matter.
- Such a power is essential for the proper exercise of the expressly conferred legislative powers.
- For example, the power to legislate on banking would also include all the related powers to legislate on matters like functions of banks, the composition of their boards, relationship with RBI, etc.
- Similarly, the power to legislate on an entry dealing with forests would include the power of afforestation, deforestation, planning and management of forest as ancillary matters.
- The jurisprudence related to this doctrine focuses on such an interpretation of the words in the statute to provide them a liberal and the widest interpretation.
- This aids in the proper and effective functioning of the object of the legislature.
- But, this doctrine has a limited application.
- It gets invoked only in cases where there is a need for aiding the main matter of the legislation.
- The main idea behind this doctrine is to equip the legislature with all the necessary powers.
- In State of Rajasthan vs. G. Chawla case, the Apex Court held that "the power to legislate on a topic includes the power to legislate on an ancillary matter which can be said to be reasonably included in the topic".
- The following provisions of the Constitution reflect the power to make law on incidental matters:
- Article 4 provides the power to make law on matters supplemental, incidental, and consequential to the law providing for adding of states under Article 2 and 3.
- Article 110 and 199 defi ne money bill for both the Union and the States.
- It includes "any matter incidental to any of the matters specifi ed in sub-clauses (a) to (f)" of the respective articles.
- Article 145 provides the power to the Supreme Court to make "rules as to the costs of and incidental to any proceedings in the Court and as to the fees to be charged in respect of proceedings therein".
- Article 169 provides for the abolition or creation of Legislative Councils in States.
- This article includes the power to make rules "as may be necessary to give effect to the provisions of the law and may also contain such supplemental, incidental and consequential provisions as Parliament may deem necessary".

60. Ans. (a)

- Statement 2 is incorrect: Calling attention motion is mentioned in the rule of procedure, not Zero Hour.

Zero hour and calling attention motion

- Zero hour is an informal device available to Members of Parliament to raise matter without any prior notice whereas calling attention motion used to call the attention of minister to a matter of urgent public importance.

Zero hour:

- Unlike the question hour, the zero hour is not mentioned in the Rules of Procedure.
- Thus it is an informal device available to the members of the Parliament to raise matters without any prior notice.

- Calling attention motion is mentioned in the rule of procedure, not Zero Hour.
- The zero hour starts immediately after the question hour and lasts until the agenda for the day (, i.e., regular business of the House) is taken up. In other words, the time gap between the question hour and the agenda is known as zero hour.
- It is an Indian innovation in the field of parliamentary procedures and has been existence since 1962.

Calling Attention Motion:

- It is introduced in the Parliament by a member to call the attention of a minister to a matter of urgent public importance, and to seek an authoritative statement from him on that matter.
- Like the zero hour, it is also an Indian innovation in the parliamentary procedure and has been in existence since 1954.
- However, unlike the zero hour, it is mentioned in the Rules of Procedure.

61. Ans. (a)

- Harmful algal blooms (HABs) commonly known as Red tides occur when algae production goes out of control and produces harmful and toxic effects on people and other organisms.
- They are caused by diverse organisms, including toxic and noxious phytoplankton, cyanobacteria, benthic algae, and macroalgae.
- Dinoflagellates and diatoms are two different types of phytoplankton and are most often found in salt water or brackish water, including in estuaries.
- Dinoflagellates are the most common cause of algal blooms in salt water. So, statement 1 is correct.
- The duration of a HAB event can range from a few weeks to longer than a year.
- The duration of a bloom depends on physical and biological conditions that influence its growth and persistence. So, statement 2 is correct.
- Shellfish being filter feeders are more prone to Bioaccumulation and are one of the most affected by Harmful Algal Blooms.
- They can cause oxygen (not carbon dioxide) in the water to deplete leading to hypoxia. So, statement 3 is not correct.
- Algae need carbon dioxide to survive. Higher levels of carbon dioxide in the air and water can lead to rapid growth of algae, especially toxic blue-green algae that can float to the surface of the water.
- Therefore, option (a) is the correct answer. Relevance: Recently, algal bloom posed threat to Kabani river ecosystem in southern India.

62. Ans. (c)

Biosphere:

- Biosphere is a relatively thin life-supporting stratum of Earth's surface, extending from a few kilometres into the atmosphere to the deep-sea vents of the ocean.
- The biosphere is a global ecosystem composed of living organisms (biota) and the abiotic (nonliving) factors from which they derive energy and nutrients.
- The biosphere is characterized by the continuous cycling of matter and an accompanying flow of solar energy in which certain large molecules and cells are self-reproducing.
- Water is a major predisposing factor, for all life depends on it.

Biome:

- A biome is a distinct biogeographical unit consisting of a biological community that has formed in response to a shared regional climate.
- Biomes may span more than one continent.
- Biome is a broader term than habitat and can comprise a variety of habitats.

Ecosystem:

- An ecosystem is a geographic area where plants, animals, and other organisms, as well as weather and landscapes, work together to form a bubble of life.

Population:

- It is a group of organisms usually of the same species, occupying a defined area during a specific time.
- Therefore, option (c) is the correct answer.

63. Ans. (c)

Adaptations by plants to cope with arid conditions:

- Thick, waxy skin to reduce loss of water and to reflect heat.
- Large, fleshy stems to store water.
- Thorns and thin, spiky or glossy leaves to reduce water loss. So, point 1 is correct.
- Spikes protect cacti from animals wishing to use stored water.
- Deep roots to tap groundwater.
- Long shallow roots which spread over a wide area. So, point 2 is not correct.
- Plants lie dormant for years until rain falls.

Adaptations by animals to cope with arid conditions:

- They are fast runners.
- They are nocturnal in habit to avoid the sun's heat during day time. So, point 3 is correct.
- They conserve water by excreting concentrated urine.
- Animals and birds usually have long legs to keep their body away from the hot ground. So, point 4 is correct.
- Lizards are mostly insectivorous and can live without drinking water for several days.
- Herbivorous animals get sufficient water from the seeds which they eat.
- Therefore, option (c) is the correct answer.

64. Ans. (c)

- Statement 1 is correct: In the Fertiliser subsidy, the purchase is made by the farmer at a price below MRP that is, below the usual demand-and-supply-rate, or regular production and import cost.
- Statement 2 is correct: Subsidy ultimately goes to the fertilizer company, even though it is the farmer that benefits.
- Statement 3 is incorrect: The companies will be paid only after the actual sale to the farmer.

Fertilizer Subsidy in India

- Farm Subsidy as a concept originated during the Green Revolution of the 1970s-80s.
- In the Fertiliser subsidy, the purchase is made by the farmer at a price below MRP that is, below the usual demand- and-supply-rate, or regular production and import cost.
- But the subsidy ultimately goes to the fertiliser company, even though it is the farmer that benefits.
- Before 2018, companies used to get reimbursed after the material was dispatched and received by the district railhead or designated go down.
- But in 2018 DBT (Direct Benefi t Transfer) was introduced which money is transferred directly to the retailer's account.
- However, the companies will be paid only after the actual sale to the farmer.
- The DBT system is seen after by the Department of Fertilizers' e-Urvarak DBT portal.

65. Ans. (d)

- Option (d) is correct

Transfer payments

- Transfer payments are receipts which the residents of a country receive 'for free',

without having to make any present or future payments in return.

- They consist of remittances, gifts and grants, financial aid, social security, and government subsidies.
- In economics, a transfer payment is a redistribution of income and wealth by means of the government making a payment, without goods or services being received in return.
- These payments are considered to be non-exhaustive because they do not directly absorb resources or create output.
- For the purpose of calculating Gross Domestic Product (GDP), government spending does not include transfer payments, which are the reallocation of money from one party to another rather than expenditure on newly-produced goods and services.

66. Ans. (b)

- Option b is correct.
- The Ministry of Railways has invited Request for Qualifications (RFQ) for private participation for operation of passenger train services over 109 Origin Destination (OD) pairs of routes through introduction of 151 modern Trains (Rakes).
- The 109 OD Pairs have been formed into 12 Clusters across the Indian Railway network.
- Each Train shall have a minimum of 16 coaches.
- The project would entail private sector investment of about Rs 30,000 crore.
- This is the first initiative of private investment for running Passenger Trains over Indian Railways network.
- Statement 1 is correct. The private entity shall be responsible for financing, procuring, operation and maintenance of the trains.
- Trains shall be designed for a maximum speed of 160 kmph. There would be a substantial reduction in journey time.
- The running time taken by a train shall be comparable to or faster than the fastest train of Indian Railways operating in the respective route.
- Statement 2 is correct: The objective of this initiative is to introduce modern technology rolling stock with reduced maintenance, reduced transit time, boost job creation, provide enhanced safety, provide world class travel experience to passengers, and also reduce demand supply deficit in the passenger transportation sector.
- Statement 3 is incorrect: The Concession Period for the project shall be 35 years.
- The Private Entity shall pay to Indian Railways fixed haulage charges, energy charges as per actual consumption and a share in Gross Revenue determined through a transparent bidding process.
- These trains shall be operated by the Driver and Guard of Indian Railways.
- The operation of the trains by the private entity shall conform to the key performance indicators like punctuality, reliability, upkeep of trains etc.
- Operation and maintenance of the passenger trains would be governed by standards & specifications and requirements specified by Indian Railways.

67. Ans. (c)

- Option c is correct.
- Cost-push inflation occurs when overall prices increase (inflation) due to increases in the cost of factors of production such as wages and raw materials.
- Statement 1 is correct: An increase in the cost of input goods used in manufacturing, such as raw materials, may lead to cost push inflation.
- Rise in crude oil prices can lead to rise in input costs and increase in cost of production.
- The higher costs of production decrease the aggregate supply in the economy.

- Since the demand for goods hasn't changed, the price increases from production are passed onto consumers creating cost-push inflation.
- Statement 2 is incorrect: Rice in household consumption due to availability of cheaper credits causes demand-pull inflation (and not cost-push inflation).
- This is because people's propensity to spend increases.
- Demand pull inflation occurs when aggregate demand in an economy is greater than the aggregate supply (at full employment level) of goods and services.
- Statement 3 is correct: Cyclones or floods are often the causes of cost-push inflation when they lead to the shutdown of certain refineries.
- Demand usually remains the same, but the refineries available to produce fuel usually have to jack up prices because they don't have enough crude oil supply to turn into fuel.
- Statement 4 is correct: Natural disasters, which can include floods, earthquakes, fires, are often unexpected causes of cost-push inflation.
- If a large disaster causes unexpected damage to a production facility and results in a shutdown or partial disruption of the production chain, higher production costs are likely to follow.
- Example: Decline in agricultural output due to floods, famine etc. leads to cost-push inflation.

68. Ans. (b)

- Option b is correct.
- The term 'economic drain' refers to a portion of national product of India which was not available for consumption of its peoples, but was being drained away to Britain for political reasons and India was not getting adequate economic or material returns for it.
- Option a is correct:

The major components of this drain were:

1. Salaries and pensions of civil and military British officials,
2. Interests on loans taken by the Indian Government from abroad,
3. Profits on foreign investment in India,
4. Stores purchased in Britain for civil and military departments,
5. Payments to be made for shipping, banking and insurance services.

- Option b is incorrect: The drain theory was put forward by Dadabhai Naoroji in his book Poverty and UnBritish Rule in India.
- Romesh Chandra Dutt wrote The Economic History of India.
- Option c is correct: The drain of wealth checked and retarded capital formation in India.
- This had immense effect on income and employment potential within India.
- The deindustrialization caused due to one way free trade and import of British goods led to decline in traditional handicrafts industry.
- The unemployment trend is witnessed in the urban to rural migration trend during that time.
- Option d is correct:

According to nationalist estimates, the economic drain at that time was—

- more than the total land revenue, or
- half the total government revenue, or
- one third of the total savings (in today's terms, it amounted to 8 per cent of the national product).

69. Ans. (b)

- Option b is correct.
- This question is based on the article "PM announces 26th December as 'Veer Baal Diwas' to mark martyrdom of Sahibzada

Zorawar Singh Ji and Sahibzada Fateh Singh Ji" published in the PIB on 9th January 2022.

- Statement 1 is incorrect.
- Sahibzada Zorawar Singh (9 Years old) and Sahibzada Fateh Singh (7 Years old) were the sons of Guru Gobind Singh.
- They were not the members of Hindustan Republican Association.
- They were captured by Aurangzeb were offered safe passage if they became Muslims.
- Both refused, and so Wazir Khan sentenced them to death. They were bricked alive.
- Statement 2 is correct. Recently, Prime Minister has announced that 26th December shall be observed as 'Veer Baal Diwas' to mark the martyrdom of Sahibzada Zorawar Singh Ji (9 Years old) and Sahibzada Fateh Singh Ji (7 Years old).
- They are remembered as among the most respected martyrs in Sikhism.

70. Ans. (b)

- Option b is correct.
- In order to bring about a new socio-political awareness among the untouchables, Dr.Babasaheb Ambedkar established Bahishkrit Hitkarini Sabaha on 20 July 1924 at Bombay.
- Ambedkar had founded the Depressed Classes Federation (DCF) in 1930 and the Independent Labour Party (ILP) in 1936.
- All India Scheduled Castes Federation (SCF) was an organisation in India founded by Ambedkar in 1942 to campaign for the rights of the Dalit community.
- All India Anti-Untouchability League, also known as Harijan Sevak Sangh was founded by Mahatma Gandhi.
- It was founded on September 30, 1932, in the wake of Gandhiji's Epic Fast at Yervada Jail, Pune, resulting in the historic Poona Pact.
- The Sangh was established to combat untouchability and a new weekly paper, the Harijan, was started.

71. Ans. (d)

- A new study by Curtin University has found the most robust evidence yet showing that Earth's continents were formed by giant meteorite impacts.
- The most commonly accepted theory in place attributes continent formation to the movement of tectonic plates.
- However, the new study provides some concrete evidence supporting the big impact theory.
- The researchers looked for evidence in zircon crystals embedded in rocks from the Pilbara Craton in Western Australia.
- This craton is remnants of an ancient crust from a meteorite impact, and began forming more than three billion years ago.
- Zircons are formed by the crystallisation of magma or are found in metamorphic rocks.
- Zircons act as tiny time capsules, recording the period of geologic activity.
- Newer zircon adds to the original crystal as time progresses.
- Older grains of zircon possessed the lighter oxygen-16.
- The younger ones contained the heavier oxygen-18.
- Therefore, option (d) is the correct answer.

Relevance: A new theory has provided evidence that giant meteorite impacts formed continents.

72. Ans. (a)

- Natural Farming is a chemical-free alias traditional farming method.
- It is considered as agro ecology based diversified farming system which integrates crops, trees and livestock with functional biodiversity.
- In Natural Farming, Beejamrit and Jeewamrit bio stimulants, a source of microbes that convert nutrients present in the soil into

forms that can be used by plants, are prepared by mixing cow dung and urine with jaggery and pulse flour.
- Crop residues are used for mulching or Achhadan.
- Formulations like Neemastra (cow dung, urine and neem leaves), brahmastra (leaves of fruit plants such as mango and guava and cow urine) and sour buttermilk are recommended for pest and disease management.
- Therefore, option (a) is the correct answer.

Relevance: Natural farming practices in Himachal Pradesh drastically reduced input costs, but farmers still lack market access.

73. Ans. (d)
- Option (d) is correct

Reasons for the Season
- A season is a period of the year that is distinguished by special climate conditions.
- The four seasons-spring, summer, fall, and winter-follow one another regularly.
- Each has its own light, temperature, and weather patterns that repeat yearly.
- The seasons are caused by the tilt of the Earth's rotational axis away or toward the sun as it travels through its year-long path around the sun.
- All the other reasons are there but they have only
- In June, when the Northern Hemisphere is tilted toward the sun, the sun's rays hit it for a greater part of the day than in winter.
- This means it gets more hours of daylight.
- In December, when the Northern Hemisphere is tilted away from the sun, with fewer hours of daylight.
- This causes the seasons on the Earth.

74. Ans. (d)
- Option (d) is correct.

Formation of Dew
- Dew forms when the radiational cooling of objects near or on the ground also cools the shallow layer of air that comes in contact with them, causing the condensation of some water vapor.
- The atmosphere supplies most of the water vapor, but some also can diffuse up through the soil and condense on the ground.
- The temperature at which condensation begins is termed the dew point.
- The best conditions for dew formation are high humidity in the lowest layers of air and the absence of a strong wind, which would create a larger, more homogeneous layer of air.
- The ideal conditions for its formation are clear sky, calm air, high relative humidity, and cold and long nights.
- For the formation of dew, it is necessary that the dew point is above the freezing point.

75. Ans. (d)
- Option (d) is correct

Factors affecting Tides
- Forces that contribute to tides are called tidal constituents.
- The Earth's rotation is a tidal constituent.
- The major tidal constituent is the moon's gravitational pull on the Earth.
- The closer objects are, the greater the gravitational force is between them.
- Although the sun and moon both exert gravitational force on the Earth, the moon's pull is stronger because the moon is much closer to the Earth than the sun is.
- Forces that contribute to tides are called tidal constituents.
- The Earth's rotation is a tidal constituent.
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- The closer objects are, the greater the gravitational force is between them.
- Although the sun and moon both exert gravitational force on the Earth, the moon's pull is stronger because the moon is much closer to the Earth than the sun is.
- The shape of bays and estuaries also can magnify the intensity of tides.
- Funnel- shaped bays in particular can dramatically alter tidal magnitude.
- Local wind and weather patterns also can affect tides. Strong offshore winds can move water away from coastlines, exaggerating low tide exposures.
- Onshore winds may act to pile up water onto the shoreline, virtually eliminating low tide exposures.
- High pressure systems can depress sea levels, leading to clear sunny days with exceptionally low tides.
- Conversely, low-pressure systems that contribute to cloudy, rainy conditions typically are associated with tides than are much higher than predicted.

76. Ans. (d)

- Coal Tar:
- It is a black, thick liquid with an unpleasant smell.
- It is a mixture of about 200 substances.
- Products obtained from coal tar are used as starting materials for manufacturing various substances that are used in everyday life and in industry.
- Products like synthetic dyes, drugs, explosives, perfumes, plastics, paints, photographic materials, roofing materials, etc.
- Interestingly, naphthalene balls used to repel moths and other insects are also obtained from coal tar.
- Therefore, option (d) is the correct answer.

Relevance: Coal tar pitch is increasingly being used in roofing as it is resistant to harsh chemicals, ultraviolet (UV) rays.

77. Ans. (c)

- Metal oxides which react with both acids as well as bases to produce salts and water are known as amphoteric oxides.
- Many metals such as copper, zinc, tin, lead, Aluminium, and beryllium form amphoteric oxides or hydroxides.
- Amphoteric depends on the oxidation states of the oxide.
- Tin Oxide, Aluminium Oxide & Zinc Oxide react with acid as well as the base. So, they are amphoteric in nature. So, points 2, 3 and 5 are correct.
- Calcium Oxide is basic in nature and Carbon Dioxide is acidic in nature.
- They are not amphoteric in nature. So, points 1 and 4 are not correct.
- Therefore, option (c) is the correct answer.

78. Ans. (a)

- At ordinary temperatures, the surfaces of metals such as magnesium, aluminium, zinc, lead, etc., are covered with a thin layer of oxide.
- The protective oxide layer prevents the metal from further oxidation. Iron does not burn on heating but iron filings burn vigorously when sprinkled in the flame of the burner. So, statement 1 is correct.
- Copper does not burn, but the hot metal is coated with a black-coloured layer of copper oxide.
- On heating, it forms a black solid. Slowly forms a surface oxide at room temperature.
- It shows no reaction with both steam and water. So, statement 2 is correct.
- Silver and gold do not react with oxygen even at high temperatures. So, statement 3 is not correct.
- Therefore, option (a) is the correct answer.

79. Ans. (b)

- Article 1(1) of the Indian Constitution says India, that is Bharat, shall be a Union of States.

- It implies two things - one, the Indian Federation is not the result of an agreement by the states; and two, no state has the right to secede from the federation.
- This implies the indestructible nature of the Indian Union.
- Therefore, option (b) is the correct answer.

80. Ans. (a)

The following Fundamental Rights are available only to Indian citizens and not to foreigners:

- Prohibition of discrimination on grounds of religion, race, caste, sex or place of birth (Article 15).
- Equality of opportunity in matters of public employment (Article 16).

Protection of six rights regarding freedom of :

1. speech and expression,
2. assembly,
3. association,
4. movement,
5. residence, and
6. profession (Article 19).

- Protection of life and personal liberty (Article 21).
- Right of minorities to establish and administer educational institutions (Article 30).
- So, point 1 and point 3 are correct.
- The other Fundamental Rights including Freedom to manage religious affairs (Article 26) and Protection in respect of conviction for offences (Article 20) are available to both Indian citizens as well as the foreigners.
- So, point 2 and point 4 are not correct.
- Therefore, option (a) is the correct answer.

81. Ans. (d)

- In discussions of justice, a distinction is drawn between procedural justice and substantive justice.
- Procedural justice refers to justice or fairness or impartiality of the processes and procedures through which a law or policy or decision is arrived at and applied.
- Substantive justice refers to justice or fairness of the content or outcome of laws, policies, decisions, etc. So, statements 1 and 2 are correct.
- Principles of procedural justice have traditionally been based on the idea of formal equality of persons, i.e., their equality as human beings or as subjects of the rule of law, irrespective of their differences in gender, religion, race, caste, wealth, etc.
- Often, rights-based justice is seen as procedural justice, whereas needs-based justice is seen as substantive justice. So, statement 3 is correct.
- Needs-based justice calls for egalitarian distribution of resources within and across countries.
- Rights-based conceptions of justice differ from needs-based justice as the main function of the state was to protect the negative liberty rights of the individuals.
- The welfare-state or egalitarian liberals stress the positive freedom or welfare rights of the citizens.
- Therefore, option (d) is the correct answer.

82. Ans. (b)

- Statement 1 is incorrect: An organism with a narrow tolerance range is said to be “steno” whereas, that with a wide tolerance range is said to be “eury”.

Tolerance range of species

- Just as species have geographic ranges, they also have tolerance ranges for the abiotic environmental conditions.
- In other words, they can tolerate (or survive within) a certain range of a particular factor, but cannot survive if there is too much or too little of the factor.

- Each organism has an invariably defined range of conditions that it can tolerate, diversity in the resources it utilises and a distinct functional role in the ecological system, all these together comprise its niche.
- An organism with a narrow tolerance range is said to be "steno" for that factor (e.g. stenothermal or stenohaline).
- An organism with a wide tolerance range is said to be "eury" (e.g. eurythermal).
- Organisms can be steno with respect to one factor and eury with respect to a different one.
- Centrarchids (bass and sunfi sh) are eurythermal but stenohaline; salmonids are just the opposite.
- These tolerance ranges are not independent.
- An organism near the tolerance limits for one factor will probably be under stress, so its ability to tolerate other factors will be reduced.
- The tolerance ranges for environmental factors partly defi ne the organism's niche.
- If salinity tolerance is graphed against temperature tolerance, a niche area is defined.
- Ideally then, the organism should try to maintain the constancy of its internal environment (a process called homeostasis) despite varying external environmental conditions that tend to upset its homeostasis.
- This constancy, for example, could be in terms of optimal temperature and osmotic concentration of body fluids.

Responses to Abiotic Factors

- Some organisms are able to maintain homeostasis by physiological (sometimes behavioural also) means which ensures constant body temperature, constant osmotic concentration, etc. This is called regulation.
- An overwhelming majority (99 per cent) of animals and nearly all plants cannot maintain a constant internal environment.
- Their body temperature changes with the ambient temperature.
- This is called conformation.
- The organism can move away temporarily from the stressful habitat to a more hospitable area and return when stressful period is over, called migration.
- Another means is the suspension i.e. to suspend their physiological process until availability of suitable environment. For example, spores formation in bacteria, fungi and lower plants; 'seed dormancy' in higher plants; and hibernation & aestivation in animals.

83. Ans. (d)

- All statements are correct

Causes of Biodiversity Loss

- The accelerated rates of species extinctions that the world is facing now are largely due to human activities.

There are four major causes of biodiversity loss:

Habitat loss and fragmentation:

- This is the most important cause of driving animals and plants to extinction.
- The Amazon rain forest (it is so huge that it is called the 'lungs of the planet') harboring probably millions of species is being cut and cleared for cultivating soya beans or for conversion to grasslands for raising beef cattle.
- Besides total loss, the degradation of many habitats by pollution also threatens the survival of many species.
- When large habitats are broken up into small fragments due to various human activities, mammals and birds requiring large territories and certain animals with

migratory habits are badly affected, leading to population declines.

Over-exploitation:

- Humans depends on nature for food and shelter, but when 'need' turns to 'greed', it leads to over- exploitation of natural resources.
- Many species extinctions in the last (500 years) were due to overexploitation by humans.

Alien species invasions:

- When alien species are introduced unintentionally or deliberately for whatever purpose, some of them turn invasive, and cause decline or extinction of indigenous species.
- The Nile perch introduced into Lake Victoria in east Africa led eventually to the extinction of an ecologically unique assemblage of more than 200 species of cichlid fish in the lake.
- Co-extinctions: When a species becomes extinct, the plant and animal species associated with it in an obligatory way also become extinct.
- When a host fish species becomes extinct, its unique assemblage of parasites also meets the same fate.

84. Ans. (d)

- All statements are correct

Ecosystem: Structure and Functions

- An ecosystem can be visualized as a functional unit of nature, where living organisms interact among themselves and also with the surrounding physical environment.

For the purpose of studying, it is convenient to divide it into two basic categories:

- **Terrestrial Ecosystem:** Forest, grassland and desert, etc.
- **Aquatic Ecosystem:** Pond, lake, wetland, river, etc.

- Interaction of biotic and abiotic components results in a characteristic physical structure of an ecosystem.
- Vertical distribution of different species occupying different levels in the ecosystem is called stratification.

The biotic and abiotic components interact in an ecosystem and perform the following functions:

- Production
- Decomposition
- Energy fl ow
- Nutrient Cycling

85. Ans. (a)

- Statement 2 is incorrect: Monetary policy was subservient to the fi scal policy in that era.
- Monetary policy in Pre-Reform Era (1948 – 1991)
- Monetary policy was subservient to the fiscal policy.
- The financial system was characterized by extensive regulations such as administered interest rates, over regulated, directed credit programmes, weak banking structure, lack of proper accounting and risk management systems and lack of transparency in operations of major financial market participants.

86. Ans. (b)

- Option (b) is correct

Obstacles for technology-driven agriculture

- The introduction of technology will result in higher production of the agriculture sector as it has been seen in many countries.
- Despite promising prospects, Indian agriculture is still done by using a manual workforce and is less driven by technology.

The major factors that present obstacles for the transition from labor-intensive agriculture to technology-driven agriculture are:

Smaller landholding:

- The average landholding in India is 1.08 hectares; it would typically sustain eight persons. Smallholders now cultivate 42 percent of operated land and constitute 83 percent of total landholdings.
- Small landholdings make it less profi table to invest in cutting-edge technologies since the scale of production fails to capitalize on the full potential of the technological tools.

Lo**w investment:**

- There is still a huge gap between the requirement of capital and investment in the agriculture sector.
- The employment of the new technologies requires substantial capital and the majority of the farmers in the country are unable to bear that cost.
- Investment from the corporate sector may be able to fill the gaps, but there are many legal barriers.
- Government schemes (such as PM KUSUM) try to provide subsidies to the farmers for the application of technologies but these schemes have limited reach and poor implementation making it very hard to be availed by the small and medium-scale farmers.

Lack of Robust Insurance policy:

- Any transition from the existing practice to the new practices carries an associated risk (or just fear of it) that becomes a cause for the farmers to be reluctant of the transition.
- Due to smallholdings, farmers in our country do not earn enough to bear such costs as they earn and invest on a season-to-season basis.
- An insurance policy that can assure the farmers to cover that probable loss might be more encouraging for them to try new technologies and practices in farming.
- PMFBY is one such policy but its implementation is not ideal and its penetration is not complete.
- While it covers the losses due to Hailstorm, Cyclone, Typhoon, Tempest, Hurricane, Tornado, Risk due to fl ood, drought, dry spells, and diseases it does not cover the loss that might be incurred due to change in practices.

87. Ans. (d)

- Both statements are correct

Employment elasticity

- Employment elasticity is a measure of the percentage change in employment associated with a 1 percentage point change in economic growth.
- The employment elasticity indicates the ability of an economy to generate employment opportunities for its population as a percent of its growth (development) process.

The sub-sectors with the highest employment elasticity are:

- Rubber and plastic products,
- Electronic and optical products,
- Transport equipment
- Electricity,
- Gas, and water supply
- Wood and products of wood.

- To step up the impact of economic growthon employment, the focus has to be on such high employment elastic sectors.

RBI data reveals the following data for employment elasticity for the decade 2000-10:

- Agriculture 0.04
- Manufacturing 0.09
- Mining & quarrying 0.52

- Utilities 0.04
- Construction 1.13
- Trade, Transport 0.19
- Finance, real estate 0.66
- Other services 0.08
- All sectors 0.19

Agriculture has one of the least elasticity. A 1% growth in agriculture would contribute only 0.04% growth in employment.

88. Ans. (c)

- Reasons for choosing salt as the important theme during the Civil Disobedience Movement –
- Salt, in a flash, linked the ideal of Swaraj with a most concrete and universal grievance of the rural poor (and with no socially divisive implications, like a no-rent campaign).
- Salt afforded a very small but psychologically important income, like Khadi, for the poor through self-help.
- Like Khadi, again, it offered to the urban populace the opportunity of a symbolic identification with mass suffering.

89. Ans. (c)

Territorial Re-organisation during Curzon's Viceroyalty –

- He created a new province of North- West Frontier Province, which was on the border with Afghanistan.
- The Berar region, which the British took from the Hyderabad, was merged with the Central Provinces.
- The name of the province was changed to 'Central Provinces and Berar'.
- Curzon partitioned the province of Bengal.
- He merged the eastern portions of Bengal with Assam to form a large province, known as East Bengal and Assam.

90. Ans. (c)

The Lightening conductor and conspiracy theory: both the theories were related to establishment of congress.

The conspiracy theory :-

- R.P. Dutt opined that the Indian National Congress was born out of a conspiracy to abort a popular uprising in India and the bourgeois leaders were a party to it.

- The Lightening conductor :- Bipan Chandra observes, the early Congress leaders used Hume as a 'lightning conductor', i.e., as a catalyst to bring together the nationalistic forces even if under the guise of a 'safety valve'.

91. Ans. (b)

Lahore session 1929

- Presided by Jawahar Nehru. Hence statement 2 is correct

The following major decisions were taken at the Lahore session:

- The Round Table Conference was to be boycotted. Hence statement 3 is incorrect.
- Complete independence was declared as the aim of the Congress. Hence statement 1 is correct.
- Congress Working Committee was authorised to launch a programme of civil disobedience, including non-payment of taxes, and all members of legislatures were asked to resign their seats.
- January 26, 1930 was fixed as the first Independence (Swarajya) Day, to be celebrated everywhere. Hence statement 4 is incorrect.

92. Ans. (c)

- 'Carbon Bomb' is an oil or gas project that will result in at least a billion tonnes of CO2 emissions over its lifetime.
- Whenever coal, oil, or gas is extracted it results in pollution and environmental degradation.
- This has the potential to significantly to global warming.
- The usage of the term 'carbon bombs' picked up after an investigative project of The Guardian from May 2022.
- The project reported the plans of countries and private companies all over the world to engage in 195 'carbon bomb' projects, identified the world over, including in the US, Russia, West Asia, Australia and India.
- Therefore, option (c) is the correct answer.

Relevance: The term 'carbon bombs' was used in a report by the famous newspaper The Guardian.

93. Ans. (d)

- The Terminator or the Boyevaya Mashina Podderzhki Tankov (BMPT), is a tank support fighting vehicle developed by Russia.
- The tank support vehicles are designed to protect the Russian tanks against enemy infantry.
- They are basically a replacement for mechanised infantry troops in the urban battlefield.
- The weapons equipped with the Terminator are capable of firing in multiple directions in quick succession, thus suppressing firepower to prevent any attempt to take out the tank columns being protected.
- Therefore, option (d) is the correct answer.

94. Ans. (d)

- Option (d) is correct : The correct order is:
- Bengaluru-Chennai-Hyderabad-Mumbai.

Coriolis Effect

- The Coriolis Effect is the name given to the imaginary force that deflects objects, such as rockets or large storms, which move over the surface of the Earth.
- The Coriolis force is directly proportional to the angle of latitude.
- It is maximum at the poles and is absent at the equator.
- Its effect increases northwards.
- As per question, Bengaluru is the southernmost point followed by Chennai, Hyderabad, and Mumbai.

95. Ans. (c)

- Statement 1 is correct : Karnataka plateau has an average elevation between 600-900 m and its northern portions include parts of Deccan Plateau.
- Statement 2 is correct : It is made up of the very old Dharwar igneous and metamorphic rocks.
- Statement 3 is incorrect : The western part of the Karnataka Plateau is called Malnad.
- Statement 4 is correct : Major portion of Karnataka Plateau is falls under the evergreen forests. Sandalwood, bamboo, charcoal, etc. are some of the valuable products of the dense forests of this region.

96. Ans. (d)

- Option d is the correct answer.
- Coal ash, also referred to as coal combustion residuals or CCRs, is produced primarily from the burning of coal in coal-fired power plants.
- Statement 1 is correct: Coal contains trace levels of trace elements, such as arsenic, barium, beryllium, boron, cadmium, chromium, thallium, selenium, molybdenum and mercury.
- Statement 2 is correct: There are several pollutants emitted into the air from a coal power plant.

- These include Sulphur Dioxide (SO), Carbon Monoxide (CO), Oxides of Nitrogen (NOx) and Ozone (O).
- Suspended Particulate Matter (SPM), Lead and Non-Methane Hydrocarbons are also released.
- Statement 3 is correct: Ash content of coal produced in the country is generally 25 to 45 % whereas average ash content of imported coal varies from 10 to 20 %. Indian Coal has comparatively higher ash content than imported coal due to drift theory of formation of coal deposits in India.

97. Ans. (d)

- Option d is the correct answer.
- Statement 1 is correct. Mutation is an alteration in the genetic material (the genome) of a cell of a living organism. A
- Mutagen is an agent of substance that can bring about a permanent alteration to the physical composition of a DNA gene such that the genetic message is changed.
- A Mutation occurs when a DNA gene is damaged or changed in such a way as to alter the genetic message carried by that gene.
- Statement 2 is correct. Mutation is a phenomenon which results in alteration of DNA sequences and consequently results in changes in the genotype.
- It can also lead to a change in the phenotype of an organism.
- In addition to recombination, mutation is another phenomenon that leads to variation in DNA.
- The genotype is a set of genes in DNA responsible for unique traits or characteristics while the phenotype is the physical appearance or characteristic of an organism.
- Statement 3 is correct. Mutagens are chemical and physical factors that induce mutations. UV radiations can cause mutations in organisms.
- Sunlight contains ultraviolet radiation which, when absorbed by the DNA, causes a cross link to form between certain adjacent bases.
- Unprotected exposure to UV radiation by the human skin can cause serious damage and may lead to skin cancer and extensive skin tumors.
- Source: Biology, NCERT XII, Chapter-5, Pg. 88

98. Ans. (a)

- Statement 3 is incorrect: The earlier activists had set up a 'Swadesh Sevak Home' at Vancouver and 'United India House' at Seattle.

Ghadr Party

- The Ghadr programme was to organise assassinations of officials, publish revolutionary and anti-imperialist literature, work among Indian troops stationed abroad, procure arms and bring about a simultaneous revolt in all British colonies.
- These revolutionaries included mainly ex-soldiers and peasants who had migrated from the Punjab to the USA and Canada in search of better employment opportunities.
- They were based in the US and Canadian cities along the western (Pacifi c) coast.
- Pre-Ghadr revolutionary activity had been carried on by Ramdas Puri, G.D. Kumar, Taraknath Das, Sohan Singh Bhakna and Lala Hardayal who reached there in 1911.
- To carry out revolutionary activities, the earlier activists had set up a 'Swadesh Sevak Home' at Vancouver and 'United India House' at Seattle.
- Finally in 1913, the Ghadr was established.
- The moving spirits behind the Ghadr Party were Lala Hardayal, Ramchandra, Bhagwan Singh, Kartar Singh Saraba, Barkatullah, and Bhai Parmanand.
- The Ghadrites intended to bring about a revolt in India.

- Their plans were encouraged by two events in 1914—the Komagata Maru incident and the outbreak of the First World War.

99. Ans. (a)

- Option a is the correct answer.
- Bhulabhai Desai, leader of the Congress Party in the Central Legislative Assembly, met Liaqat Ali Khan, deputy leader of the Muslim League in that Assembly, and both of them came up with the draft proposal for the formation of an interim government at the centre.
- This draft came to known as Desai-Liaqat Pact.
- Statement 1 is correct. Pact has provision that an equal number of persons will be nominated by the Congress and the League in the central legislature.
- Statement 2 is incorrect. Pact provides for 20 percent reserved seats for minorities in interim government.
- Statement 3 is correct. No settlement could be reached between the Congress and the League on these lines, but the fact that a sort of parity between the Congress and the League was decided upon had far- reaching consequences.

100. Ans. (a)

- Option a is the correct answer.
- Statement 1 is correct. Gandhi ji, in his journal Young India, mentioned that the Charkha does not seek to destroy all machinery but it does regulate its use and check its uncontrolled growth.
- He told that it uses machinery for the service of the poorest in theirown cottages.
- In fact wheel is itself a machinery.
- Statement 2 is correct. The charka, could provide the poor with supplementary income and make them self-reliant and thus liberate people from exploitative colonialism and capitalism.
- Statement 3 is incorrect. Charkha focuses on increasing the role of manual labour for a self-reliant society, but according to Gandhi ji, the spinning of wheel was a protection against passion and anger.
- It was a shield against toxic emotions.
- The spinning wheel was an 'emblem of human dignity and equality', the 'handmaid of agriculture'.
- Thus, it was not only limited to manual labour but also to mental labour.
- Source: NCERT Class-XII Themes in Indian history part-III chapter-13 Mahatma Gandhi and National movement page –352.