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By



SOURCES



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Important News Articles

1. Telangana: 1,300-year-old temples from Badami Chalukyan period discovered - Times of India
2. Earth's early evolution: Fresh insights from rocks formed 3.5 billion years ago - Down To Earth
3. How Rani Chennamma's revolt against the British inspired a national campaign for women's rights - Indian Express
4. India's stance on data transfers at WTO spooks semiconductor industry giants - The Hindu
5. India will not rush into signing free trade deals: Goyal - Indian Express
6. ISRO: PAPA detects solar wind impact of coronal mass ejections - The Hindu
7. US achieves first moon landing in 50 years - Indian Express
8. International collaboration of physicists demonstrates laser cooled Positronium - The Hindu

Editorials, Gists and Explainers

9. The NB8 visit to India focuses on cooperation and trust - The Hindu
10. Donor gametes are allowed: what the new rule on surrogacy says - Indian Express

Quick Look

1. Exercise Dosti
2. Badwater Basin
3. Smishing
4. Coronal Mass Ejections (CMEs)

Important News Articles

GS I

1. Telangana: 1,300-year-old temples from Badami Chalukyan period discovered - Times of India

Relevance: Indian culture will cover the salient aspects of Art Forms, literature and Architecture from ancient to modern times.

News:

- Recently, two **Badami Chalukya temples**, estimated to be between 1,300 to 1,500 years old, and a **label inscription** dating back to the 8th or 9th century AD were recently unearthed in **Mudimanikyam village, Nalgonda district**, along the banks of the **Krishna river**.
- The temples and inscription provide valuable insights into the region's rich history.

Historical Significance

- These temples are unique examples of **Kadamba Nagara style** in the **Rekha Nagara format**, a rare architectural style in Telangana.
- This showcases the **influence of the Badami Chalukya period** in the region.
- Researchers emphasise the significance of these temples in **preserving the cultural heritage of Telangana**.
- They suggest minimal restoration and conservation to maintain their historical integrity.

Inscription Details

- The label inscription, found on a **pillar of a group of five temples**, known as **Panchakuta**, in the village, dates back to the 8th or 9th century AD.
 - However, these temples are **no longer in use**, with one missing the Shivalinga and another containing a Vishnu idol.
- It bears the term '**Gandaloranru**', possibly a **heroic title**, suggesting its association with the **Badami Chalukya period**.

Prelims Takeaway

- Badami Chalukyas
- Panchakuta Temples

2. Earth's early evolution: Fresh insights from rocks formed 3.5 billion years ago - Down To Earth

Relevance: Salient features of world's physical geography.

News:

- Earth's age is approximately **4.5 billion years**, characterised by **vast oceans** and **frequent volcanic eruptions**.
- Despite substantial knowledge, gaps persist, particularly regarding the **geological processes of early Earth**.

Exploring Ancient Rocks

- **Ancient volcanic and sedimentary rocks**, dating back 4 billion to 2.5 billion years, hold vital clues.
- These rocks, found in **cratons**, offer insights into **past Earth processes**.
- The **Singhbhum Craton** in India, dating back 3.5 billion years, provides a significant case study.

Cratons

- They are **ancient continental pieces** dating back billions of years, offering insights into **Earth's early geological processes**.
- They host **diverse rock groups**, including greenstones and granites, preserving evidence of past volcanic and sedimentary processes.

Comparative Study

- Studying cratons like the Singhbhum Craton in India, South Africa, and Australia provides a window into the **Archaean age**, about 4 billion to 2.5 billion years ago.
- Researchers compared the Singhbhum Craton with **counterparts in South Africa and Australia**.

Prelims Takeaway

- Archaean Age
- Cratons
- Singhbhum Craton

- Comparative analysis of cratons reveals **commonality in explosive-style volcanic eruptions** around 3.5 billion years ago.
- Understanding these early processes aids in **reconstructing Earth's evolutionary history**.

Research Methodology

- Rocks from the Singhbhum Craton were studied in the **laboratory**, aided by **field-based studies** and **uranium-lead radiometric dating**.
- **Similarities** were noted between the geological features of the Singhbhum Craton and those of South Africa and Australia.
- **Key Findings**
 - **Submarine mafic volcanic eruptions** were prevalent **between 3.5 and 3.3 billion years ago**.
 - This contrasts with **silicic volcanism**, which was dominant around 3.5 billion years ago.

Significance of Discoveries

- Provides insights into **early tectonic activities** and **Earth's formative years**.
- **Unique geological features**, such as greenstone belts, provide invaluable information about **early habitable conditions** and the **emergence of life**.
- Comparative analysis helps construct a **comprehensive model of Archaean geological processes**.

3. How Rani Chennamma's revolt against the British inspired a national campaign for women's rights - Indian Express

Relevance: Modern Indian history from about the middle of the eighteenth century until the present – significant events, personalities, issues.

News:

- Recently, several social groups across the country organised a national campaign **Naanoo Rani Chennamma** (I am Rani Chennamma too).
- **Purpose:** To commemorate 200 years of Rani Chennamma's rebellion against the British East India Company.

Rani Chennamma

- Chennamma was born in **Kakati**, a small village in today's Belagavi district of Karnataka.
- She became **queen of Kittur** (now in Karnataka) when she married **Raja Mallasarja** of the Desai family.
- After Mallasarja's death in 1816, his eldest son, **Shivalingarudra Sarja**, ascended the throne.
- Before his death in 1824, **Shivalingarudra adopted a child, Shivalingappa**, as the successor.
- However, the British East India Company refused to recognise Shivalingappa as the successor of the kingdom under the '**doctrine of lapse**'.

Doctrine of Lapse

- Introduced by **Lord Dalhousie** in **1848**, the Doctrine of Lapse aimed at expanding British territories in India.
- Under the doctrine of Lapse, **any princely state without a natural heir would collapse** and would be **annexed** by the Company.
- The policy was seen as illegitimate by many Indian rulers and played a role in the Indian Rebellion of 1857.
- Several states annexed due to this Doctrine, include Satara (1848), Jaitpur (1849), Sambalpur (1849), Udaipur (1850), Jhansi (1853), and Nagpur (1854).
- The princely state of Kittur was taken over by the British East India Company in 1824 by imposing the 'doctrine of lapse'.
 - This was even before it was officially articulated by Lord Dalhousie.

Kittur Rebellion

- **John Thackery**, the British official at Dharwad, launched an **attack on Kittur** in October 1824.
- In this battle British forces **lost heavily** and the Collector and political agent, St. John Thackeray was killed by the Kittur forces.
- Two British officers, Sir Walter Elliot and Mr. Stevenson, were also taken as hostages.
- However, the British army again attacked the Kittur Fort and **captured it**.

Prelims Takeaway

- Kittur Rebellion
- Rani Chennamma

- Rani Chennamma and her family were **imprisoned** and jailed at the fort in **Bailhongal**, where she died in 1829.

GS II

4. India's stance on data transfers at WTO spooks semiconductor industry giants - The Hindu

Relevance: Important International institutions, agencies and fora- their structure, mandate.

News:

- Recently, a global consortium of semiconductor industry groups appealed to India to reconsider its plan to **impose duties on cross-border digital e-commerce and data transfers**.

The Background

- This plea comes ahead of a **World Trade Organization (WTO) meeting** in Abu Dhabi, where ministers from various countries will discuss **trade-related issues**.
- This includes extending a **moratorium on applying duties on electronic transmissions**, in place since 1998.
- **Developing nations** like India, South Africa and Indonesia are set to oppose efforts by the US and Europe **to extend the moratorium**.

Concerns Raised

- The collapse of the moratorium could result in **tariffs on digital e-commerce and chip design data transfers**, exacerbating chip shortages and raising costs.
- The **World Semiconductor Council (WSC)** highlights that such tariffs would **hinder India's semiconductor industry growth** and its efforts to **attract investment**.
 - especially considering India hosts over 20% of the world's semiconductor design workforce.
- India's stance to renew the moratorium is seen as crucial for **signalling a favourable investment climate** to semiconductor companies.

India's Perspective

- India argues that physical goods, once governed by traditional tariff rules, should now incur duties due to their **availability as digital services**.
- Developing nations are **facing massive loss in potential revenue** with such imports from developed countries on the rise.

Prelims Takeaway

- E-commerce
- World Trade Organization (WTO)
- World Semiconductor Council (WSC)

5. India will not rush into signing free trade deals: Goyal - Indian Express

Relevance: Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests.

News:

- The UK is still pushing to advocate for a more **extensive opening of the Indian economy** under the **free trade agreement (FTA)** being negotiated.
- With general elections looming and the Model Code of Conduct (MCC) expected to come into effect soon, signing the deal before the elections appears unlikely.

Key Points of Contention

- India's **high tariff regime** has been a concern for trade partners, with it having one of the highest import tax rates globally.
- The UK seeks **reductions in duties on cars and whisky**, while India aims for **improved access for its service sector workforce** in the UK.
- Talks are also progressing on the **proposed bilateral investment treaty (BIT)**.

FTA Potential and Significance

Prelims Takeaway

- Free Trade Agreement (FTA)
- Bilateral Investment Treaty (BIT)
- Model Code of Conduct (MCC)

- The FTA with the UK holds significance as the **first comprehensive deal with a major western country**, promising deeper economic integration.
- It serves as a **model for future agreements** with larger western trade partners like the European Union and European Free Trade Association (EFTA).
- Economic integration with the West becomes crucial amid the **global supply chain reset** post-COVID-19 and efforts to diversify away from dependence on China.

Free Trade Agreement (FTA)

- An **agreement** between countries or regional blocks **to reduce or eliminate trade barriers**, through mutual negotiations with a view to **enhancing trade**.
- It includes **goods, services, investment, intellectual property**, competition, government procurement and other areas.
- This **concept** of free trade is the opposite of **trade protectionism or economic isolationism**.
- FTAs can be **categorised** as
 - Preferential Trade Agreement
 - Comprehensive Economic Cooperation Agreement (CECA)
 - Comprehensive Economic Partnership Agreement (CEPA)

Impact of FTA on the Global Economy

- By blending **local production** with foreign trade, FTAs help **boost growth in economies**.
- As **selected goods** are produced by every country at **lower costs** due to FTAs, international trade increases **production and consumption**.
- FTAs also help **diversify supply chains** by making it easier for more businesses to **conduct business across borders**.

GS III

6. ISRO: PAPA detects solar wind impact of coronal mass ejections - The Hindu

Relevance: Achievements of Indians in science & technology; indigenization of technology and developing new technology.

News:

- Recently, ISRO announced the operational status of the **Plasma Analyser Package for Aditya (PAPA) payload** on the Aditya-L1 satellite.
- The PAPA payload is developed by the Space Physics Laboratory and Avionics Entity of the Vikram Sarabhai Space Centre (VSSC)/ISRO.

Key Features of PAPA Payload

- PAPA is an **energy and mass analyser** designed for **in-situ measurements** of solar wind electrons and ions in the **low energy range**.
- It comprises two sensors viz. **Solar Wind Electron Energy Probe (SWEEP)** and **Solar Wind Ion Composition Analyser (SWICAR)**.
 - These facilitate comprehensive observations of solar phenomena.
- The sensors also detect the **direction of arrival of solar wind particles** enabling a holistic understanding of solar wind dynamics.

Operational Status and Achievements

- PAPA has been operational since December 12, 2023, and has been performing nominally.
- Its advanced sensors successfully **detected the impact of coronal mass ejections (CMEs)**, including those occurring in February 10-11, 2024.
- The sensors are continuously observing **solar wind electrons and ions**, demonstrating effectiveness in **monitoring space weather conditions**.

Prelims Takeaway

- Aditya L1 Mission
- PAPA Payload
- Coronal Mass Ejections (CMEs)

- The payload's performance aligns with its design across all **operational modes**, showcasing its capability to **analyze solar phenomena**.

7. US achieves first moon landing in 50 years - Indian Express

Relevance: Awareness in the fields of IT, Space, Computers, robotics, nano-technology, bio-technology and issues relating to intellectual property rights.

News:

- Fifty-two years after the last successful **Apollo mission**, a US-made spacecraft, **Odysseus**, landed on the Moon on February 23.
- This marked the **advent of private space companies** on the lunar surface.

Mission Details

- Odysseus, developed by Intuitive Machines, lifted off on a **Falcon 9 rocket of SpaceX**, carrying six NASA payloads to the Moon.
- The spacecraft carried six NASA payloads to the Moon.
- The **lander module, Nova-C**, became the **second to land in the Moon's south pole region**, following Chandrayaan-3 last year.
- **Funding:** For this mission, NASA paid Intuitive Machines \$118m under the **Commercial Lunar Payload Services (CLPS)** programme.

Why is it called Odysseus?

- It was named Odysseus after a contest among employees of Intuitive Machines of Houston, the company in charge of the mission.
- The name is inspired from the journey of the **hero of the ancient Greek epic poem "Odyssey"**.
- Odyssey's journey serves as an analogy for the **long and challenging nature** of the lunar mission.

Significance of the Mission

- It signifies a new phase in lunar exploration focused on **establishing infrastructure and technology to support long-term human presence**.
- It aims to lay the **groundwork for exploiting lunar resources and fostering sustainable exploration**.
 - This is in contrast to past moon landings, which were primarily scientific endeavours.
- This information will **help evaluate factors** such as the quantity of water present and the accessibility of this vital resource.
- This is significant as NASA prepares to **send a crewed mission** in September 2026 with **Artemis III**.

Commercial Lunar Payload Services Program (CLPS)

- Under CLPS, so far, at least **14 private companies** have been contracted to **carry NASA payloads to the Moon**.
- **Objective:** To create the market and technology ecosystem in the private space industry with respect to science and technology needs of lunar exploration.

Prelims Takeaway

- Odysseus
- Commercial Lunar Payload Program (CLPS) Services

8. International collaboration of physicists demonstrates laser cooled Positronium - The Hindu

Relevance: Science and Technology- developments and their applications and effects in everyday life.

News:

- An international collaboration of researchers from the **Anti-hydrogen Experiment: Gravity, Interferometry, Spectroscopy (AEGIS)**, has achieved a significant milestone by successfully demonstrating the **laser cooling of Positronium**.

Positronium

- It is a **fundamental atom** composed of an **electron (e⁻)** and a **positron (e⁺)**, both being leptons that **interact through electromagnetic and weak forces**.

Prelims Takeaway

- Positronium
- AEGIS Initiative

- With a **very short life**, it annihilates with a half-life of 142 nanoseconds.
- It is considered a **pure leptonic atom**.
 - Unlike usual atoms that contain a mixture of baryons and leptons, Positronium solely consists of electrons and positrons.
- Its **hydrogen-like system**, with halved frequencies for excitation, makes it an ideal candidate for attempting laser cooling and performing tests of fundamental physics theories.

AEGIS Initiative

- The AEGIS experiment was **formally accepted by CERN in 2008**, with construction and commissioning continuing through 2012-2016.
- It involves physicists from 19 European groups and one Indian group.
 - Professor Sadiq Rangwala from Raman Research Institute (RRI) in Bengaluru is leading the Indian effort.
- The experiment was conducted at the **European Organization for Nuclear Research (CERN)** in Geneva, Switzerland.
- **Significance:** Serves as a crucial precursor to the formation of anti-hydrogen and the measurement of Earth's gravitational acceleration on antihydrogen in the AEGIS experiment.

Achievements

- The AEGIS team successfully cooled Positronium atoms from ~380 Kelvin to ~170 Kelvin.
- A 70-nanosecond pulse of the **alexandrite-based laser system** was used to demonstrate cooling in one dimension.
- Lasers deployed were either in the **deep ultraviolet or infrared frequency bands**.

Future Implications

- Laser cooling of anti-atoms like Positronium and their spectroscopic comparison are crucial tests for **Quantum Electro Dynamics (QED)**.
- This achievement opens doors for creating **exotic many-particle systems** like Bose-Einstein condensates.

Editorials, Gists and Explainers

9. The NB8 visit to India focuses on cooperation and trust - The Hindu

Relevance: Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests.

Context:

- The **eight Nordic-Baltic countries** are participating together as representatives of the Nordic-Baltic cooperation, the NB8, in this year's **Raisina Dialogue** in New Delhi

NB8 Views

- The NB8 emphasises the importance of **global cooperation in the face of geopolitical uncertainties**, particularly amidst Russia's invasion of Ukraine.
- It underscores the **significance of trust, dialogue, and collaboration in safeguarding peace, stability, and a rules-based world order**.

NB8 Countries

- It comprises governments of eight countries of the north viz. Denmark, Estonia, Finland, Iceland, Latvia, Lithuania, Norway and Sweden.
- They are linked geographically and share deep historical, social, economic and cultural ties.
- Taken together, the size of the Nordic-Baltic economies would qualify not only for the G-20 but also the G-10.
- They advocate for democracy, human rights, and an international order based on multilateralism and international law.

NB8 and India

- They also have long-term and ever-closer ties with India and the Indo-Pacific region in common.
- Their cooperation with India to various sectors including innovation, green transition, maritime, health, intellectual property rights, new technologies, space cooperation and artificial intelligence, student exchanges, culture and tourism.

Security and Geopolitical Considerations

- Acknowledging interlinked security concerns in the Nordic-Baltic region and the Indo-Pacific, the delegation stresses the importance of upholding international law and addressing security threats.
- They recognize India's growing global role and leadership in initiatives such as the G-20, advocating for India's continued engagement in global security and prosperity.

Urgent Call for Global Cooperation

- Against the backdrop of geopolitical shifts and recent shocks including health crises and climate-related disasters, the NB8 urges a return to positive global cooperation.
- The ongoing conflict in Ukraine underscores the urgency of upholding international law and territorial integrity, emphasizing the need for accountability and peace-building efforts.

Support for Ukraine's Peace Formula

- Endorsing Ukraine's peace formula, backed by broad international support, the NB8 highlights Ukraine President's diplomatic efforts for a just and lasting peace.
- It welcomes the participation of various countries and organizations in peace formula meetings, signalling a collective commitment to resolving the conflict.

Strengthening Partnerships

- As the first joint high-level NB8 delegation outside Europe, their visit signifies a commitment to deepen dialogue and cooperation on mutual priorities.
- By choosing India as their first destination, the NB8 seeks to reaffirm their message of partnership, trust, and collaboration for development, peace, and stability.

10. Donor gametes are allowed: what the new rule on surrogacy says - Indian Express

Relevance: Government policies and interventions for development in various sectors and issues arising out of their design and implementation.

Context:

- The Central government's recent modifications to the **Surrogacy (Regulation) Rules, 2022** reflect a significant shift in the legal landscape surrounding **surrogacy practices** in India.

Key Amendments

- The amended rules allow couples certified with medical conditions to use donor gametes for surrogacy, provided at least one gamete originates from the intending couple.
- The amendment allows surrogacy using donor gametes under specific medical conditions, as certified by the District Medical Board.
- Single women, including widows and divorcees, are mandated to use self-eggs and donor sperm for surrogacy, ensuring compliance with regulatory standards.

SC PROD AFTER FLOOD OF PETITIONS

> After notification of March 14 last year, Rule 7 of Surrogacy (Regulation) Act said couple undergoing surrogacy **must use own eggs and sperm, donor gametes not allowed**

> SC was flooded with petitions from women after it granted relief to one woman and **prima facie found fault with Rule 7**



> On Jan 9, **SC referred to grievances raised by a large section of women** and said many of them could not afford to approach SC

> Now, couples can use donor gametes after **district medical board certifies either spouse has a condition preventing use of own gamete**. Single women must use own egg cells

Significance of Amendment

- The relaxation facilitates surrogacy for older women and those with medical conditions hindering egg production.
- Previously banned, the use of donor eggs and sperm is now permitted, addressing infertility issues in intending couples.
- Experts hail the amendment for its positive impact on surrogacy accessibility.

Intended Recipients of Surrogacy

- Surrogacy primarily targets women with missing or abnormal uteruses, failed IVF attempts, or conditions endangering pregnancy.
- Doctors highlight thin endometrial layers and missing or abnormal uterus as a key factor necessitating surrogacy.
- But experts caution against unnecessary surrogacy, citing potential complications
 - such as immune system inheritance and nutritional disparities affecting the child's long-term health.

India

Quick Look

1. Exercise Dosti

- Indian and Sri Lankan coast guard ships reached the Maldives recently to take part in the trilateral coast guard exercise Dosti 16.
- Exercise Dosti is a biennial trilateral coast guard exercise between India, Sri Lanka, and the Maldives.
- It was first conducted in 1991 between the Indian and Maldives Coast Guards. Sri Lanka joined the exercise for the first time in 2012.
- The exercises have focused on exercises and drills on providing assistance in sea accidents, eliminating sea pollution, and the Coast Guard's procedures and conduct during situations such as oil spills.
- Aim: To further fortify the friendship, enhance mutual operational capability, exercise interoperability and build cooperation between the Coast Guards of India, Sri Lanka, and the Maldives.

2. Badwater Basin

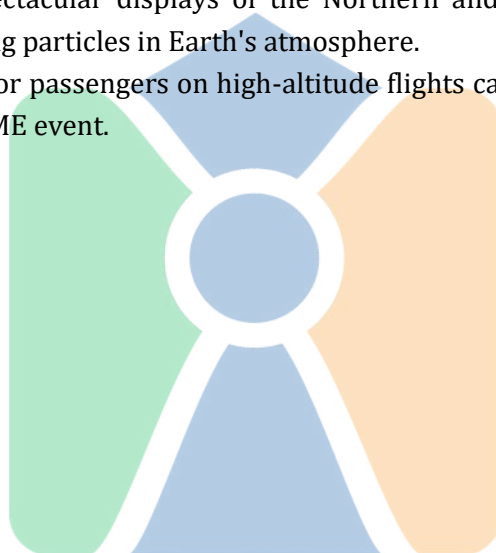
- In the parched expanse of North America's driest region, Badwater Basin has defied expectations by lingering and expanding as an ephemeral lake.
- Badwater Basin is endorheic in nature i.e. water flows into it but not out, typically resulting in rapid evaporation and ephemeral lakes.
- Situated within Death Valley, it holds the distinction of being the lowest point in North America, lying at 282 feet (86 meters) below sea level.
- Despite its usual patterns, increased precipitation over the past six months has disrupted its typical behaviour.
- Originally formed as Manly Lake in August 2023 following Hurricane Hilary, it was anticipated to shrink, yet it remarkably endured through the fall and winter seasons.
- Its resurgence came in February 2024, when a powerful atmospheric river replenished its waters.

3. Smishing

- It is a form of phishing that targets individuals through text messages or SMS.
- Similar to phishing emails, smishing messages aim to trick one into divulging personal information or downloading malware onto the device.
- It is done in through following ways
 - Fake alerts and warnings: Scammers send texts posing as legitimate institutions such as banks, government agencies, or delivery services. They claim there is an issue with your account or a package delivery, urging you to click on a link for further details.
 - Urgent requests: Smishers manipulate emotions by creating a sense of urgency. They might promise prizes, warn of impending legal action, or claim your account is compromised, pressuring one to act quickly without thinking.
 - Exploiting current events: Scammers capitalise on ongoing events such as tax season by impersonating income tax officers, offering tax refunds, or threatening penalties for non-compliance. They may also exploit natural disasters or health crises to solicit donations or spread misinformation.

4. Coronal Mass Ejections (CMEs)

- CMEs are large expulsions of plasma and magnetic fields from the Sun's corona that propagate outward into interplanetary space.
- During a CME, the Sun releases a colossal amount of material, including electrons, protons, and heavier ions, as well as magnetic fields. This ejected material travels at high speeds into space.
- CMEs are typically triggered by the destabilisation of the Sun's magnetic fields.
- The exact mechanisms are complex, but they often involve the reconfiguration or disruption of magnetic loops on the Sun's surface.
- Impact on Earth
 - The interaction between the CME's magnetic fields and Earth's magnetosphere can lead to geomagnetic storms that can disrupt satellite communications, navigation systems, and even power grids.
 - CMEs can cause spectacular displays of the Northern and Southern Lights, also known as auroras, by energising particles in Earth's atmosphere.
 - Astronauts in space or passengers on high-altitude flights can be exposed to elevated levels of radiation during a CME event.



Mentorship
India

Prelims Track Question

Q1. With reference to Badami Chalukyas, consider the following statements

1. They promoted a new style of architecture known as Vesara.
2. The empire was divided into Maharashtra and then into smaller Rashtrakutas, Vishaya, and Bhoga.

Which of the statements given above is/are correct?

- A. Only 1
- B. Only 2
- C. Both 1 and 2
- D. Neither 1 nor 2

Q2. The Singhbhum Craton, seen in the news recently, is located between

- A. Malwa plateau and Western Ghats
- B. Karnataka plateau and Telangana plateau
- C. Deccan plateau and Nilgiri range
- D. Chhota Nagpur plateau and the Eastern Ghats

Q3. Rani Chennamma is associated with which one of the following events?

- A. Kittur Rebellion
- B. Ahom revolt
- C. Kol Uprising
- D. Pahariyas' Rebellion

Q4. Consider the following statements regarding Semiconductors

1. Semiconductors are materials which have a conductivity between conductors and insulators.
2. Semiconductors are pure elements only.
3. The semiconductor chips are now an integral part of contemporary automobiles, household gadgets and essential medical devices.

How many of the statements given above is/are incorrect?

- A. Only one
- B. Only two
- C. All three
- D. None

Q5. Consider the following statements with reference to Free Trade Agreements (FTAs)

1. These are international agreements between countries that aim to reduce or eliminate barriers to trade and promote economic integration.
2. It involves the reduction of tariffs only between the countries.

Which of the statements given above is/are not correct?

- A. Only 1
- B. Only 2
- C. Both 1 and 2
- D. Neither 1 nor 2

Q6. With reference to Plasma Analyser Package for Aditya (PAPA), consider the following statements

1. It is an energy and mass analyser designed for in-situ measurements of solar wind electrons and ions.
2. Its sensors can detect the direction of arrival of solar wind particles.
3. Recently, it has detected the impact of coronal mass ejections (CMEs).

How many of the statements given above is/are correct?

- A. Only one
- B. Only two
- C. All three
- D. None

Q7. Consider the following statements with reference to Odysseus

1. It is a part of NASA's Commercial Lunar Payload Services program (CLPS).
2. The name is inspired from the journey of the hero of the ancient Greek epic poem "Odyssey".
3. The lander module, Nova-C, became the first to land in the Moon's south pole region.

How many of the statements given above is/are correct?

- A. Only one
- B. Only two
- C. All three
- D. None

Q8. Consider the following statements regarding Anti-hydrogen Experiment: Gravity, Interferometry, Spectroscopy (AEGIS)

1. It is a collaboration of physicists from the USA and India.
2. Its aim is to measure the Earth's gravitational acceleration on antihydrogen.

Which of the statements given above is/are correct?

- A. Only 1
- B. Only 2
- C. Both 1 and 2
- D. Neither 1 nor 2

Q9. Consider the following countries

1. Finland
2. Iceland
3. Norway
4. Latvia

How many of the countries mentioned above are members of the Nordic-Baltic cooperation?

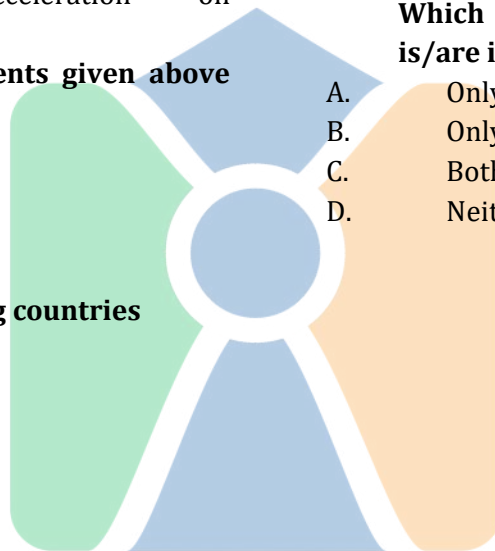
- A. Only one
- B. Only two
- C. Only three
- D. All four

Q10. Consider the following statements about In Vitro Fertilization (IVF)

1. Under IVF, the egg is fertilised by the sperm in the laboratory and not in the woman's reproductive tract.
2. It may involve eggs, sperm or embryos from a known or anonymous donor.

Which of the statements given above is/are incorrect?

- A. Only 1
- B. Only 2
- C. Both 1 and 2
- D. Neither 1 nor 2



Mentorship
India

Prelims Track Answer

Answer 1 Option C is correct

Explanation

- The Chalukyas ruled over the central Indian plateau of the Deccan between the sixth and twelfth centuries.
- The Badami Chalukyas ruled over an empire that comprised the entire state of Karnataka and most of Andhra Pradesh in the Deccan.
- Pulakesi II had been perhaps the greatest emperor of the Badami Chalukyas.
- It saw the evolution and proliferation of a new style of architecture known as Vesara, a combination of the South Indian and the North Indian building styles. **Hence, statement 1 is correct.**
- The rock-cut temples of Pattadakal, a UNESCO World Heritage Site, Badami, and Aihole constitute their most celebrated monuments.
- The empire was divided into Maharashtra (provinces), then into smaller Rashtrakutas (Mandala), Vishaya (district), and Bhoga (group of ten villages). **Hence, statement 2 is correct.**
- Many autonomous regions existed, ruled by feudatories like Alupas, Gangas, Banas, and Sendrakas.
- The Badami Chalukyas minted coins of a different standard compared to the northern kingdoms.
- The coins had Nagari and Kannada legends. They minted coins with symbols of temples, lion or boar facing right, and the lotus.

Answer 2 Option D is correct

Explanation

- Singhbhum Craton is a vast swathe of rocky land that stretches mainly across parts of Jharkhand and Odisha, between the Chhota Nagpur plateau and the Eastern Ghats. **Hence, option D is correct.**
- This ancient part of the Earth's crust has been found in previous research to date back to 3.5 billion years ago.
- The craton's oldest rock assemblages are largely volcanic and sedimentary rocks also known as greenstone successions.
- The Singhbhum Craton's unique geological features, including its greenstone belts, provide invaluable information about Earth's surface and atmospheric processes.

- This is crucial for hypothesising early habitable conditions and the emergence of life on Earth.

Answer 3 Option A is correct

Explanation

- Recently, several social groups across the country organised a national campaign Naanoo Rani Chennamma (I am Rani Chennamma too).
- Purpose: To commemorate 200 years of Rani Chennamma's rebellion against the British East India Company.
- John Thackeray, the British official at Dharwad, launched an attack on Kittur in October 1824.
- In this battle British forces lost heavily and the Collector and political agent, St. John Thackeray was killed by the Kittur forces.
- Two British officers, Sir Walter Elliot and Mr. Stevenson, were also taken as hostages.
- However, the British army again attacked the Kittur Fort and captured it.
- Rani Chennamma and her family were imprisoned and jailed at the fort in Bailhongal, where she died in 1829. **Hence, option A is correct.**

Answer 4 Option A is correct

Explanation

- Semiconductors are materials which have a conductivity between conductors and insulators. **Hence, statement 1 is correct.**
- They can be pure elements, silicon or germanium or compounds gallium, arsenide or cadmium selenide. **Hence, statement 2 is incorrect.**
- They are the basic building blocks that serve as the heart and brain of all modern electronics and information and communications technology products.
- The semiconductor chips are now an integral part of contemporary automobiles, household gadgets and essential medical devices such as ECG machines. **Hence, statement 3 is correct.**
- India has also launched the Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPecs) under which a budget outlay of Rs 3,285 crore is spread over a period of eight years for manufacturing of electronics components and semiconductors.

Answer 5 Option B is correct**Explanation**

- Free Trade Agreement (FTA) is an agreement between countries or regional blocks to reduce or eliminate trade barriers, through mutual negotiations with a view to enhancing trade. **Hence, statement 1 is correct.**
- It includes goods, services, investment, intellectual property, competition, government procurement and other areas.
- It can involve the reduction of tariffs (taxes on imports) as well as non-tariff barriers like quotas and regulatory restrictions. **Hence, statement 2 is incorrect.**
- This concept of free trade is the opposite of trade protectionism or economic isolationism.

Answer 6 Option C is correct**Explanation**

- Recently, ISRO announced the operational status of the Plasma Analyser Package for Aditya (PAPA) payload on the Aditya-L1 satellite. **Hence, statement 3 is correct.**
- PAPA is an energy and mass analyser designed for in-situ measurements of solar wind electrons and ions in the low energy range. **Hence, statement 1 is correct.**
- It comprises two sensors viz. Solar Wind Electron Energy Probe (SWEEP) and Solar Wind Ion Composition Analyser (SWICAR).
- The sensors also detect the direction of arrival of solar wind particles enabling a holistic understanding of solar wind dynamics. **Hence, statement 2 is correct.**

Answer 7 Option B is correct**Explanation**

- Fifty-two years after the last successful Apollo mission, a US-made spacecraft, Odysseus, landed on the Moon on February 23.
- The name is inspired from the journey of the hero of the ancient Greek epic poem "Odyssey". **Hence, statement 2 is correct.**
- Odysseus, developed by Intuitive Machines, lifted off on a Falcon 9 rocket of SpaceX, carrying six NASA payloads to the Moon.
- The spacecraft carried six NASA payloads to the Moon. The lander module, Nova-C, became the second to land in the Moon's south pole region, following Chandrayaan-3 last year. **Hence, statement 3 is incorrect.**

- For this mission, NASA paid Intuitive Machines \$118m under the Commercial Lunar Payload Services (CLPS) programme. **Hence, statement 1 is correct.**

- Under CLPS, so far, at least 14 private companies have been contracted to carry NASA payloads to the Moon.
- Objective: To create the market and technology ecosystem in the private space industry with respect to science and technology needs of lunar exploration.

Answer 8 Option B is correct**Explanation**

- The AEGIS experiment was formally accepted by CERN in 2008, with construction and commissioning continuing through 2012-2016.
- It involves physicists from 19 European groups and one Indian group. **Hence, statement 1 is incorrect.**
 - Professor Sadiq Rangwala from Raman Research Institute (RRI) in Bengaluru is leading the Indian effort.
- Significance: Serves as a crucial precursor to the formation of anti-hydrogen and the measurement of Earth's gravitational acceleration on antihydrogen in the AEGIS experiment. **Hence, statement 2 is correct.**

Answer 9 Option D is correct**Explanation**

- NB8 Countries comprises governments of eight countries of the north viz. Denmark, Estonia, Finland, Iceland, Latvia, Lithuania, Norway and Sweden. **Hence, option D is correct.**
- They are linked geographically and share deep historical, social, economic and cultural ties.
- Taken together, the size of the Nordic-Baltic economies would qualify not only for the G-20 but also the G-10.
- They advocate for democracy, human rights, and an international order based on multilateralism and international law.
- They also have long-term and ever-closer ties with India and the Indo-Pacific region in common.

Answer 10 Option D is correct**Explanation**

- In Vitro Fertilization (IVF) is a medical procedure used to assist individuals or couples who are facing fertility challenges in achieving pregnancy.
- It is a complex process that involves retrieving eggs from ovaries and manually combining them with sperm in a lab for fertilization.
- Several days after fertilization, the fertilized egg (now called an embryo) is placed inside a uterus.
- Pregnancy occurs when this embryo implants itself into the uterine wall. **Hence, statement 1 is correct.**
- The procedure can be done using a couple's own eggs and sperm or from a known or anonymous donor. **Hence, statement 2 is correct.**
- The success rate of IVF depends on a number of factors including reproductive history, maternal age, the cause of infertility, and lifestyle factors.

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