SCIENCE AND TECHNOLOGY [GS-III]

Top Quark, Higgs boson's closest friend

Physicists at the Large Hadron Collider (LHC) in Europe reported the most precise mass measurement of the Top Quark at 172.52 GeV/c2 having implications for the whole universe.

About Quarks

- **Elementary particles:** Quarks are the **ultimate building blocks of visible matter** in the universe.
  - They **make up the protons and neutrons of an atom** and lies on the ground floor of the Standard Model of particle physics.
- **Experimental Evidence: At the Stanford Linear Accelerator Center (SLAC) in California in 1968,** experimenters fired electrons, and muons, at protons, and found evidence that the electrons and muons were scattering off three smaller particles contained within the protons with each having their own electric charge.
- **Bonds:** Under normal condition Quarks are always **bound together by the strong nuclear force and never exist alone** forming composite particles called hadrons.
  - **Baryons:** These are the particles made of **three quarks which include protons** (two up and one down quark) and neutrons (one up and two down quarks).
    - Particles made of two quarks are called **mesons.**
- **Flavours:** In the present standard model, there are **six "flavors" of quarks with each having its own set of quantum numbers, and with different masses.**
  - **Up quark; Down quark; Strange quarks; Charm quark; Bottom quarks;Top quark (** It is the heaviest with a mass over 61,000 times more than the up quark)

About Top Quark

- Top Quark is the **most massive particle scientists have found to date.**
  - It is **10-times heavier than a water molecule, about three-times as much as a copper atom, and 95% as much as a full caffeine molecule.**
- **Decay:** The top quark is a **very unstable particle and breaks up into lighter, more stable particles in less than 10−25 seconds.**
  - By the mass-energy equivalence, a more massive particle is also a more energetic particle and the more energetic particles often break down into ones with less energy.
- **Discovery:** Top Quark was **discovered in 1995 at a particle accelerator in the US called the Tevatron,** measuring its mass to be 151-197 GeV/c2 at first.
  - **Physicists at the Large Hadron Collider (LHC) in Europe reported the most precise figure yet at 172.52 GeV/c2.**

Significance of measuring the precise mass of Top Quark

- **To understand Higgs Boson:** Higgs Boson **interacts most strongly with the top quark as it is the most massive subatomic particle.** By measuring the top quark's mass as precisely as possible, a lot can be known about the Higgs boson as well.
  - Higgs Boson **interacts with particles providing them with their mass**. Without this aspect of nature no particles would have mass.
- **Universe quantum tunnelling event:** Measuring the top quark mass precisely **has implications for whether our universe will tunnel out of existence a**s The Higgs boson with its mass of 126 GeV/c2 is the precise enough to keep the universe in its current state.
  - The atoms of most chemical elements **will be destroyed, taking stars, galaxies, and earthlife with them if the Higgs field was slightly stronger than it is now.**
- **Peculiar nature:** To determine its **oddball nature as** on the one hand, it is the one closest to the Higgs boson's mass and on the other hand, all the other particles like it are much, much lighter.
- Researchers will be able to **incorporate the top quark's mass measurement into calculations t**hat inform our understanding of our universe's particles.
- **Finding more particles:** Precisely measuring the top quark's mass is also key to knowing whether some other particle with mass close to that of the top quark could be hiding in the data.

GS PAPER-2-INTERNATIONAL RELATIONS

Trade Relationship Between India and China

The article discusses India's increasing manufacturing capabilities in sectors like solar cells and electronics, heavily relying on imported Chinese components. It also covers the complex trade and political relationship between India and China, highlighting both economic dependence and strategic challenges.

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What is the Current Status of India's Manufacturing Sector?

1. **Solar Cell Production:** India's solar-cell manufacturing capacity is set to increase from 6 gigawatts to 30 gigawatts within a year, positioning the country as a potential exporter of solar products.
2. **Electronics Manufacturing:** The capacity for manufacturing electronics, especially mobile phones, now meets 97% of domestic demand. India earned $15 billion from handset exports last year, with projections to reach $50 billion in electronic exports in the next two years.

What is the Trade Relationship Between India and China?

1. **Volume of Trade:** Over the past four years, trade between India and China has been recorded at $88 billion, $126 billion, $136 billion, and $119 billion, showing significant economic exchange.
2. **Import Reliance:** Imports from China have grown by 31% in the past year, with a noted increase in the share of electronic devices and components from China. India relies on Chinese imports for critical components like solar cells, glass, frames, and electronics parts such as printed circuit boards and semiconductors.
3. **Trade Deficit:** Despite strategic tensions, the trade deficit continues, largely due to the essential nature of Chinese imports that support India's manufacturing and economic ambitions.
4. **Strategic Compartmentalization:** Despite tensions like the Galwan incident, economic engagements continue separately from border issues, highlighting a strategy to prioritize economic ties despite political or military disputes.

What Are the Key Certainties in India-China Relations?

1. **No Gain from Military Conflict:** China has nothing to benefit from a full-scale military confrontation with India, indicating a mutual understanding to avoid such escalations.
2. **Persistent Gap:** The significant economic and power disparity between India and China is expected to continue for at least another decade.
3. **Balanced Border Deterrence:** India's strong border defenses match the scale of China's military build-up, maintaining a status quo at the border.
4. **Domestic Challenges in China:** China faces internal macroeconomic and demographic issues, along with complex border disputes with other neighbors, which demand substantial attention from its policymakers.
5. **Shared Global Interests:** Representing 40% of the world's population, India and China share more common global interests than often recognized, stemming from their statuses as ancient civilizations and neighbors.
6. **Dialogue Importance:** The need for distinctions in dialogue between states, governments, people, and societies is crucial. There is significant potential to enhance people-to-people connections, fostering better mutual understanding despite ongoing border hostilities.

What Should Be India's Strategy?

1. **Enhance Political Dialogue:** Engage China through more robust political dialogue to better understand and manage bilateral issues, as suggested by experts like former foreign secretary Vijay Gokhale.
2. **Explore Export Opportunities:** Exploit the Chinese $6 trillion consumer market more effectively. Even a 1% market share offers a significant economic opportunity, given the size of China's economy.
3. **Strategic Use of Chinese Capital:** Adopt a nuanced approach to Chinese capital inflows. Avoid general restrictions that might hamper economic opportunities, especially in sectors where such investments do not pose national security threats, like the automobile industry.
4. **Increase People-to-People Links:** Despite border hostilities, there is a need to enhance people-to-people relations, which can help improve mutual understanding and smooth over political tensions.

GS PAPER-2-GOVERNANCE-GOVERNMENT POLICIES AND INTERVENTIONS FOR DEVELOPMENT IN VARIOUS SECTORS AND ISSUES ARISING OUT OF THEIR DESIGN AND IMPLEMENTATION

Impact of Bharatiya Nyaya Sanhita 2023 on Street vendors

The article discusses India's new penal code, the Bharatiya Nyaya Sanhita 2023, and its impact on street vendors. Despite existing laws, street vending remains chaotic due to poor implementation and corruption. The article suggests easier licensing to balance order and commerce.

What challenges do street vendors face with the introduction of the Bharatiya Nyaya Sanhita 2023?

1. **New Legal Framework:** The Bharatiya Nyaya Sanhita (BNS) 2023 introduces updated legal codes that replace outdated pre-1947 laws. A street vendor was one of the first individuals charged under Section 285 of the BNS for causing obstruction under a foot-over bridge at New Delhi Railway Station, illustrating immediate enforcement challenges.
2. **Challenges in Regulation:** Despite the Street Vendors Act of 2014, which aimed to regulate and organize street vending, implementation has been poor. The act's goals to map vending zones and issue certificates have not effectively managed the chaos.

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3. **Corruption and Inconsistency:** Arbitrary enforcement by local officials and police corruption have exacerbated difficulties for vendors. The act was intended to reduce bribery, but uneven law enforcement has led to continued problems.
4. **Economic Impact:** Restrictive interventions in street vending impact the livelihood of many vendors who rely on this informal economy.

What should be done?

1. **Simplify Licensing:** Licenses for street vendors should be easier to obtain and not scarce. This approach would help in maintaining pathway accessibility without excessive control.
2. **Improve Implementation of the Street Vendors Act:** Enhance cooperation between local administrations to effectively implement the Street Vendors Act of 2014, ensuring that the goals of organized vending zones and licensing are achieved.
3. **Reduce Corruption:** Strengthen enforcement mechanisms to reduce bribery and ensure fair treatment of vendors by officials, which is crucial for the equitable application of the law.

GS PAPER3-ECONOMY-INFRASTRUCTURE-ENERGY

Challenges of India's Shift to Green Energy

The article discusses the challenges India faces as it moves away from fossil fuels to greener energy sources. It highlights the impact on government revenues from fossil fuels, the need for new revenue sources, and how to manage the economic and employment effects of this transition.

What Are the Challenges of India's Shift to Green Energy?

1. **Revenue Loss:** Transitioning away from fossil fuels will significantly reduce government revenue, which currently constitutes over 3% of India's GDP.
2. **State Financial Autonomy:** Different states have varied dependencies on revenue sources. For instance, Odisha earns significantly through coal royalties, whereas Maharashtra relies on tax revenues. The introduction of GST over VAT threatens this autonomy, particularly concerning petroleum products.
3. **Electric Vehicle Subsidies:** While fossil fuel vehicles generate substantial revenue, electric vehicles (EVs) require hefty subsidies. Balancing these subsidies with the need to maintain government revenue is a complex challenge.
4. **Employment Impact:** The reduction in coal use will lead to job losses, not just directly in mining but also indirectly through associated services and industries, affecting numerous livelihoods.
5. **Stranded Assets:** Transitioning from thermal power to renewable energy will lead to stranded assets, where investments in thermal power become redundant, further complicating the financial challenges of the green transition.

How Can India Address These Challenges?

1. **Rationalizing GST:** Adjusting the Goods and Services Tax (GST) is a potential strategy, but it requires significant negotiations between the central government and the states to find a balance that does not compromise state revenue autonomy.
2. **Implementing Carbon and Road Use Taxes:** Introducing carbon taxes could accelerate the transition from fossil fuels and alleviate immediate revenue issues. Additionally, road use taxes offer a straightforward method that might align better with the goal of maintaining state autonomy.
3. **Reducing Non-Productive Expenditure:** While challenging, cutting down on non-essential government spending could free up funds for more critical areas impacted by the transition.

Enhancing PSE Roles in Renewable Energy: Encouraging Public Sector Enterprises (PSEs) that are currently involved in fossil fuels to participate in the renewable energy sector could align their interests with the transition goals, helping to mitigate revenue losses.

PRELIM FACT

1.Santhal Hul

Hul Divas is observed annually on June 30 in memory of tribal leaders — Sidho and Kanhu Murmu — who led the Santhal hul (rebellion) on June 30, 1855, at Bhognadih in Sahebganj district (now Jharkhand).

out Santhal Rebellion:

Topic	Information
What is the Santhal Rebellion?	Santhal rebellion (also known as 'Hul') (1855-1856) was a revolt against both the British East the Santhal. The rebellion was led by the **four sibling Brothers – Sidhu, Kanhu, Chand and B**
Santhals and their Migration	The Santhal people migrated from the **Birbhum and Manbhum regions of Bengal to modern-day Santhal Pargana**. The British relocated them to the forested area of **Damin-i-Koh** as part of their revenue collection strategy.

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Reasons behind the Hul	The Santhals rebelled against the British **due to extortions, oppressive extractions, dispossession of property, false measurements, and other illegalities.**
Organization of the Hul	Contrary to popular belief, the Hul was a **well-planned and organized political war.** Preparations included **guerrilla formations, military teams, detectives, secret bases,** logistics, and a network of message carriers for coordination. **Non-Adivasi Hindu castes** also participated in the rebellion.
Contribution of Women	**Phulo-Jhano**, two sisters, led an army of 1,000 women who played crucial roles in the rebellion. The East India Company's army was defeated twice during the uprising.
End	After the rebellion started, **martial law was proclaimed** by the East India Company which lasted until January 3, 1856, when martial law was suspended and the rebellion was **eventually suppressed by the Presidency armies.**
Lasting Impact of the Hul	The Santhal rebellion **inspired future uprisings, such as the Santhal involvement in the 1857 mutiny.** It **symbolized resistance against British** colonialism and laid the foundation for subsequent movements in Jharkhand.

2.National Test House

- Recently, the Centre plans to make National Test House as apex certification body for all Indian products.

National Test House:

- **About:** NTH was established in 1912 as the **"Government Test House"** in Alipore, Calcutta. National Test House (NTH) is a leading scientific organisation dedicated to testing, calibration, and quality evaluation of raw materials and finished products for over 109 years.
- **Nodal Ministry:** NTH operates as a subordinate office under the Department of Consumer Affairs, Ministry of Consumer Affairs, Food & Public Distribution.
- **Key Objective:** To support and advise domestic manufacturers on engineering goods production through quality testing.

3.Chital

- The Project Cheetah authorities **have reached an in-principle decision** to shift surplus cheetahs from Kuno national park to Gandhi Sagar wildlife sanctuary to save the chital Population.

Chital (Spotted Deer)

- **Native Species:** The chital, also known as the spotted deer, chital deer, and axis deer, is a deer species indigenous to the Indian subcontinent.
- **Origins:** Johann Christian Polycarp Erxleben
- **Biological Features: I**t is sexually dimorphic; males are larger than females, and antlers are exclusively found on males.
- **Population Estimation: A**ccording to the IUCN, the Axis deer is found throughout its range, although no overall population estimate is given.
  - However, the IUCN Red List classifies the Axis deer as Least Concern (LC).

Kuno National Park:

- **Location**: Kuno National Park is situated in the **Sheopur district of Madhya Pradesh,** nestled near the Vindhyan Hills.
  - **Named after the Kuno River**, a major tributary of the Chambal River, the park was originally established as a wildlife sanctuary before being designated a national park in 2018.
  - It has been chosen as a site for the 'Action Plan for Introduction of Cheetah in India'.
- **Fauna:** jungle cat, Indian leopard, sloth bear, Indian wolf, striped hyena, golden jackal, Bengal fox, and dhole.
- **Flora:** The forested areas of Kuno National Park are predominantly occupied by Kardhai, Salai, and Khair trees, constituting a mixed forest environment.
  - The park boasts a diverse plant life, including 123 tree species, 71 shrub species, 32 exotic and climbing species, and 34 species of bamboo and grass.

4.Shyok River

- Recently, five soldiers died after a tank was swept away by strong water currents in the Shyok river during a military training in Ladakh

Shyok River:

- The Shyok River flows through northern Ladakh in Jammu and Kashmir, India, and into the Pakistan-administered region of Gilgit-Baltistan, where it merges with the Indus River.

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- **Tributary:** As a tributary of the Indus River, it has a unique course. Its primary right-bank tributary is the Nubra River.
- **Course:** The river originates from the Rimo Glacier, one of the tongues of the Siachen Glacier, and its name derives from a Ladakhi word meaning 'the river of death'.
  - The alignment of the Shyok River is peculiar; it starts from the Rimo Glacier and flows southeast.
  - Upon reaching the Pangong range, it abruptly turns northwest and flows parallel to its original course.
  - The Shyok River flows through a broad valley, quickly narrowing into a gorge after Chalunka, before finally joining the Indus River at Skardu, Pakistan.
- **Strategic Importance:** The Shyok River valley holds strategic significance due to its **access to several crucial passes in the Karakoram Range,** notably the renowned Karakoram Pass.

5.Snowblind Malware

Recently it has found that a new banking malware called 'Snowblind' is targeting Android users to steal banking credentials.

About Snowblind Malware

1. About: Snowblind is a new type of Android banking malware designed to steal banking credentials by bypassing security features.

2. Key Features:

i) Snowblind uses a built-in Android security feature to bypass anti-tamper mechanisms.

ii) This malware repackages apps to avoid detection of accessibility features that can extract sensitive information like login credentials and gain remote access to the app.

iii) Snowblind exploits a feature called 'seccomp', which stands for 'secure computing' and is part of the Linux kernel and Android OS.

iv) It injects code that loads before seccomp initializes anti-tampering measures, allowing the malware to bypass security mechanisms and utilize accessibility services.

v) Snowblind can remotely view the victim's screen by using accessibility services.

vi) It can disable biometric and two-factor authentication, which are commonly used security features in banking apps to prevent unauthorized access.

vii) Snowblind typically infects users who install apps from untrusted sources.

viii) The malware is mostly active in Southeast Asia, although the exact number of affected devices is unknown.

3. Security Implications Snowblind poses a significant threat to banking app users by circumventing advanced security measures.

4. Users are advised to avoid installing apps from untrusted sources and to remain vigilant about app permissions and behaviors.

6.Global IndiaAI Summit 2024

The Ministry of Electronics and Information Technology is organizing the '**Global IndiaAI Summit**'. This summit highlights India's commitment to the ethical and inclusive growth of AI technologies.

About Global IndiaAI Summit 2024

1. Hosted by: The Global IndiaAI Summit 2024 hosted by the Ministry of Electronics and Information Technology.

2. Duration: It will take place on July 3rd and 4th in New Delhi.

3. Key Objectives

i) Foster Collaboration: Bringing together global AI experts from various fields including science, industry, civil society, governments, international organizations, and academia.

ii) Knowledge Exchange: Sharing insights on key AI issues and challenges.

iii) Promote Ethical AI: Emphasizing responsible AI development and deployment.

4. India's Role: India will host member countries and experts from the Global Partnership on Artificial Intelligence (GPAI) to promote safe, secure, and trustworthy AI.

5. IndiaAI Pillars and Focus Areas: The IndiaAI Mission aims to build a robust AI ecosystem in India, focusing on seven key pillars:

i) **IndiaAI Compute Capacity:** This pillar focuses on establishing a scalable AI computing ecosystem with over 10,000 GPUs through public-private partnerships. An AI marketplace will provide AI as a service and pre-trained models, acting as a central hub for essential AI resources.

ii) **IndiaAI Innovation Centre:** Dedicated to developing and deploying indigenous large multimodal models (LMMs) and domain-specific foundational models, this center aims to cater to the unique needs of India's diverse industries and sectors.

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iii) **IndiaAI Datasets Platform:** This platform aims to streamline access to high-quality non-personal datasets for AI innovation. A unified data platform will provide seamless access for Indian startups and researchers, aiding in the development of robust AI models.
iv) **IndiaAI Application Development Initiative:** This initiative promotes AI applications in critical sectors by addressing problem statements from Central Ministries, State Departments, and other institutions. It focuses on developing impactful AI solutions for large-scale socio-economic transformation.
v) **IndiaAI FutureSkills:** By reducing barriers to AI education, this pillar aims to increase AI courses at various academic levels and establish Data and AI Labs in Tier 2 and 3 cities, ensuring a steady pipeline of skilled AI professionals nationwide.
vi) **IndiaAI Startup Financing:** This pillar supports deep-tech AI startups with streamlined access to funding. By providing risk capital and financial support, the mission aims to nurture a vibrant ecosystem of AI startups driving technological advancements and economic growth.
vii) **Safe & Trusted AI:** This pillar ensures responsible AI development by implementing Responsible AI projects, developing indigenous tools and frameworks, and establishing guidelines for ethical, transparent, and trustworthy AI technologies.

7. Minami-Torishima Island

Researchers recently discovered around 230 million metric tons of minerals crucial for making electric car batteries on the seabed off Minami-Torishima Island.

About Minami-Torishima Island

Aspects	Description
About	1. Minami-Torishima Island, also known as Marcus Island, is an isolated Japanese coral atoll in the northwestern Pacific Ocean. 2. It is the easternmost territory belonging to Japan and the only Japanese territory on the Pacific Plate, past the Japan Trench. 3.The island lies 1,950 km southeast of central Tokyo.
Geography	1. The shape of the island is close to an equilateral triangle. 2. Minami-Torishima Island is formed by a raised coral reef. The terrain is flat, with a maximum altitude of 9 meters.
Climate	The island is located in the transitional zone between tropical and subtropical climates. It has an oceanic climate with an average annual temperature of around 25.6 °C.
Economic Zone	The exclusive economic zone based on the baseline of Minami-Torishima Island covers approximately 430,000 km², which is larger than Japan's land area.

ANSWER WRITING

Q. In recent years, India and Nepal have made significant strides in energy cooperation and digital connectivity. Evaluate the impact of these developments on bilateral relations, economic growth, and regional dynamics.

India and Nepal share a unique relationship characterised by deep-rooted cultural, historical, and geographical ties. India is Nepal's largest trading partner and the principal source of foreign investments, with extensive cooperation in areas such as trade, education, and infrastructure development. In recent years, India and Nepal have made significant strides in energy cooperation and digital connectivity, marking a new chapter in their bilateral relations.

Impact on Bilateral Relations:

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- **Enhanced Cooperation**: The collaboration in energy and digital sectors has strengthened the bilateral ties, reflecting a deepening of **mutual trust** and cooperation.
  For instance: Recently, India renewed an agreement to export electricity (554 MW) to Nepal for next 3 months at a time when Nepal is facing a power crisis.
- **Strategic Partnerships**: Joint projects such as cross-border electricity trade and digital infrastructure development have fostered strategic partnerships.
  For example: The **Joint Vision Statement on Power Sector Cooperation** was signed in **2022** which covers bilateral cooperation in the **production**, **transmission** and cross-border **trading** of hydropower.
- **Diplomatic Engagement**: Regular **high-level visits** and **dialogues** focusing on these sectors have improved diplomatic relations.
  For instance: During the **2023** visit of **Nepal's Prime Minister**, a long-term power trade agreement was signed between India and Nepal, aiming to export **10,000 megawatts** of electricity from Nepal to India over the next **10 years**.
- **Mutual Benefits**: Both countries benefit from **shared resources** and expertise, fostering a sense of **mutual respect** and collaboration.
  For instance: In **February 2024**, the **Indian Ministry of Communications allowed** Nepali citizens to obtain mobile **SIM cards** during their travel to India, enhancing connectivity for Nepali travellers and boosting India's tourism.
- **Conflict Resolution**: **Joint initiatives** in energy and digital connectivity have provided platforms for addressing and resolving bilateral disputes amicably.
  For example: Joint initiatives like the **Arun III** and **Upper Karnali** where both countries work together, have provided platforms for addressing and resolving bilateral disputes amicably.

Impact on Economic Growth:

1. **Energy Security**: Increased energy cooperation, including hydropower projects and electricity trade, has enhanced energy security for both countries, promoting **sustainable economic growth**.
   For instance: The **Arun III Hydropower Project**, which is expected to generate **900 MW**, will significantly enhance energy security for both India and Nepal.
2. **Infrastructure Development**: Investments in energy infrastructure, such as power plants and transmission lines, have spurred economic activities and **job creation**.
3. **Digital Economy**: Improved digital connectivity has facilitated the growth of the digital economy, enabling better **access to markets, services,** and **information.**
   For example: Indian nationals can now make payments in Nepal using **mobile fund transfers** and **QR code scans** through **Unified Payments Interface (UPI)** apps.
4. **Trade and Investment**: Enhanced connectivity has boosted trade and investment opportunities, benefiting businesses and consumers in both countries.
   For example: Nepal earned over **Rs 10 billion** in **2022** from electricity exports , which has helped reduce the **trade deficit** with India and augment **foreign exchange reserves**.
5. **Rural Development**: Access to energy and digital services in rural areas has improved the **quality of life** and livelihood opportunities for rural populations in border areas.

Impact on Regional Dynamics:

1. **Regional Stability**: Strengthened India-Nepal relations contribute to regional stability, setting a **positive example** for other South Asian countries.
2. **Economic Integration**: Collaborative projects in energy and digital sectors promote greater **economic integration** in the region.
   For example : Development of the **SAARC Grid**, aims to connect the power grids of South Asian countries, facilitating **cross-border electricity trade** and enhancing regional economic integration.
3. **Geopolitical Influence**: India's support in these areas helps **counterbalance external influences** and reinforces its position as a key **regional player**.
   For example : India provided significant **financial** and **technical** assistance for the completion of the **Arun III Hydropower Project** in Nepal, strengthening its geopolitical influence in South Asia.
4. **Cross-border Cooperation**: Successful bilateral projects can pave the way for broader **regional cooperation** in energy and digital connectivity, benefiting the entire South Asian region.
   For example: Successful bilateral projects, such as the **Motihari-Amlekhgunj Petroleum Pipeline** and the proposed **Raxaul-Kathmandu rail link** can pave the way for broader regional cooperation benefiting the entire South Asian region.

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5. **Environmental Sustainability**: Joint efforts in **renewable energy projects**, such as hydropower, contribute to environmental sustainability and regional climate goals.
   For example: The **Nepal Electricity Authority** and India's National **Thermal Power Corporation Limited (NTPC)** signed a Memorandum of Understanding **(MoU)** to collaborate on renewable energy projects.

Recent efforts to renew bilateral relations through enhanced cooperation on digital connectivity and energy security mark a significant step in mending ties that soured after the 2015 political crisis. Rebuilding political trust and improving India's public perception in Nepal requires India to openly discuss contentious issues and show flexibility in accommodating Nepal's interests. These initiatives highlight a commitment to foster a stronger, more collaborative partnership that benefits both nations and contributes to regional stability.

MCQS

1. The Higgs boson is often referred to as the "God particle." Which of the following statements best describes its significance?
   a) It is responsible for the strong nuclear force that holds protons and neutrons together in an atomic nucleus.
   b) It is responsible for the electromagnetic force between charged particles.
   c) It is associated with the origin of mass in elementary particles through its interaction with the Higgs field.
   d) It is responsible for the weak nuclear force that governs radioactive decay.
2. Consider the following statements regarding Shyok River:
   1. Shyok River originates from the Rimo Glacier, near Siachen Glacier.
   2. It is a tributary of the Indus river and joins the Indus in Ladakh.
   Which of the statements given above is/are correct?
   a) 1 only b) 2 only
   c) Both 1 and 2 d) None
3. After the Santhal Uprising subsided, what was/were the measure/measures taken by the colonial government?
   1. The territories called 'Santhal Paraganas' were created.
   2. It became illegal for a Santhal to transfer land to a non-Santhal.
   Select the correct answer using the codes below.
   a) 1 only b) 2 only
   c) Both 1 and 2 d) Neither 1 nor 2
4. Shyok River is a tributary of the
   a) Jhelum River b) Sutlej River
   c) Indus River d) Brahmaputra River
5. 'Sidhu, Kanhu, Chand, and Bhairav' were associated with which rebellion?
   a) Sepoy Mutiny
   b) Indigo Rebellion
   c) Santhal Rebellion
   d) Chuar Rebellion
6. Consider the following statements about the Northeastern Council (NEC):
   1. The Northeastern Council (NEC) was established in 1971 to promote economic and social development in the northeastern region of India.
   2. The NEC is headquartered in Shillong, Meghalaya.
   3. The council functions under the Ministry of Home Affairs, Government of India.
   How many of the above statements is/are correct?
   a) Only one **b) Only two**
   c) All three d) None
7. Gandhi Sagar wildlife sanctuary to which surplus cheetaas are to be shifted from kuno national park is located in which of the following state?
   a) Madhya Pradesh
   b) Odisha
   c) Chhatisgarh
   d) jharkhand
8. Which one of the following statements is correct about the 'top quark'?
   a) It is the lightest of all observed elementary particles.
   b) It is the most massive of all observed elementary particles.
   c) It does not participate in weak interactions.
   d) It was discovered in 2008.
9. Consider the following statements about national test house
   1. NTH was established in 1912 as the "Government Test House" in Alipore, Calcutta
   2. NTH operates as a subordinate office under the Department of Consumer Affairs, Ministry of Consumer Affairs, Food & Public Distribution
   3. its Objective is To support and advise domestic manufacturers on engineering goods production through quality testing.
   Which of the above statements are correct?
   a) 1and 2 b) 2 and 3
   c) All three d) None
10. Minami –Torisima Island ,a coral atol situated in which ocean ?
    a) Atlantic ocean
    b) Pacific ocean
    c) Indian ocean
    d) Arctic ocean

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