

Current affairs 6th July 2025 by Right IAS

Topic → India–Trinidad and Tobago Relations

Key Agreements & Initiatives Signed
 1. 2. Six agreements signed between India and Trinidad & Tobago to deepen bilateral ties.

Focus areas: Finance and pharmaceutical sectors India aims to expand presence in the Caribbean region

International Initiatives 1. 2. Trinidad and Tobago joins two Indian-led global initiatives: Coalition for Disaster Resilient Infrastructure (CDRI) Global Biofuel Alliance (GBA) India donates \$1 million worth agro-machinery to NAMDEVCO. Promotes collaboration in: Millet cultivation Seaweed Fertilizer Natural farming

Fact → General José de San Martín: Argentina's National Hero

Key Contributions: 1. 2. Leader of the South American independence movement against Spanish colonial rule. Known as the “Liberator of Argentina, Chile, and Peru.” In Chile: Defeated Spanish forces at the Battle of Chacabuco (1817) and the Battle of Maipú (1818). Played a crucial role in liberating Chile with Chilean patriot Bernardo O’Higgins.

Topic → The Union Cabinet's Employment-Linked Incentive (ELI) Scheme

The Union Cabinet has approved the Employment Linked Incentive (ELI) scheme with a budget of ₹99,446 crores. Aimed at job creation, especially in the manufacturing sector. Part of the 2024-25 budget promises. Duration: August 1, 2025 – July 31, 2027 Implementing Agency: Employees' Provident Fund Organisation (EPFO)

Key Provisions: For Employees: The Union Cabinet has approved the Employment Linked Incentive (ELI) scheme with a budget of ₹99,446 crores. Aimed at job creation, especially in the manufacturing sector. Part of the 2024-25 budget promises. Duration: August 1, 2025 – July 31, 2027 Implementing Agency: Employees' Provident Fund Organisation (EPFO) Eligibility: New recruits with salaries up to ₹1 lakh. EPF Wage Benefit: One-month EPF wage (max ₹15,000), paid in two instalments: After 6 months of continuous service After 12 months of continuous service A portion of benefit kept in a savings instrument, withdrawable later. For Employers (Registered with EPFO): ₹3,000/month/employee for 2 years, provided: The employee is newly recruited. Employment is sustained for at least 6 months. For the manufacturing sector, incentives extend to 3rd and 4th year as well.

Key Concerns EPFO Role: As a savings custodian, not a job creation agency. No government funds in EPFO's corpus. Raises questions about funding mechanism and transparency. Lack of Structural Measures: Does not directly address: Economic slowdown Wage Stagnation Low purchasing power of workers

Implementation Challenges: Risk of manipulation by employers to claim incentives without real job creation. Needs robust monitoring, transparent payroll tracking, and independent audits.

Topic → Study on Human-Caused Airborne Chemicals

Not Bathing (for 3 Days): Minimal effect on chemical emissions. Skin glands quickly

regenerate oils lost due to washing. 2. Re-wearing Unwashed Clothes (for 3 Days): ~25% increase in ozone-driven airborne chemical production. 6-MHO & Geranyl Acetone levels increased by up to 77%. Clothes alone, when coated with old skin oil, became active chemical emitters. 3. Temperature & Humidity: Changing temperature from 22°C to 28°C or humidity from 40% to 70%: Had no significant impact on chemical emission rates.

Chemical Source: Most of these emissions are byproducts of ozone reacting with squalene, a natural oil in skin. **Implications:** Re-wearing dirty clothes significantly alters indoor air chemistry. Clothing acts as a chemical reactor, especially when coated with oxidized skin oils. Hygiene affects air quality, especially in closed environments like offices, cars, or aircraft cabins

Topic → The Origins of Life: How Heat and Flow May Have Sparked Early Chemistry

How Heat Creates Movement Temperature Difference: Imagine a crack filled with water, warmer on one side. Warm Liquid Rises: Creates an upward flow. Cooler Liquid Sinks: Forms a continuous loop. This movement circulates water, encouraging molecules to drift and concentrate.

What are protocells? Simple, cell-like structures that may have been precursors to true cells. How does temperature affect molecular interactions? Creates movement in liquids, facilitating molecule interaction and concentration. What is the significance of the green fluorescent protein (GFP)? Acts as a visual indicator of protein synthesis. Could hydrothermal vents have played a role in the origin of life? Yes, they may provide necessary conditions, but more research is needed. What does this study imply about the

complexity of early life? Suggests early life may have been simpler, relying on basic physical processes.

Topic → Evidence of Matrilineal Clans in Neolithic China

Recent research from Peking University has brought to light fascinating evidence suggesting that some Neolithic communities on China's eastern coast were organized into matrilineal clans between 4,750 and 4,500 years ago. **Historical Context** For years, scientists have debated whether any early human societies were matrilineal. While numerous genetic studies have concluded that ancient societies were largely patriarchal, exceptions do exist. Notable examples include the Chaco Canyon dynasty in North America (800-1300 BC) and certain Celtic communities in Germany (616-200 BC). What does the evidence suggest about gender roles in Neolithic societies? The findings suggest that some Neolithic societies may have had more egalitarian or matrilineal structures than previously believed. How does this research impact our understanding of human history? It challenges traditional narratives of patriarchal dominance and highlights the complexity of social structures in early human societies. What is a matrilineal clan? A matrilineal clan is a family group in which lineage and inheritance are traced through the mother.

How does mtDNA differ from nuclear DNA?

mtDNA is inherited only from the mother and is not mixed with paternal DNA, while nuclear DNA is a combination of both parents' genetic material. What role do isotopes play in archaeological studies? Isotopes help researchers understand the geographical origins, diets, and migration patterns of ancient populations.

Strontium (Sr) Isotope Analysis

Strontium (Sr) isotope analysis is a powerful tool in archaeology and anthropology for studying human migration, origin, and lifestyle patterns in ancient populations. What are Strontium Isotopes? Strontium (Sr) has several isotopes, but the two most important for analysis are: ^{87}Sr (Radiogenic) – produced by the decay of ^{87}Rb (rubidium) ^{86}Sr (Stable) The $^{87}\text{Sr}/^{86}\text{Sr}$ ratio varies based on the geology of a region (type and age of rocks/soil)

How Does it Help in Archaeology?
Strontium from local soils and rocks enters plants, which are eaten by animals and humans. Human bones and teeth absorb Sr during life: Teeth enamel: Records Sr ratio during childhood (non-remodelling tissue). Bones: Reflect Sr ratio during the last few years before death (continuously remodelled)

The Hindu

Topic → Piezo-Resistive Effect

Definition: The piezo-resistive effect is the change in the electrical resistance of a material when mechanical stress or pressure is applied to it **How It Works:** When a material is stretched (tensile stress) or compressed (compressive stress): Its shape and internal atomic arrangement change. This alters the flow of electrons, causing a change in its resistance.

Materials That Show Piezo-Resistive Effect: Semiconductors like: Silicon (Si) Germanium (Ge) Some metallic alloys also show the effect, but it's more significant in semiconductors. **Applications:** MEMS sensors (Micro-Electro Mechanical Systems) Pressure sensors, Acceleration sensors Touch sensors

Topic → F-NpCu1 – New Copper-Sensing Molecule

What is F-NpCu1? A molecular probe that lights up (fluoresces) in the presence of free copper (Cu^{2+}) in biological tissues. Composed of: Naphthalimide dye – provides fluorescent signal. Copper-reactive group – binds specifically to free copper ions. Fluorine tag – assists in imaging or further tracking.

Functionality: Probe fluorescence changes with copper concentration: Brightens in areas with high copper, Dimmer in copper-deficient regions. Successfully tracked both copper excess and deficiency in real biological samples.

Topic → HIP 67522 – Magnetic Star-Planet Interaction Discovery

Key Discovery: A strong correlation between the planet's transit and the star's magnetic flaring activity. Suggests that the planet's orbital motion disrupts the star's magnetic field, causing: Stellar flares Likely coronal mass ejections (CMEs)

Impact on the Planet: The flares and CMEs release high-energy radiation, which: Bombards the planet Strips and rarefies its already puffy atmosphere

Piezoresistive effect

