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Bridging a divide with an 'Indian Scientific Service'

Prelims: General Studies Paper - 1
Current events of national and international importance

Mains: General Studies - 3
Achievements of Indians in science & technology; indigenization of technology and developing new technology.

1. Background

- India's post-Independence service rules **prioritised generalist administrators** to ensure **stability and nation-building.**
- Governance is now shaped by **science, technology, environment,** and **risk-intensive sectors.**
- Scientists entered government service but remained governed by **administrative rules designed for a different era.**
- Unlike many advanced countries**, India lacks a dedicated scientific governance framework.**

2. Challenges

- **Structural mismatch**: Scientific careers are **specialised and peer-driven**, but service rules mirror **general administration**.
- **Weak integration:** Scientists lack role-specific training, clear authority, and protected career paths in government.
- **Reactive use of science**: Inputs are often sought for **short-term legal or regulatory needs**, not long-term policy foresight.
- **Limited institutional voice**: Scientists remain bound by **Central Civil Services (Conduct) Rules, 1964,** restricting independence.
- **Policy distortion**: Inability to formally record risks and uncertainty reduces science to an **advisory or symbolic role.**
- **Global contrast:** Countries like the **U.S., U.K., France, Germany, and Japan** have protected **scientific cadres**; India does not.

3. Way Forward

- Create an **Indian Scientific Service (ISS)** as a permanent, all-India scientific cadre.
- Recruit scientists through rigorous **national selection and peer evaluation**.
- Place scientists within ministries and regulators as **integral decision-making participants**.
- Frame **separate scientific service rules** to protect integrity and document evidence transparently.
- Clearly **distinguish scientific advice from policy choice**, while keeping final authority with elected leaders.
- Develop specialised cadres across **environment, climate, health, disaster risk, energy, agriculture, technology, and regulation.**
- **Strengthen evidence-based policymaking** to match India's ambitions in climate action, public health, and technology

The UAE-India corridor is sparking a growth story

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

1.Context

- India and the United Arab Emirates **signed a trade agreement (CEPA) in 2022 to increase economic cooperation**
- The **target of $100 billion trade by 2030 was reached five years earlier** than planned
- In January 2026, both countries **set a higher trade target of $200 billion by 2032.**

2. The Scale and Direction

- **Non-oil trade grew nearly 20% to $65 billion,** showing diversification beyond energy.
- The **UAE has invested over $22 billion in India**, while **India has invested more than $16 billion** in the UAE.
- **Nearly five million Indians live in the UAE,** with over 1,200 weekly flights linking the two nations.
- **Indian firms are expanding in clean energy and services in the UAE**, while **UAE firms are investing in India's infrastructure, banking**, and energy sector.
- Abu Dhabi Investment Authority (ADIA) opened an office in India's GIFT City, strengthening long-term ties.

3. Long-Term Institutional Support and Global Expansion

- The partnership is **supported by agreements like CEPA (2022), the 2024 Bilateral Investment Treaty, and a Strategic Defence Partnership.**
- **CEPA removed tariffs on about 90% of goods,** encouraging long-term business investment.
- The **corridor is expanding globally through Bharat Mart** in the UAE and joint projects in Africa.
- The partnership now **goes beyond bilateral trade toward wider global cooperation.**
- **India is hosting the AI Summit 2026, and the UAE is investing heavily in AI,** boosting their cooperation.

4.The Next Chapter

- **India, now the world's fourth-largest economy with a $4 trillion GDP,** is entering a strong global growth phase.
- **Indian businesses are increasingly eager to expand** internationally.
- The India-UAE corridor is helping accelerate this global expansion.
- The **Delhi Declaration outlines broader India-Arab cooperation** in economy, energy, technology, and security through 2028.
- The **future of the partnership will depend not just on trade numbers, but on deeper economic integration** and global reach.

What are bio-based chemicals and enzymes?

Prelims: General Studies Paper - 1
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Awareness in the fields of IT, Space, Computers, robotics, nano-technology, bio-technology and issues relating to intellectual property rights.

1.What Are Bio-Based Chemicals and Enzymes?

- Bio-based chemicals are **industrial chemicals made from plant-based materials like sugarcane or corn using biological processes**; examples include lactic acid and bio-alcohols.
- **Enzymes are biological catalysts used in industries such as food, detergents, textiles, and pharmaceuticals**; for example, proteases in detergents help remove stains while reducing energy use.

2. Why India Needs Them?

India has strong potential to scale this sector due to:

- A **large agricultural base** for feedstocks
- Expertise in fermentation from pharmaceuticals and vaccines
- A growing manufacturing ecosystem
- **Expanding bio-based chemicals can reduce dependence on imported petrochemicals**.
- **It can create value for agricultural produce, and strengthen India's position** in sustainable industrial inputs.

3. Where Does India Stand Today?

- India has **identified bio-based chemicals and enzymes as priority sectors under the Department of Biotechnology's BioE3 policy.**

The **BioE3 Policy (Biotechnology for Economy, Environment and Employment) is an initiative of India's Department of Biotechnology** to promote high-performance biomanufacturing. It aims to boost bio-based chemicals and enzymes, reduce imports, and support sustainable economic growth.

- Many Indian companies like Praj Industries, Godrej Industries, Godavari Biorefineries, and major enzyme players are **actively expanding bio-based chemicals and enzyme production.**

4. Global Developments

- **European Union:** Promotes bio-based chemicals under its Bioeconomy Strategy linked to climate and circular economy goals.
- **United States:** The USDA BioPreferred Program encourages federal procurement of certified bio-based products.
- **China:** Prioritizes high-value bio-based chemicals and enzymes in national bioeconomy plans.
- **Japan:** Integrates research and manufacturing readiness through government-supported projects.

5. Key Risks and Challenges

- **Bio-based products can be costlier than petrochemical alternatives** in the early stages.
- **Limited feedstock supply and infrastructure** can slow large-scale production.
- **Manufacturers may be reluctant to switch** to bio-based inputs.

6.Way Forward

- **Develop shared biomanufacturing infrastructure** such as biofoundries and pilot plants.
- **Establish clear quality standards** for bio-based products.
- **Introduce strong certification systems** to ensure credibility.
- **Implement supportive government procurement policies** to boost demand and investor confidence.

Ambiguities in the U.S.-India trade deal

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Effect of policies and politics of developed and developing countries on India's interests, Indian diaspora.

1. Background of the Interim Trade Agreement

- India and the **United States** agreed to an **interim trade agreement** after tensions caused by **U.S. tariffs (25% + 25% penalty)** imposed in **August 2025**.
- The U.S. agreed to **reduce tariffs on Indian imports from 50% to 18%**.
- The agreement is seen as the **first step toward a bilateral trade agreement (BTA)**.
- It aims to **restore strategic and economic ties** between the two countries.

2. India's Major Commitments

- India agreed to **reduce or eliminate tariffs and non-tariff barriers** on **industrial goods, food, and agricultural imports from the U.S.**
- India expressed intent to **stop importing Russian crude oil** (not officially confirmed by Indian authorities).
- India plans to **purchase $500 billion worth of U.S. goods** over **five years**, including:
  - **Energy products**
  - **Aircraft and parts**
  - **Technology products**
  - **Precious metals**
- The objective from the U.S. side is to **reduce India's trade surplus with the U.S.**

3. Expected Benefits of the Agreement

- **Lower U.S. tariffs** could help **Indian exports expand in the U.S. market**.
- **Labour-intensive sectors**, especially **textiles and clothing**, may gain a **competitive advantage**.
- However, this advantage may be **reduced by the U.S.–Bangladesh trade deal**, which gives **duty-free access to some Bangladeshi textile exports**.

4. Concerns and Criticisms

Agriculture and farmers

- No clear assurance that **tariff protection on cereals** will continue.

- Fear of **U.S. agricultural imports harming Indian farmers and food security**.
- Concerns about possible **imports of genetically modified (GM) food products**.

Trade imbalance and sovereignty

- India removed many **trade barriers**, while the U.S. still keeps **18% tariffs on Indian exports**.
- Earlier **average U.S. tariffs were only about 2.5%**, making the deal appear **unequal**.
- Questions raised about **accepting U.S. monitoring of India's oil imports**, especially regarding **Russian oil**.
- Critics argue this could affect **India's economic sovereignty and policy independence**.

KEYWORDS

Delhi Declaration (2026)

- The **Delhi Declaration (2026) is a joint statement adopted after the India–Arab Foreign Ministers' Meeting held in New Delhi** between India and members of the Arab League.
- It outlines a **framework for deeper political, economic, and strategic cooperation** between India and Arab countries.
- It backs **the Arab Peace Initiative on Israel–Palestine** and expresses shared commitment to reducing conflict without formally engaging with alternative external frameworks.
- India and Arab states emphasise norm-based diplomacy focused on stability and recognised governments, avoiding alignment with any single power bloc.

India-AI Impact Summit 2026

- The **India-AI Impact Summit 2026 will be the first global AI summit hosted in the Global South.**
- It will be held from **16 to 20 February 2026 at Bharat Mandapam** in New Delhi.
- The **summit is based on three pillars, or "Sutras": People, Planet, and Progress**.
- Building on the three foundational Sutras, **the deliberations at the AI Impact Summit will be structured around 7 Chakras**.
- These **Chakras represent key areas of multilateral cooperation that channel collective efforts** towards inclusive and sustainable societal outcomes.

Herath

- **Herath** is the **local name for Maha Shivaratri in Kashmir**, a festival that holds deep **religious and cultural significance** in the region.
- The word **"Herath"** comes from two **Sanskrit words "Hara" (Lord Shiva) and "Ratri" (night)**.
- The festival marks the **divine union of Lord Shiva and Goddess Parvati** and is observed with **special rituals, night-long prayers, and traditional ceremonies** in **Kashmiri households**.
- Unlike in many other parts of India, families traditionally prepare **mutton and fish dishes** during the celebration.
- The festival fostered **communal harmony between Muslims and Hindus in Kashmir**, despite the **migration of Kashmiri Pandits during the 1990s militancy**.