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Current affairs summary for prelims

29 April, 2024

Forest Fires in India

Context: *During ongoing forest fires in Uttarakhand's Nainital district, the Indian Air Force conducted firefighting operations on Sunday, the second consecutive day of the blaze.*

➢ **Causes of Forest Fires:**

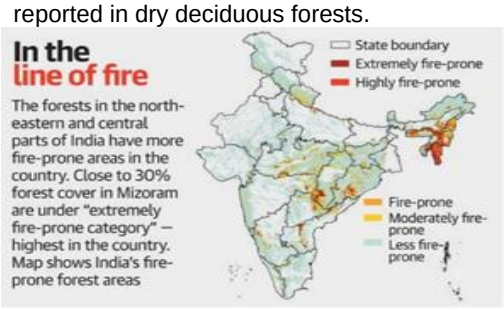
- **Man-made Factors:** Changes in agriculture and unchecked land-use patterns are believed to be significant contributors to forest fires.
- **Local Practices:** Deliberate fires by locals for various reasons such as promoting the growth of quality grass, concealing illegal tree cutting, and poaching.
- **Farming Activities:** Agricultural practices can inadvertently lead to forest fires, especially during the dry season.
- **Electricity Infrastructure:** Friction of electricity cables with dry leaves and lightning strikes can trigger wildfires.

➢ **Prevention and Control Measures:**

- **Early Detection:** Construction of watch towers and deployment of fire watchers for early detection of fires.
- **Community Involvement:** Involvement of local communities in fire prevention and control efforts.
- **Creation of Fire Lines:** Establishment and maintenance of fire lines, both Kachha (covered) and Pucca (open), to control the spread of fires.
- **Technological Solutions:** Utilisation of satellite-based remote sensing technology and GIS tools for early warning, real-time monitoring, and estimation of burnt areas.

➢ **Forest Fire Frequency and Impact:**

- **Seasonal Patterns:** The forest fire season in India lasts from November to June, with higher incidents reported in March, April, and May.
- **Factors Influencing Fires:** Temperature, precipitation, vegetation, and moisture levels contribute to the scale and frequency of forest fires.
- **Extent of Prone Areas:** Nearly 36% of India's forests are prone to frequent fires, with severe incidents reported in dry deciduous forests.



- **Regional Variations:** States in northeastern India exhibit the highest tendency for forest fires, along with parts of western Maharashtra, southern Chhattisgarh, central Odisha, and regions in Andhra Pradesh, Telangana, and Karnataka.

➢ **Bambi Bucket**

- **Functionality:** Bambi Bucket is a specialised aerial firefighting tool used since the 1980s.
- **Design:** It is a lightweight collapsible container that releases water from underneath a helicopter to targeted areas.
- **Water Release:** Water is released through a pilot-controlled valve, allowing for precise targeting.
- **Quick Refilling:** One of its key features is the ability to be quickly and easily filled from various sources such as lakes and swimming pools.
- **Capacity:** Available in various sizes and models, ranging from 270 litres to over 9,840 litres.
- **Inventor:** Don Arney, a Canadian businessman, invented the Bambi Bucket in 1982.
- **Motivation:** Arney noticed inefficiencies and high failure rates in existing aerial firefighting water buckets.
- **Design Improvements:** The Bambi Bucket addressed limitations of previous water buckets by offering better storage options and delivering a solid column of water for more accurate and effective firefighting.
- **Widespread Adoption:** The Bambi Bucket is used in over 115 countries by more than 1,000 helicopter operators.
- **Recognition:** In 2017, Don Arney was inducted into the Inventors Hall of Fame for his invention of the Bambi Bucket.

India's industrial goods imports

Context: *China's portion of India's imports for industrial goods has surged to 30% from 21% over the past 15 years, according to GTRI.*

➢ **Concerns Regarding Trade Deficit with China:**

- The economic think tank GTRI highlights the growing trade deficit with China as a significant concern.
- This dependency has profound strategic implications, impacting both economic and national security dimensions.

➢ **Stagnation and Surge in Exports and Imports:**

- From 2019 to 2024, India's exports to China remained stagnant at around $16 billion annually.
- In contrast, imports from China surged from $70.3 billion in 2018-19 to over $101 billion in 2023-24.
- This surge resulted in a cumulative trade deficit exceeding $387 billion over five years.

➢ **Call for Import Strategy Recalibration:**

- GTRI founder Ajay Srivastava emphasises the need for evaluating and potentially recalibrating import strategies.
- This recalibration aims to foster more diversified and resilient supply chains, reducing dependency on single-country imports, particularly from geopolitical competitors like China.

➢ **Rising Dependence on China in Industrial Imports:**

- Over the last 15 years, China's share in India's industrial product imports has significantly increased from 21% to 30%.
- China's export growth to India outpaced India's total import growth from all other countries by 2.3 times.

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➢ **Sectoral Dependence and Import Values:**
- Key sectors witnessing rising dependence on Chinese imports include electronics, telecom, electrical products, machinery, chemicals, pharmaceuticals, iron, steel, base metals, plastics, textiles, clothing, automobiles, medical equipment, leather, paper, glass, ships, aircraft, and others.
- During April-January 2023-24, electronics, telecom, and electrical products sectors had the highest import value at $67.8 billion, with China contributing $26.1 billion.

➢ **Importance of Machinery and Capital Goods:**
- Half of the imports from China consist of capital goods and machinery, emphasising the need for focused research and development in this area.
- China plays a key role as a supplier of machinery to India, particularly in sectors like electronics, telecom, and electrical products.
- Importance of Chemicals and Pharmaceuticals: India's chemical and pharmaceutical imports from China highlight the significant role of Chinese products in these sectors, accounting for 29.2% of total imports.

➢ **Potential for Domestic Production:**
- Many products imported from China could potentially be produced domestically, particularly those dominated by micro, small, and medium enterprises (MSMEs).
- India imports a broad array of products from China, highlighting significant gaps in India's industrial capabilities across various sectors.

➢ **Impact of Chinese Companies in Indian Sectors:**
- Chinese companies are involved in various Indian sectors, including energy, telecommunications, transportation, smartphones, electronics, electric vehicles, solar energy, and engineering projects.
- The large-scale entry of Chinese automakers into India is expected to impact domestic auto/EV manufacturers, firms in the EV value chain, and battery development.

Phi-3-mini

Context: *Shortly after Meta revealed its Llama 3 Large Language Model (LLM), Microsoft introduced the newest iteration of its 'lightweight' AI model, dubbed the Phi-3-Mini.*

➢ **Introduction to Phi-3-mini:**
- Phi-3-mini is the latest addition to Microsoft's lineup of AI models, designed to provide practical choices for generative AI applications.
- It boasts a parameter count of 3.8 billion and is accessible on various AI development platforms like Microsoft Azure AI Studio and HuggingFace.
- Available in two variants, one offering a 4K context-length and another with a context window of up to 128K tokens, enabling enhanced comprehension of large text content.

➢ **Features of Phi-3-mini:**
- Offers a context window of up to 128K tokens, making it the first model in its class to support such a feature without compromising quality.
- Instruction-tuned, facilitating responsiveness to diverse user instructions and immediate usability without additional tuning.
- Future plans include the introduction of Phi-3-small (7B) and Phi-3-Medium models to provide customers with more flexibility.

➢ **Comparison with LLMs:**
- Phi-3-mini belongs to the category of streamlined language models (SLMs), offering cost-effectiveness and superior performance on resource-constrained environments.
- Specialized for specific tasks through fine-tuning, SLMs like Phi-3-mini excel in accuracy and efficiency compared to their larger counterparts.
- Notable differences include inference speed, latency, and suitability for cost-constrained scenarios, where SLMs prove advantageous.

➢ **Performance and Applications:**
- Phi-3-mini surpasses its predecessors and rivals, demonstrating strong reasoning and logic capabilities.
- It has outperformed models of similar or larger sizes, including Gemma 7B and Mistral 7B, in key areas.
- Microsoft cites its collaboration with an Indian business conglomerate utilizing Phi-3 in a farmer-facing app, showcasing its practical applications in real-world scenarios.

LLM vs SLM

Aspect	LLM (Large Language Models)	SLM (Small Language Models)
Advantages	• Deep language understanding • Versatility • Contextual relevance	• Efficient resource utilization • Suitable for smaller datasets • Faster training and inference
Drawbacks	• Computationally intensive • Data requirements • Potential for bias	• Limited language understanding • Contextual limitations • Task-specific training

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NEWS IN BETWEEN THE LINES

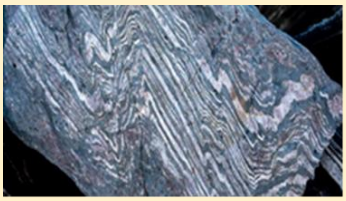
Indulekha Painting

The first true copy of Raja Ravi Varma's painting "Indulekha" will be unveiled on 29th April 2024, at Kilimanoor Palace, the birthplace of the legendary artist, commemorating his 176th birth anniversary celebrations.

About the Indulekha Painting:

- Indulekha is a **painting by the renowned Indian artist Raja Ravi Varma**, depicting the eponymous protagonist of the first modern novel in **Malayalam literature**, "Indulekha," **authored by O. Chandu Menon** and **published in 1889**.
- It was emerged in the **public domain in 2022** and evoked a great sense of enthusiasm among the art fraternity.
- The novel is **about the romantic love of a young Nair woman** in 19th century Kerala and the societal constraints that affect it.
- The painting is believed to have been inspired by **Olympia by Manet,** but **Varma replaced the boudoir** with an **upper-caste woman from Malabar**, India to portray Indulekha's independent spirit.
- Raja Ravi Varma's painting style is known for its **attention to detail**, **use of vibrant** colors and **depiction of Indian mythological** and **historical figures**, **reflecting the cultural ethos of the time**.
- The painting's portrayal of Indulekha holding a letter addressed to her **lover Madhavan encapsulates** the romantic narrative of the novel and highlights themes of love and longing.

Discovery of Ancient Earth's Magnetic Field



Recently, the Geologists at MIT and Oxford University uncover ancient rocks in Greenland bearing remnants of Earth's earliest magnetic field, dating back approximately 3.7 billion years.

About:

- The rocks retain signatures of a magnetic field with a **strength of at least 15 microtesla,** similar to Earth's present-day magnetic field, as revealed by a study published in the Journal of Geophysical Research.
- This discovery represents some of the earliest evidence of a magnetic field enveloping Earth, extending **its known existence by another 200 million years**, providing insights into the planet's early geological history.
- Scientists **speculate that Earth's early magnetic field,** by shielding the planet from **damaging solar radiation** while retaining a life-sustaining atmosphere, could have played a crucial role in fostering early life and making the planet habitable.
- Researchers **aimed to find rocks preserving the Earth's magnetic field** signatures when first formed, leading them to sample rock formations in Greenland's Isua Supracrustal Belt.
- The team collected whole **rock samples of banded iron formations**, indicating their formation in **primordial oceans before the rise in atmospheric oxygen around 2.5 billion years ago.**
- **Using uranium-to-lead ratio, researchers determined the magnetized** minerals in the rocks.

Nehru Zoological Park

Recently, white tigers sought relief from scorching temperatures by playing in a pond at Nehru Zoological Park, Hyderabad, as the India Meteorological Department issued a four-day heatwave warning for 12 districts in Telangana.

About Nehru Zoological Park:

- Nehru Zoological Park, also **known as Zoo Park**, is a zoo in Hyderabad, **Telangana**.
- It is **named after Jawaharlal Nehru**, India's first Prime Minister.
- The zoo is **considered one of the best in Asia** and is home to over 1,500 species of birds, animals, and reptiles.
- The zoo was **established on October 6, 1963** and is run by the forest department of the Government of Telangana.
- It was **started in 1959 by relocating the erstwhile Zoo** enclosures from Public Gardens, in Hyderabad.
- The Zoo is abutting the Mir-Alam Tank bund which is an indigenous arch bund dam with 24 arches formed 200 years ago.
- It was the **first zoo in India to introduce initiatives like the Safari Park** and **Nocturnal Animal House**.
- Tiger, African Lion, Jaguar, Ostrich, Macaws, Rhinoceros, Elephant, Nilgiris Langur, Lion Tailed Macaque, Black Headed Ibis, Eurasian Spoonbill, Indian Star Tortoise, Indian Soft Shell Turtle, etc. are found here.

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Combustion

Abut Combustion:

- Combustion is a **chemical reaction**, specifically a redox reaction, where one substance (reductant) loses electrons and another substance (oxidant) gains electrons.
- It typically **involves the burning of fuels such as fossil fuels (like petroleum)** or biomass to produce energy.
- **Combustion reactions release energy** in the form of **heat** and **light**, which can be harnessed for various applications, including powering engines and generating electricity.
- Internal combustion engines power **most cars** and **motorcycles**, utilizing fossil fuels like petroleum for combustion, though **electric vehicles** are gradually re placing them.
- Combustion results in the formation of **new chemical compounds**, including **carbon dioxide** (CO_2), **water vapor** (H_2O) and other by-products depending on the specific fuel and conditions.
- It is a multidisciplinary field that studies the fundamental principles and applications of combustion, including its **mechanisms**, **kinetics**, and **environmental impacts**.
- Combustion of fossil fuels contributes to **air pollution** and **greenhouse gas emissions, leading to environmental issues** such as climate change and health concerns.

Place in News
Iraq

Recently, Iraq's parliament passed a law criminalizing same-sex relationships. The law imposes severe penalties, including up to 15 years in prison for engaging in same-sex relations and a minimum of seven years for promoting homosexuality or prostitution.

Iraq (Capital: Baghdad)

Location: Iraq, officially known as the Republic of Iraq, is a **country in West Asia.**

Boundaries: Iraq shares it borders with **Iran** (East), **Syria** (West), **Turkey** (North), **Saudi Arabia** (South), the **Persian Gulf** and **Kuwait** (Southeast) and **Jordan** (Southwest).

Physical Features:

The highest point in Iraq is **Mount Halgurd**, a part of the Zagros mountain range located in the Kurdistan region of northern Iraq.

The major rivers in Iraq are the **Tigris** and **Euphrates** rivers.

Iraq possesses significant reserves of **oil**, **natural gas**, **phosphates**, **sulfur**, **salt**, **copper**, **phosphorite** and **gypsum**.

Membership: Iraq is a member of various international organizations and bodies, including the **United Nations** (UN), **the Arab League**, **the Organization of Islamic Cooperation** (OIC) and the **Non-Aligned Movement** (NAM).

Political Structure: Iraq is a **federal parliamentary republic**. Its government consists of a President, Prime Minister and Council of Representatives.

POINTS TO PONDER

- Under which ministry does the Indian Historical Records Commission (IHRC) function? **– Ministry of Culture**
- What is the theme of 'World Intellectual Property Day 2024'? **– IP and the SDGs: Building our common future with innovation and creativity**
- Who was recently elected as the Chairman of the Athletes Commission of the Wrestling Federation of India (WFI)? **– Narsingh Pancham Yadav**
- Where was the 12th International Meeting of High Ranking Officials Responsible for Security Matters recently held? **– St. Petersburg, Russia**
- Which country recently passed the Foreign Aid Bill to provide military aid to Ukraine? **– USA**