



## National Science Day

### ❖ Context:

- The Prime Minister has extended his greetings to all scientists and innovators on National Science Day.

### ❖ Key Highlights:

- In 1986, the Government of India designated February 28 as National Science Day to commemorate the announcement of the discovery of the "Raman Effect".
- This year's edition is being celebrated under the theme of "Global Science for Global Wellbeing", in light of India's G20 presidency.

### ❖ About Sir CV Raman:

- Raman was born to a family of Sanskrit scholars in Trichy (present-day Tiruchirapalli) in the Madras Presidency in 1888.
- At the age of only 16, He received a BA degree from Presidency College in Madras, and was placed first in his class.
- While studying for his MA degree, at the age of 18, he got published in the Philosophical Magazine: this was the first research paper ever published by Presidency College.
- Due to his ill health, he was unable to travel abroad for further education.
- While still a full-time civil servant, Raman began after-hours research at the Indian Association for the Cultivation of Science (IACS).
- At the age of 29, he finally resigned from his civil services job and took up a professorship in Presidency College, Calcutta.
- By 1921, while passing through the Mediterranean Sea, Raman was most fascinated by the sea's deep blue colour.
- He soon found out that the colour of the sea was the result of the scattering of sunlight by the water molecules.
- Fascinated by the phenomenon of light-scattering, Raman and his collaborators in Calcutta began to conduct extensive scientific experiments.

### ❖ The Raman Effect:

- The Raman Effect refers to the phenomenon in which when a stream of light passes through a liquid, a fraction of the light scattered by the liquid is of a different colour.
- This happens due to the change in the wavelength of light that occurs when a light beam is deflected by molecules.
- In general, when light interacts with an object, it can be reflected, refracted or transmitted.
- One of the things that scientists look at when light is scattered is if the particle it interacts with is able to change its energy.
- The Raman Effect is when the change in the energy of the light is affected by the vibrations of the molecule or material under observation, leading to a change in its wavelength.

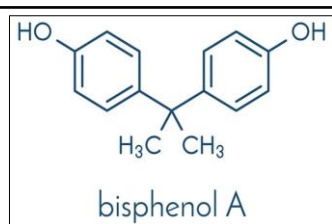
### ❖ The Importance Of The Discovery:

- CV Raman's discovery took the world by storm as it had deep implications far beyond Raman's original intentions.
- As Raman himself remarked in his 1930 Nobel Prize speech, "The character of the scattered radiations enables us to obtain an insight into the ultimate structure of the scattering substance.
- The discovery would also find its use in chemistry, giving birth to a new field known as Raman spectroscopy.
- It became a basic analytical tool to conduct nondestructive chemical analysis for both organic and inorganic compounds.
- With the invention of lasers and the capabilities to concentrate much stronger beams of light, the uses of Raman spectroscopy have only ballooned over time.
- Today, this method has a wide variety of applications, from non-invasive study of cultural objects to detecting hidden drugs in luggage.

## Bisphenol A (BPA)

### ❖ Context

- Recently, a study conducted in Thiruvananthapuram, Kerala, suggests Bisphenol A can indirectly aid in the spread of vector-borne diseases in humans and animals.



### ❖ Key Highlights:

- It establishes BPA can significantly shorten the breeding time of southern house mosquitoes (Culex quinquefasciatus) and thereby aid in its quick multiplication.
- This mosquito is a major carrier of the West Nile virus, Rift Valley fever virus and avian pox in tropical and subtropical countries.
- About Bisphenol A:
  - It is an industrial chemical that has been used to make certain plastics and resins since the 1950s.
  - BPA is found in polycarbonate plastics and epoxy resins.

- Polycarbonate plastics are often used in containers that store food and beverages, such as water bottles.
- The chemical is widely used to soften plastics, paints and other products.
- Impacts of BPA :
  - When ingested, disrupts the endocrine system by interfering with the hormones and affects the brain and prostate gland of foetuses, infants and children.
  - The chemical can cause high blood pressure, diabetes and cardiovascular disease in adults.
  - BPA is known to impair reproduction and development in aquatic organisms.
  - BPA exposure is delays larval development and pupation time in common fruit fly (Drosophila melanogaster).

### Face to Face Centres





## IEA Annual Methane Global Tracker Report

### ❖ Context

- According to **International Energy Agency (IEA) annual Methane Global Tracker report**, fossil fuel companies emitted 120 million metric tonnes of methane into the atmosphere in 2022, only slightly below the record highs seen in 2019.

### ❖ Findings of the Report:

- The **energy sector accounts for around 40%** of the total average methane emissions from human activity.
  - Oil and natural gas companies are known to release methane into the atmosphere when natural gas is flared or vented.
  - The greenhouse gas is also **released through leaks from valves and other equipment** during the drilling, extraction and transportation process.
  - More than 260 billion cubic metres (bcm) of natural gas (mostly composed of methane) is wasted through flaring and methane leaks globally today
- In the oil and gas sector, **emissions can be reduced by over 75%:**
  - It can be done by implementing well-known measures such as **leak detection and repair programmes** and **upgrading leaky equipment**.
  - 80% of the available options to curb the release of methane could be implemented by the fossil fuel industry at net zero cost.

- Reducing 75% of the wastage of natural gas could **lower global temperature rise by nearly 0.1 degree Celsius by mid-century.**
- ❖ **International Energy Agency (IEA)**
  - It is an **autonomous intergovernmental organization**.
  - Established in the framework of the **Organization for Economic Co-operation and Development (OECD)** in **1974 in the wake of the 1973 oil crisis**.
  - It mainly focuses on its **energy policies which include economic development, energy security and environmental protection**.
  - IEA member countries are required to **maintain total oil stock levels equivalent to at least 90 days** of the previous year's net imports.
  - **Membership- Only OECD member states** can become members of the IEA (31 Member). India became an Associate member of IEA in March 2017.
  - **Headquarter- Paris.**
  - **Publication- World Energy Outlook (Annual).**

## Governor's Refusal to Summon the Session

### ❖ Context

- The Supreme Court is set to hear a challenge by the Punjab government against the state Governor, over his refusal to summon the Budget session of Vidhan Sabha.



### ❖ Key Highlights

- Governor has cited Article 167 of the Constitution, which relates to the **duties of the Chief Minister in furnishing information to the Governor**.
- Governor questions to CM on appointments are under this provision.
- **Constitutional Validity :**
  - The Governor has to act according to the aid and advice of the council of ministers.
  - Constitutionally, the office of the Governor has little discretion to not act on the cabinet's advice.
  - Under Article 174 a Governor shall summon the House at a time & place, as she or he thinks fit.
  - **Article 174 (2) (a)** says a Governor may from **"time to time"** prorogue the House.
  - **Article 174 (2) (b)** allows her or him to dissolve the Legislative Assembly.

- **Article 163(1)** of the Constitution says that "there shall be a council of Ministers with the Chief Minister at the head to aid and advise the Governor in the exercise of his functions, except in so far as he is by or under this constitution required to exercise his functions or any of them in his discretion.
- A **joint reading of the 2 provisions** leaves the Governor with minimal discretion in summoning the house.
- **SC Observation :** In 2016, the Supreme Court in **Nabam Rebia & Bamang Felix vs Deputy Speaker, or the Arunachal Pradesh Assembly case**, expressly said that the power to summon the House is not solely vested in the Governor.

## News in Between the Lines

### Organ on Chips

#### ❖ Context

- The recent U.S. Food and Drug Administration Modernization Act 2.0 green-lit **computer-based and experimental alternatives to animals to test new drugs**.

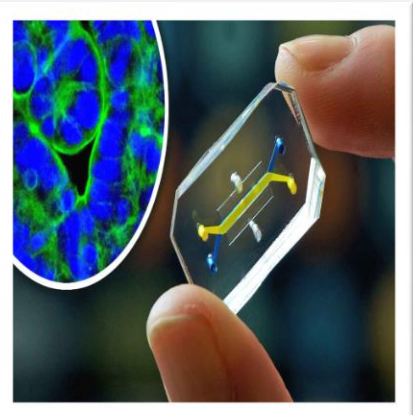
#### ❖ Key Highlights:

- Before the new Act, researchers had to demonstrate the safety and efficacy of a drug in an animal model of the disease before moving to human clinical trials.

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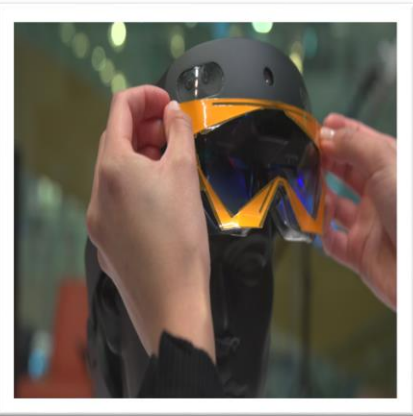






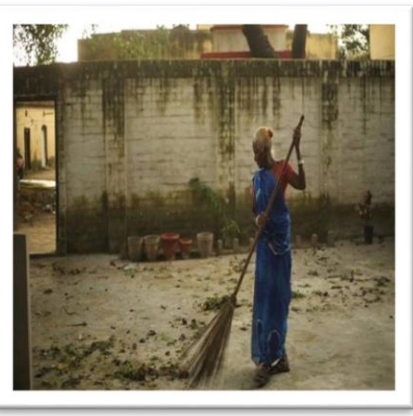
- The move is **expected to boost the research and development of organ chips.**
- **Organ Chips:**
  - Organ Chips are **small devices containing human cells.**
  - They are **used to mimic the environment in human organs**, including blood flow and breathing movements, serving as synthetic environments in which to test new drugs.
  - **Advantages:**
    - **It can boost the research and development of Organ chips.**
    - Reduce the cost of R&D of drugs
    - **Reduce the chances of contamination** and spread of disease from animals being experimented on.
    - Organ chips can be used to develop personalised therapies for individual patients.
    - **Minimize ethical dilemmas** associated with the use of animals for testing (treatment of animal and their well-being).

## Augmented Reality (AR)



- ❖ **Context**
  - MIT researchers have built an augmented reality headset that enables users to see hidden objects inside a box or under a pile.
- ❖ **Key Highlights:**
  - The headset, called **X-AR**, combines computer vision and wireless perception to automatically locate a specific item that is hidden from view.
  - **Application:** The device can **help e-commerce warehouse workers quickly find items** on cluttered shelves or buried in boxes, or by identifying the exact item for an order when many similar objects are in the same place.
    - It could also be used in a manufacturing facility to help technicians locate the correct parts to assemble a product.
- ❖ **AR and VR:**
  - **Augmented reality (AR)** augments your surroundings by adding digital elements to a live view, often by using the camera on a smartphone.
  - **Virtual reality (VR)** is a completely immersive experience that replaces a real-life environment with a simulated one.

## Safai Karamchari Commission



- ❖ **Context**
  - After remaining without leadership for almost a year, the National Commission for Safai Karamcharis (NCSK) has now appointed a chairperson, vice-chairperson, and member.
- ❖ **Key Highlights:**
  - The National Commission for Safai Karamcharis (NCSK) was constituted on 12th August, 1994 as a statutory body by an Act of Parliament.
  - It was constituted through the '**National Commission for Safai Karamcharis Act, 1993**', as a legal body for a period of three years until March 31, 1997.
  - As per Section 1(4) of the Act, the Commission **was scheduled to dissolve after March 31, 1997.**
  - However, the **Act's validity was extended through Amendment Acts** passed in 1997 and 2001, up to March 2002 and then up to February 2004, respectively.
  - With the lapsing of the "The National Commission for Safai Karamcharis Act, 1993" w.e.f. 29.2.2004, the **Commission is acting as a Non-Statutory body** of the Ministry of Social Justice and Empowerment.
  - The Commission's tenure is extended from time to time through Government Resolutions.

## Raisina Dialogue

- ❖ **Context**
  - Italian PM Giorgia Meloni to be chief guest at 8th Raisina Dialogue.
- ❖ **About Raisina Dialogue:**
  - The Raisina Dialogue is India's premier conference on **geopolitics and geo-economics** committed to addressing the most challenging issues facing the global community.
  - **Every year, leaders in politics, business, media, and civil society** converge in New Delhi to discuss the state of the world and explore opportunities for cooperation on a wide range of contemporary matters.

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- The Dialogue is structured as a multi-stakeholder, cross-sectoral discussion, involving heads of state, cabinet ministers and local government officials.
- They are joined by thought leaders from the private sector, media and academia.
- The conference is hosted by the **Observer Research Foundation in partnership** with the Ministry of External Affairs, Government of India.
- This effort is supported by a **number of institutions, organisations and individuals**, who are committed to the mission of the conference.

## Mission Shakti



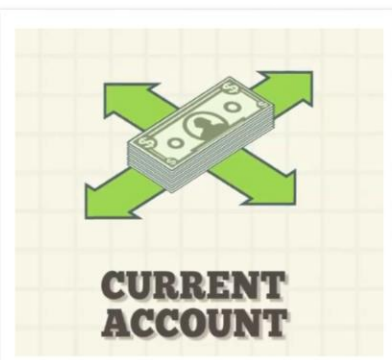
### ❖ Context

- **The Supreme Court has sought more information** from the government about Mission Shakti, an umbrella scheme for the safety, security, and empowerment of women.

### ❖ About Mission Shakti:

- **'Mission Shakti' is a scheme** aimed at strengthening interventions for women safety, security and empowerment.
- **'Mission Shakti' has two sub-schemes - 'Sambal' and 'Samarthya'.**
- While the **"Sambal"** sub-scheme is for safety and security of women, the **"Samarthya"** sub-scheme is for empowerment of women.
- **The scheme seeks to** make women economically empowered, exercising free choice over their minds and bodies in an atmosphere free from violence and threat.
- **It also seeks to reduce** the care burden on women and increase female labour force participation by promoting skill development, capacity building, financial literacy, access to micro-credit etc.

## Current Account Deficit



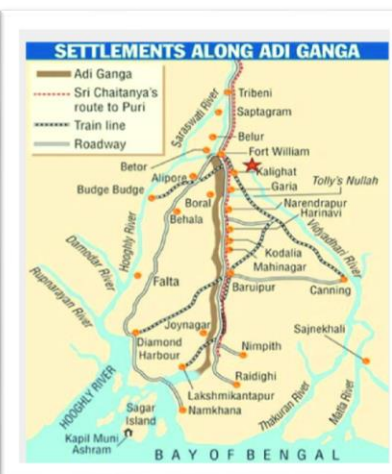
### ❖ Context

- As per the RBI's quarterly statistics, the **current account deficit (CAD)** widened to 4.4% of GDP in the second quarter of 2022-23, down from 2.2% in the preceding quarter.

### ❖ About Current Account Deficit:

- The current account deficit is a measurement of a country's trade where the value of the goods and services it imports exceeds the value of the products it exports.
- A current account deficit **represents negative net sales abroad**. Developed countries, such as the United States, often run deficits.
- **Emerging economies** often run current account surpluses. **Impoverished** countries tend to run current account debt.
- The **current account includes** net income, such as interest and dividends, and transfers, such as foreign aid, although these components make up only a small percentage of the total current account.
- The current **account represents a country's foreign transactions** and, like the capital account, is a component of a country's balance of payments (BOP).

## Adi Ganga Project



### ❖ Context

- Recently, the **National Mission for Clean Ganga** announced plans to revive the Adi Ganga.

### ❖ Key Highlights:

- The project has been allocated around Rs 650 crore funds.
- The project aims to restore the river and provide a sustainable solution to the pollution problem.
- The project is **being implemented with the support of the World Bank** and aims to improve the water quality and ecosystems of the Ganges, Brahmaputra, and Meghna river basins.
- **Adi Ganga** : Adi Ganga, also known as **Tolly's Nullah**, was once a thriving river that **served as the main channel of the Ganga river** until the 17th century.
  - It is the original channel of the River Ganga that passes through the city of Kolkata.
- **National Mission for Clean Ganga (NMCG)** : It is an **initiative launched by the Government of India in 2011** to reduce pollution and ensure the rejuvenation of the Ganga river.
  - National Ganga Council implements the NMCG.
  - The mission is structured into five tiers, with a **National Ganga Council at the top, chaired by the Prime Minister of India.**

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