Prelim Bits 17-11-2023 | UPSC Daily Current Affairs

Disappearance of Saturn's Rings

Recently, scientists revealed that in 2025, Saturn will align edge-on with Earth, rendering its splendid rings virtually invisible.

> ***Saturn*** *is the 6th planet from the Sun, 2nd largest in the solar system after Jupiter and a gas giant composed primarily of hydrogen and helium. It has radius about 9 times that of Earth, although it has a low density and is only about 95 times more massive than Earth.*

- **Saturn's Rings** – It is primarily ice particles with a smaller fraction of rocky debris and dust ranging from micrometres to meters in size that spreads out over 280,000km from the planet.
- ***7 distinct rings*** are named as A, B, C, D, E, F, and G rings with varying transparency and brightness.

> *In 1610, Galileo Galilei, renowned as the pioneer of modern astronomy, 1st laid eyes upon the magnificent rings of Saturn.*

- **Origin** – May be from remnants of comets, asteroids, and moons which were ripped apart by the planet's immense gravitational pull.
- It is younger than a tenth of Saturn's own age.
- **Rings orbit** – Directly above Saturn's equator and so they are tilted to the plane of Saturn's orbit.

> *While Earth's equator is tilted by 23.5 degrees,* ***Saturn's equator has a 26.7 degree tilt*** *and so just like Earth, Saturn experiences seasons, but more than 29 times longer than ours.*

- **Disappearance** – As Saturn tilts, its rings will *seem to vanish* due to the planet's tilt and Earth's perspective.
- As the seasons on Saturn progress, the southern side of the rings tilted Earth's way to the northern side and then, the planet tips back to reveal the southern side once more.
- When it is ***edge-on, the rings appear to vanish*** seen from a distance as they are so thin.
- ***Twice per Saturnian year (29.4 Earth Year), we see the rings edge on*** and they all but vanish from Earth's view point.

> *The last time Saturn's rings seem to be invisible was in **2009** and it gradually became visible again. Now, the rings will be edge on once again in **March 2025** and they'll gradually come back into view, before sliding out of view again in **November 2025.***

Reference

1. The Hindu| Saturn's Rings Disappear
2. Earth| Saturn's Rings

Working of Electric Battery

Electric battery, as a portable sources of electric power are at the foundation of convenience and sustainability.

- **Electric cell** – A device that converts chemical energy into electrical energy.

Components of Electric Cell
• **Electrode –** It is a *metal plates* in the cell where *cathode* is the positively charged electrode, the one to which electrons arrive, while *anode* is the negatively charged electrode, which 'supplies' electrons. • **Electrolyte** – It is a *liquid or gel that contains ions* which allows the flow of electric charge between the electrodes. • **Separator** - It is a *barrier that prevents the 2 electrodes* from touching and shorting out the cell. • **Wire** – The 2 metal electrodes are connected by a wire.

- **Principle** – It uses ***redox reactions*** to produce an electric current which is combination of both ***oxidation*** (release of electrons) and ***reduction*** (consumption of electrons) reaction.
- **Working** – A voltaic, or galvanic cell consists of 2 half-cells where each half-cell is made of a metal electrode immersed in an electrolyte of that metal.
    - For example, a zinc electrode in zinc sulphate and a copper electrode in copper sulphate.
- The ***zinc oxidises at the anode***, releases 2 electrons into the electrode and Zn2+ ions goes into the electrolyte.
- Copper ions (Cu2+) from the copper sulphate deposit onto the cathode, which now requires 2 electrons thus ***copper reduces at the cathode***.
- So, the wire connecting the electrodes ***transports 2 electrons from anode to cathode***.
- An external circuit connected to the wire can draw the electron flow for various applications.

An electric battery is a combination of electric cells.

Reference

The Hindu| Working of Electric Battery

Smog Tower

Recent research by IIT-Bombay found that smog tower at Connaught Place, New Delhi cleans air with 50% efficiency that drops to 30% at a distance of 50 meters from the filters, and just above 10% when 500 meters away.

- **Working** – Polluted air is sucked in and made to pass through 1000's of filters to remove dust particles and then clean air is released back to the atmosphere.
- **Updraft air cleaning system** – It sucks in polluted air from bottom sends it upwards to the filters and clean air is distributed.
- **Downdraft air cleaning system** – It sucks in polluted air from above, sends it down to the filters, and clean air is then distributed.

- **Inward fans** – When operated, they create a negative pressure that helps to suck the polluted air from outside into the tower.
- **Filters** – It have both macro and micro layers to trap particles of 10 microns and larger, and particles of around 0.3 microns, respectively.
- **Outward fans** – They are kept in different directions in the outward vent and when operated, the filtered air is released (at a rate of 1,000 cubic metres per second in Connaught Place tower).
- **Challenges** – Higher installation cost and requirement of lot of maintenances.
- As they operate outdoors, it cannot clean enough air or fast enough.
- As soon as filtered air is released, it mixes again with the surrounding pollution, which offsets any improvements.

Reference

The Economic Times| Working of Smog Tower

Worldwide Governance Indicators (WGI)

Recently, Chief Economic Adviser of India stressed on the need for the World Governance Index to be more transparent and less subjective as it has been used for ratings assessment by credit ratings agencies.

The WGI is developed in 1999 by 2 World Bank researchers and the data will be updated annually every September.

- It is released by the ***World Bank (WB)***.
- **Objective** - To help researchers and analysts assess broad patterns in perceptions of governance across countries and over time.
- It provide a ***ranking of 215 countries*** territories.
- **Criteria** – It is based on ***6 dimensions of governance***

- **Data Source** – It aggregate data from more than 30 think tanks, international organizations, NGOs, and private firms across the world selected on the basis of ***3 key criteria***
    - They are produced by credible organizations.
    - They provide comparable cross-country data.
    - They are regularly updated.
- **Issues** – Data's are based on subjective opinions of some institutions which might be erroneous or manipulated.

Credit rating – It is an assessment of the creditworthiness of a borrower (individual, corporation, state or provincial authority, or sovereign government) in general terms or with respect to a particular debt or financial obligation.

Credit rating agency (CRA) - It is a company that assigns credit ratings and there are 6 credit rating agencies registered under SEBI namely, CRISIL, ICRA, CARE, SMERA, Fitch India and Brickwork Ratings.

References

1. Indian Express| Issues with Worldwide Governance Index
2. World Bank| Worldwide Governance Indicators (WGI)

International Monetary Fund (IMF) Quota

International Monetary Fund (IMF) executive board approves 50% quota increase to strengthen resources following the guidance from the International Monetary and Financial Committee (IMFC) at the 2023 annual meetings.

- Quotas are the building blocks of the IMF's financial and governance structure which are ***denominated in Special Drawing Rights (SDRs)***, the IMF's unit of account.
- **Reflection** – An individual member country's quota broadly reflects its relative position in the world economy.
- **Usage of IMF Quotas**

*Currently, **India has a quota** of special drawing rights (SDR) 13,114.4 million which denotes a share of 2.75%, making it the 8th largest quota-holding country*

in the IMF. Based on the quota, India has 132,063 votes, which denotes a share of 2.63%.

- **Quota revival** – The IMF's board of governors conducts general ***reviews at least every 5 years.***

Any changes in IMF quotas require ***approval by 85% of the total voting*** *power, and a member's own quota cannot be changed without its consent.*

- **Significance of quota increase** – It would *enhance the IMF's permanent resources* and *strengthen the quota-based nature* of the fund by reducing the reliance on borrowing.
- It would *safeguard global financial stability* and respond to members' potential needs in an uncertain and shock-prone world.

Reference

1. Business Standard| IMF Quota increase
2. IMF| IMF Quotas

Other Important News
Mitra Shakti, 2023 • The 9th edition of Mitra Shakti, a Joint ***military*** exercise between ***India and Sri Lanka*** commenced recently in Pune. • **Aim -** To jointly rehearse conduct of Sub Conventional operations under Chapter VII of United Nations Charter. • Chapter VII of the United Nations Charter sets out the UN Security Council's powers to maintain peace.
33rd Conference of WOAH Regional Commission • India recently hosts the 33rd Conference of the World Organization for Animal Health (WOAH) Regional Commission for Asia and the Pacific at New Delhi. • WOAH is an intergovernmental Organization working across borders to improve the health of animals. • WHOA is headquartered in Paris and has 182 Members including India. • WHOA has adopted its Seventh Strategic Plan for 2021 - 2025.
Second Thomas Shoal • 2nd Thomas Shoal is a ***submerged reef*** in the ***Spratly Islands of the South China Sea.*** • The shoal is located ***105 nautical miles*** west of Palawan, Philippines and lies within Manila's Exclusive Economic Zone (EEZ). • The shoal is a disputed territory and is claimed by China, the Philippines, Taiwan (ROC) and Vietnam. • To know about Scarborough Shoal Click here

Bartan Bank

• A panchayat in ***Odisha***'s Nuapada district recently introduces Bartan Bank to reduce plastic waste.

• The Bartan Bank will act as a ***repository of steel utensils*** as alternatives to single use plastics during community functions and social gatherings.

Cyclone Midhili

• It is a cyclonic storm that is expected to intensify over the ***Bay of Bengal***.

• The storm is expected to cross the Bangladesh coast and bring heavy rainfall to West Bengal's coastal districts.

• The name Midhili was proposed by the ***Maldives***.

Sinhagad fort

• The ***Watch and earn*** **initiative** is a project to protect the Sinhagad fort, an ancient hill fortress located at Pune in ***Maharashtra***.

• The fort is previously known as ***Kondhana*** and it is known for the ***Battle of Sinhagad.***

• Battle of Sinhagad was held in 1670 between Tanaji Malusare, a Maratha commander and Udaybhan Rathore, a fort keeper under Jai Singh I.

Tuvalu

• Australia has offered refuge to citizens of Tuvalu because of the catastrophic impacts of climate change, in a landmark agreement.

• Under the pact, citizens of Tuvalu will have the right to live, work and study in Australia.

• Tuvalu is a nation of 9 coral islands nestled in the ***South Pacific***, formerly known as the Ellice Islands.

• It has been defined by the United Nations as "extremely vulnerable" to the effects of climate change, with most of its landmass less than 5 metres above sea level.

"Dashboard" portal

• Union Minister of Science & Technology recently launched the software application "Dashboard" portal.

• It is an ***Artificial Intelligence (AI) driven technology*** dashboard to analyze Parliament Questions on various parameters including member's profile.

• It also serve as a dashboard for Cabinet Notes, Acts of Parliament and Gazette Notifications of Govt. of India related to Department of Science & Technology.

Silkyara Tunnel

• The Silkyara tunnel connects the villages of Silkyara and Dandalgaonin in ***Uttarakhand***.

• It is part of the Chardham project of the ***Ministry of Road Transport and Highways.***

• The tunnel aims to reduce the distance between 2 major pilgrim sites ***Yamunotri and Gangotri*** in Uttarakhand.

• The tunnel collapsed recently trapping at least 40 workers inside.

Nayi Chetna – 2.0

• Nayi Chetna – 2.0 is a gender campaign that aims to eradicate violence against women and advance the rights of women and gender-diverse individuals.

• The campaign was launched by the Ministry of Rural Development on ***November 25***, the ***International Day for the Elimination of Violence against Women***.

• The campaign is led by Deendayal Antyodaya Yojana-National Rural Livelihoods Mission (DAY-NRLM) and launched in all states under the National Rural Livelihoods Mission, supported by 9 ministries.



SHANKAR
IAS PARLIAMENT
Information is Empowering