Prelim Bits 27-04-2019

Safe City Project

- Union government's Empowered Committee of Officers for Nirbhaya funds scheme had approved Safe City projects in eight selected metropolitan cities, namely, Delhi, Kolkata, Mumbai, Chennai, Bengaluru, Hyderabad, Ahmedabad and Lucknow with a view to provide safety to women in public places.
- The project would be implemented as a Centrally Sponsored Scheme with Centre and State sharing the funding in 60:40 ratio.
- The major components of the Safe City project include

1. Setting up an Integrated Smart Control Room and Pink Out-posts for facilitating ease of filing complaint by women.
2. Setting up Women Help Desks in all Police Stations with Counsellors.
3. Implementing Safety measures in buses, including Cameras.
4. Improving Street Lighting in identified Hot Spot areas.
5. Integration of Women power-help line with a single Emergency number.

IPBES Assessment Report

- Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services' (IPBES) releases Global Assessment Report on ecosystem services.
- IPBES has 132 member governments, is the body that measures the contribution of biodiversity to people.
- According to this assessment, invasive alien species have increased and constitute to be one of the most serious drivers of biodiversity loss across the Asia-Pacific region.
- While agriculture-intensive areas and urban clusters are the usual victims, such attacks mostly happen on islands and around coastlines.

Invasive Species

- Invasive alien species are species whose introduction and/or spread outside their natural past or present distribution threaten biological diversity.

- These species are found in or known to impact animals, plants, fungi and microorganisms, and can affect all types of ecosystems.
- In recent past, the invasive alien species have spread faster and are invading unknown territories due to increasing volume of international trade, improvements in transportation, and cross-border migration.

Zero Shadow Day

- Zero shadow day (ZSD) are the days when the sun will rise at true east and set at true west.
- It occurs twice a year, happens two times in a day at a particular place and it usually happens at places between tropic of cancer and tropic of Capricorn.
- During ZSD a sub-solar point happens when the sun is directly overhead at a particular latitude.
- When the sun is at the zenith (the highest point in the sky) its rays will be hitting a particular point exactly perpendicular to the surface.
- This will make shadow of any object to be exactly under it, making it look like there are no shadows.

Double Electron Capture

- There are four fundamental forces in the Universe: gravitational force, electromagnetic force, strong forces and weak forces.
- Among these, the weak forces act at the shortest distance and aid in the disintegration of atomic nuclei, this happens through a process known as beta decay.
- One of the processes of beta decay is an electron capture in which the nucleus captures an electron, in turn converting a proton in the nucleus into a neutron and emitting a neutrino.
- The disintegration of some atomic nuclei happens through a double electron capture (two electrons are captured by the nucleus instead of one) which is very slow, and hence the longer half-life.
- Researchers have found the first direct evidence of a rare radioactive decay reaction, known as the two neutrino double electron capture.
- The reaction is rare because its half-life, the time it takes to lose 50 per cent of its mass is much bigger, almost one trillion times, than the known age of the Universe.
- This detection is an important step towards knowing the constituents of dark matter, which makes up 27 per cent of the Universe.

Dark Matter

- Around 68 per cent is filled with is dark energy which remains unknown and undetected.
- The rate of expansion of the Universe cannot be explained with the existence of ordinary matter alone.
- Only by taking dark matter and dark energy into account can this rate be explained.
- Dark matter could be made up of yet unfound particles known as Weakly Interacting Massive Particles (WIMP).
- Such particles will display rare radioactive reactions such as neutrino-less double beta decay, one example of which is a neutrino-less double electron capture.
- The recent observation of a neutrino double electron capture is the first step towards the neutrino-less version of the reaction.

Source: Indian Express, the Hindu, Down to Earth

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