Sagittarius A* : Black Hole at Centre of Milky Way

Why in News?

Recently, Scientists from the **Event Horizon Telescope (EHT)** facility, revealed the first image of the black hole named Sagittarius A* at the centre of our galaxy - the Milky Way.

- Nearly all galaxies have these giant black holes at their centre, where light and matter cannot escape, making it extremely hard to get images of them.
- Researchers called the black hole "**the gentle giant in the centre of our galaxy**".

What does Black Hole Image Unveil?

- This image of the black hole referred to as **Sagittarius A* (Sagittarius A(asterisk))** gave further support to the idea that the compact object at the centre of our galaxy is indeed a black hole.
    - It is near the border of Sagittarius and Scorpius constellations. **It is 4 million times more massive than our sun.**
- It strengthens Einstein's general theory of relativity that a point in space where matter **is so compressed as to create a gravity field from which even light cannot escape.**
- The researchers said that imaging Sagittarius A*, the black hole at the centre of the Milky Way, was much more difficult than imaging M87.
    - In 2019, the Event Horizon Telescope made history by releasing the first ever image of a black hole **Messier 87 (M87)** – the black hole at the centre of a galaxy M87, which is a supergiant elliptic galaxy.

What are Black Hole?

- The concept was theorized by Albert Einstein in 1915 and the term 'black hole' was coined in the mid-1960s by American physicist John Archibald Wheeler.
- Usually, the black holes belong to two categories:
    - One category ranges between a few solar masses and tens of solar masses. These are thought to form when massive stars die.
    - The other category is of supermassive black holes. These range from hundreds of thousands to billions of times that of the sun from the Solar system to which Earth belongs.
- In April 2019, the scientists at the Event Horizon Telescope Project released the **first-ever image of a Black Hole** (more precisely, of its shadow).
- **Gravitational waves** are created when two black holes orbit each other and merge.

Galaxy

- A galaxy is a huge collection of gas, dust, and billions of stars and their solar systems, all held together by gravity.
- Earth is the part of the **Milky Way Galaxy,** which also has a super Massive Blackhole in the middle.

Event Horizon

- There is a region of space beyond the black hole called the event horizon. This is a "point of no return", beyond which it is impossible to escape the gravitational effects of the black hole.

Event Horizon Telescope Project

- EHT is a group of 8 radio telescopes (used to detect radio waves from space) located in different parts of the world.

UPSC Civil Services Examination, Previous Year's Question (PYQs)

Q. Recently, scientists observed the merger of giant 'blackholes' billions of light-years away from the Earth. What is the significance of this observation? (2019)

(a) 'Higgs boson particles' were detected.
(b) 'Gravitational waves' were detected.
(c) Possibility of inter-galactic space travel through 'wormhole' was confirmed.
(d) It enabled the scientists to understand 'singularity'

Ans: (b)

Source: TH