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SNAP-10A

Remembering the world's first nuclear reactor to operate in space, SNAP-10A.

- SNAP-10A was the world's first operational nuclear reactor in space.
- SNAP-10A was launched on April 3, 1965 by the U.S.
- While it still remains in orbit, it was operational for just 43 days.
- SNAP-10A was built as a result of the System for Nuclear Auxiliary Power (SNAP) programme or SNAPSHOT for Space Nuclear Auxiliary Power Shot.
- The objective of this programme was to develop compact, lightweight, reliable atomic devices that could then be employed in space, sea, and land.
- **Reactor -** The SNAP reactors had enriched uranium fuel with zirconium hydride as a moderator, and liquid Na-K alloy as the coolant.
- A thermoelectric converter was used to directly convert heat from the reactor into electricity.
- **U.S. -** SNAP-10A is the U.S.' first and only known nuclear reactor in space.
- **Russia -** Has sent quite a few of them, including one that crashed and scattered radioactive debris over Canada in 1978.

References

1. The Hindu - The world's first operational nuclear reactor in space

Fast Radio Bursts

Scientists may finally discovered what causes mysterious fast radio bursts.

- Fast radio bursts (FRB) are intense but short radio signals that last for milliseconds.
- The first FRB was discovered in 2007 by American astronomer Duncan Lorimer which led to the term '*Lorimer Bursts*'.
- Astronomers have been working on theories about what could be causing these signals, a research paper is published on that recently.
- Astronomers studied 2 neutron stars colliding and turning into a black hole generating a burst of gravitational waves.

  A neutron star is the remnant of a collapsed supergiant star that was between 10 and 25 times the mass of our Sun.

- **Theory -** The merging of two neutron stars colliding and turning into a black hole may have caused the fast radio bursts.

- A neutron start has a magnetic field but a black hole does not have a magnetic field.
- Based on this, the paper mentions the fast radio burst could have been generated when the strong magnetic field of a neutron star ceases to exist.
- **Limitation -** The new theory can only truly apply to the fast radio burst that was discovered in FRB 20190520B.
- Scientists can't definitively say that this hypothesis of a collapsing neutron star applies to all fast radio bursts.

References

1. IE - Astronomers may have discovered source of fast radio bursts
2. Science Alert - What Are Fast Radio Bursts?

Performer's Rights

Actor Anushka Sharma challenged the sales tax levied against her income from advertisements and performances in award shows.

- In the year 1961, with the enactment of the Rome Convention, the concept of performer rights was accorded recognition.
- In 1994, performer rights were recognised under the **Copyright Act, 1957** in India.
- The Act is also in conformity with 2 WIPO internet treaties concluded in 1996 namely, the WIPO Copyright Treaty (WCT) and WIPO Performances and Phonograms Treaty (WPPT).
- **Performers -** Indian law recognized the concept of performer in an exhaustive manner.
- Section 2(qq) defines the term 'performer', which includes actor, musician, dancer, acrobat, snake conjurer, a person delivering lecture or making any kind of performance.
- **Performer's Rights -** Section 38 and 39 of the Copyright Act recognize the concept of performer rights.
- The performer engages in any performance including, literary work, song, movie is entitled for performer's rights.
- For example, if copyright of a song is licensed, it would not just be the producer who would get a royalty but the singer and lyricist would also be entitled for a share.
- The protection of performer's rights is 50 years from the end of the year in which the performance was fixed or it took place.
- The performers' rights cannot be transferred or sold through an agreement.
- This ensures the production houses cannot simply buy out an artist and her work remains with her.

References

1. IE - Anushka Sharma's plea on sales tax disposed of by Bombay HC
2. Legal Services India - Rights of Performers under Copyright Law

Bandipur National Park

Bandipur completed 50 years as a Project Tiger Reserve on April 1, 2023.

- On April 1, 1973, that the then Prime Minister Indira Gandhi launched the flagship Tiger conservation programme, Project Tiger.
- Bandipur was among the first 9 reserves to be brought under Project Tiger.
- **History -** Bandipur was once the private hunting grounds of the erstwhile Maharajas of Mysore.
- Bandipur National Park was formed in 1941 by including most of the forest areas of the then Venugopala Wildlife Park.
- In 1985 the area was enlarged and renamed as Bandipur National Park.
- At present, the adjoining Nugu Wildlife Sanctuary too has been incorporated under Bandipur.
- **Boundaries -** Moyar River forms the natural southern border of Bandipur towards the Nilgiris.
- Kabini reservoir separates the Nagarahole and Bandipur National Park.



- **Fauna -** Apart from tigers and elephants, several endangered species such as sloth bears, gaurs, Indian rock pythons, jackals, muggers, and four-horned antelopes are found here.
- **Flora -** A wide range of timber trees are found here including teak, rosewood, sandalwood, Indian-laurel, Indian Kino tree, giant clumping bamboo, etc.
- **Nilgiri Biosphere Reserve -** The Bandipur Tiger Reserve is an important component of Nilgiri Biosphere Reserve, the country's first biosphere reserve.
- Nilgiri Biosphere Reserve spans over Bandipur, Nagarahole, Mudumalai, and Wayanad
- Nilgiri Biosphere Reserve complex is home to the highest number of tigers (about 724) and Asian elephants in the country.

References

1. The Hindu - Bandipur completes 50 years as Project Tiger Reserve
2. Bandipur National Park

Reusable Launch Vehicle Mission

ISRO successfully carried out the landing experiment of the Reusable Launch Vehicle Autonomous Landing Mission (RLV-LEX) at Challakere.

- **Reusable Launch Vehicle (RLV) Mission** of ISRO aims to develop space planes/shuttles that can travel to low earth orbits, deliver payloads and return to earth for use again.
- **RLV-TD** (Technology Demonstrator) is a series of tests in developing essential technologies for a fully reusable launch vehicle to enable low-cost access to space.
- **RLV LEX -** The Reusable Launch Vehicle Autonomous Landing Mission (RLV LEX) test was the second of the 5 RLV-TDs.
- The first trial of the RLV-TD was conducted on May 23, 2016.
- Three more experiments have to be conducted.
    1. Return flight experiment (REX)
    2. Powered cruise flight

3. Scramjet Propulsion Experiment (SPEX)

- RLV-TD will be used to develop technologies like hypersonic flight (HEX), autonomous landing (LEX), return flight experiment (REX), powered cruise flight, and Scramjet Propulsion Experiment (SPEX).
- This RLV will be scaled up to become the first stage of India's reusable two-stage orbital (TSTO) launch vehicle in the future.
- ISRO's RLV-TD looks like an aircraft.
- It consists of a fuselage, a nose cap, double delta wings, and twin vertical tails.
- **1st and 2nd RLV-TD**
    1. The first test with RLV-TD (HEX1) involved the vehicle landing on a hypothetical runway over the Bay of Bengal.
    2. The second test with RLV-TD LEX experiment involved a precise landing on a runway.
- **Advantages -** Low-cost, reliable, and on-demand mode of accessing space.
- **Global Scenario of RLV -** Reusable space vehicles have been in existence for a long time.
- NASA space shuttles carried out dozens of human space flight missions.
- Space X demonstrates partially reusable launch systems with its Falcon 9 and Falcon Heavy rockets since 2017.
- SpaceX is also working on a fully reusable launch vehicle system called Starship.

References

1. The Hindu - ISRO successfully conducts landing experiment of RLV-TD
2. IE - ISRO's Reusable Launch Vehicle Mission RLV LEX

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