Prelim Bits 25-07-2019

Tiangong-2

- **Tiangong-2** ("Heavenly Palace") is a Chinese Space Laboratory.
- It is an experimental space station which carried out research and human operations in Low Earth Orbit (**LEO**).
- It was launched on September 2016 and it was has deorbited on July 19, 2019 spent over 1,000 days in orbit.
- It was brought down to Earth in a controlled fashion and burned up over the South Pacific ocean by China.
- It followed the **Tiangong-1**, China's first space station, which crashed into the southern Pacific Ocean on 2018.
- It deploys to space the first-ever 'Cold Atomic Fountain Clock' which has a higher precision than conventional atomic clocks.
- It detected 55 'gamma-ray bursts' by a device names POLAR installed on the spacecraft.
- It also docked a micro-satellite that took high-resolution pictures of the connected space lab and Shenzhou-11 manned spacecraft.

Lightning strike

- 29 people have been killed by lightning over the past 36 hours in Bihar.
- India sees 2000-2500 lightning deaths every year on average.
- Lightning is the biggest contributor to accidental deaths due to natural causes.
- It is a rapid, massive discharge of electricity in the atmosphere, some of which is directed towards the Earth's surface.
- It is an electrical discharge caused by imbalances between storm clouds and the ground, or within the clouds themselves.
- Occurrences of lightning are not tracked in India, as not enough data for scientists to work with.
- As water vapour moves upward in the cloud, the falling temperature causes it to condense.
- As they move to temperatures below zero degrees celsius, the water droplets change into small ice crystals.
- They continue to move up, gathering mass until they are so heavy that they start to fall to Earth.

- This leads to a system in which, simultaneously, smaller ice crystals are moving up and bigger crystals are coming down.
- Collisions triggers the release of electrons , a process that is very similar to the generation of sparks of electricity.
- This process results in a situation in which the top layer of the cloud gets positively charged, while the middle layer is negatively charged.
- The electrical potential difference between the two layers is huge, of the order of a billion to 10 billion volts.
- In very little time, a massive current, of the order of 100000 million amperes, starts to flow between the layers.
- While the Earth is a good conductor of electricity, it is electrically neutral.
- However, in comparison to the middle layer of the cloud, it becomes positively charged.
- As a result, about 15%-20% of the current gets directed towards the Earth as well.
- It is this flow of current that results in damage to life and property on Earth.
- Lightning rarely hits people directly, people are most commonly struck by what are called **"ground currents".**
- The electrical energy, after hitting a large object (such as a tree) on Earth, spreads laterally on the ground for some distance.
- The people in this area receive electrical shocks.
- It becomes more dangerous if the ground is wet or if there is metal or other conducting material on it.
- Water is a conductor, and many people are struck by lightning while standing in flooded paddy fields.
- Taking shelter under a tree is dangerous, lying flat on the ground too, can increase risks.
- Grounded buildings offer protection but occupants who uses a landline phone may be shocked by conducted electricity.

Global Innovation Index-2019

- It is an annual ranking that quantifies the state of national innovation ecosystem across countries.
- Its co-published by World intellectual property organisation (**WIPO**), Cornell University and INSEAD.
- The **CII**, Dassault Systèmes and the National Confederation of Industry (**CNI**) and SEBRAE are its Knowledge Partners.
- It ranked 129 economies based on 80 indicators ranging from intellectual property filing rates to mobile-application creation, education spending and scientific and technical publications.
- This year's theme– "Creating Healthy Lives - The Future of Medical

Innovation".

- Switzerland is the world's most-innovative country followed by Sweden, the U.S, the Netherlands and the U.K.
- **India** maintains its top place in the Central and Southern Asia region as the **52nd ranked** (57th in 2018).
- India remains 2nd among middle-income economies in the quality of innovation.
- It maintains top ranks in indicators such as productivity growth and exports of services related to information and communication technologies.
- Bengaluru, Mumbai and New Delhi features in the GII ranking on the world's top science and technology clusters.
- India lags in areas like,

1. Overall quality of education,
2. Access to information and communication technologies.
3. Student to teacher ratio in secondary level education.
4. Proportion of women with advanced degrees in the workforce.

- **GII 2019 Key Findings –**

1. Middle-income economies especially in Asia are increasingly contributing to global R&D.
2. Public R&D expenditures particularly in some high-income economies are growing slowly or not at all.
3. Increased protectionism poses risks. It may lead to a slowdown of growth in innovation productivity.
4. Innovation inputs and outputs are still concentrated in very few economies.
5. Most top science and technology clusters are in the U.S., China and Germany.
6. Brazil, India, Iran, the Russian Federation, and Turkey feature in the top 100 list.

New Space India Limited.

- New Space India Ltd. (**NSIL**) is a Public Sector Enterprise under the administrative control of 'Department of Space'.
- It has been incorporated as a new commercial arm of **ISRO**.
- It will commercialise ISRO's space products.
- It has been incorporated to carry out the following roles and functions,

1. Small Satellite technology transfer to industries from ISRO
2. Manufacture of Small Satellite Launch Vehicle (SSLV) in collaboration with Private Sector.
3. Productionisation of PSLV through Indian Industries.

4. Marketing of Space based products and services.
5. Transfer of technology developed by ISRO Centres.
6. Marketing spin-off technologies and products both in India and abroad.

- **NSIL** will act in the presence of another commercial arm of ISRO, **Antrix.**
- **Antrix** Corporation looks at foreign markets whereas **NSIL** will focus mostly on domestic industries for commercialisation activities.

Source: PIB, The Indian Express