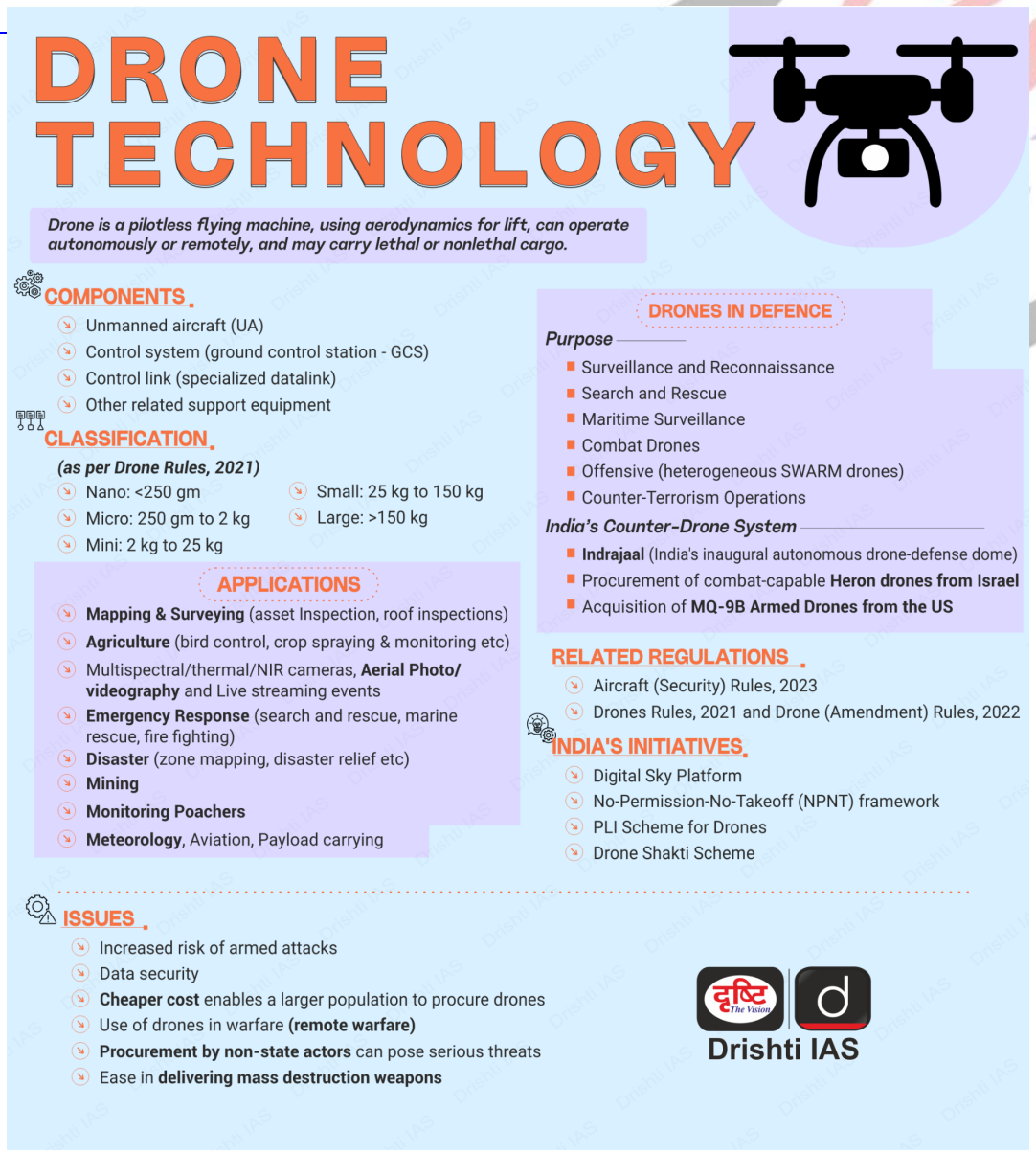
Drone Test at World's Highest Pass

Source: IE

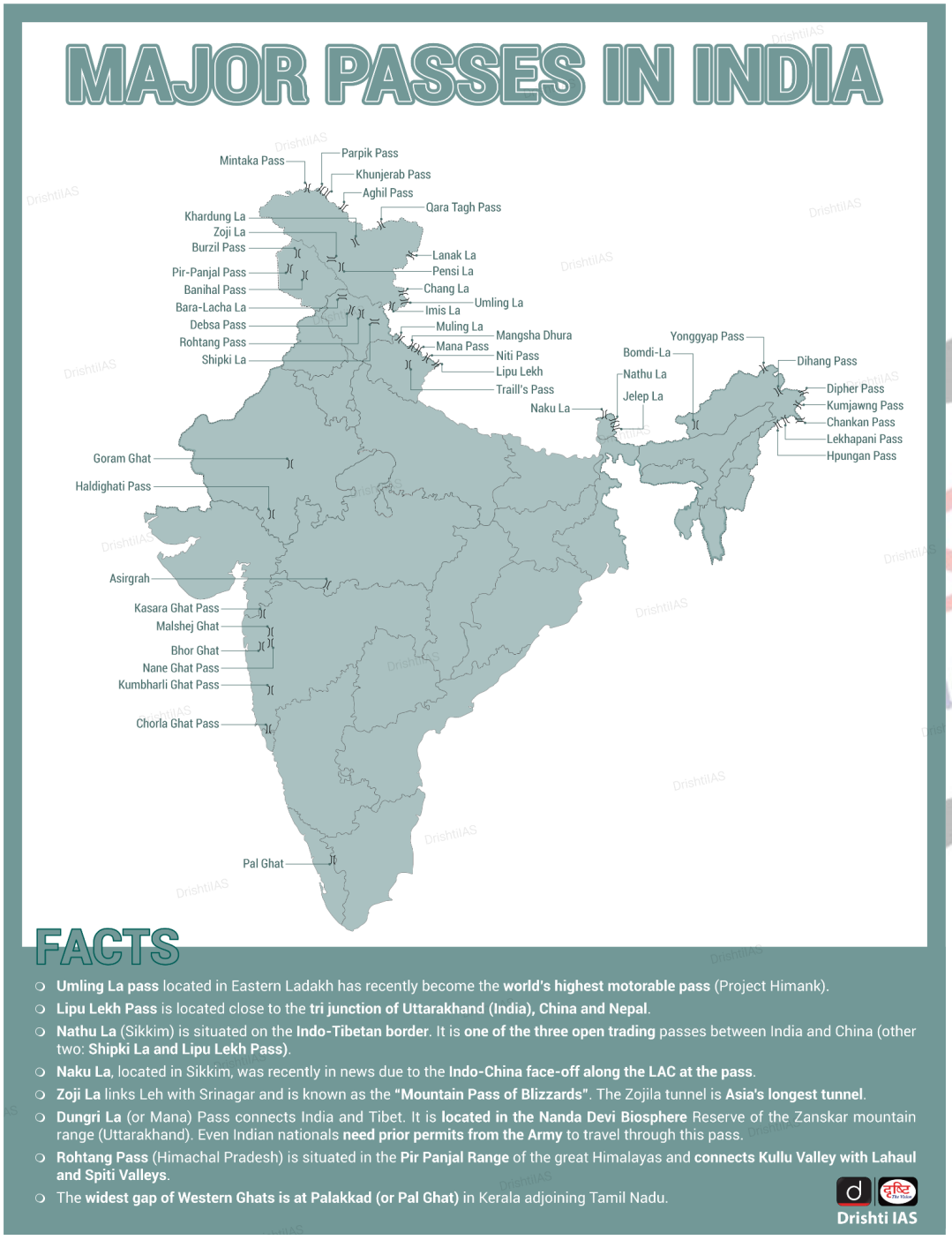
Recently, a Bengaluru firm, **NewSpace Research and Technologies** tested a **100-kg Max Takeoff Weight (MTOW) Unmanned Aerial Vehicle (UAV)** at 19,024 feet altitude at **Ladakh's Umling La pass**, the highest motorable pass in the world.

- According to the firm, this is a **new world record for high altitude operations** achieved by a 100-kg MTOW class drone.
    - It will greatly **improve support logistics, disaster and rescue operations, and medical relief** in the **mountainous regions of J&K, Uttarakhand, and the North Eastern states.**

//



- **Umling La pass:**
  - Umling La in Ladakh is the **world's highest motorable road** at 19,024 ft, constructed by the **Border Road Organization** as part of **"Project Himank".**
  - The **52-km road connects Chishumle to Demchok villages,** which are near the **Line of Actual Control (LAC)** and a **friction point between India and China.**



Read More: Air-Launched Unmanned Aerial Vehicle

4th Periodic Review of the ICCPR

Source: MEA

India successfully concluded its **4th periodic review by the Human Rights Committee** under the **International Covenant on Civil and Political Rights (ICCPR)** in Geneva.

- The ICCPR is an important international human rights treaty that, along with other key documents, forms the **International Bill of Human Rights**. It obligates countries to protect and preserve basic human rights such as the right to life, freedom of speech, and gender equality.
    - Adopted by the UN General Assembly in 1966, ICCPR came into force in 1976 and has been ratified by 173 countries including **India in 1979**, undergone three previous reviews, with the latest in 2024.
    - The 4th periodic review covered diverse issues including anti-corruption measures, non-discrimination, women's and minority rights, counter-terrorism, judicial framework , and privacy laws.
- Other main UN International Human Rights Conventions and Protocols that India is a part of include**:**
    - **ICERD (International Convention on the Elimination of All Forms of Racial Discrimination)**
    - **CEDAW (Convention on the Elimination of All Forms of Discrimination against Women)**
    - **CRC (Convention on the Rights of the Child).**

Read more: **Protesting is a Fundamental Right: UN**

Indian Aid to Palestinian Refugees

Source: BS

Recently, India has released the first tranche of **USD 2.5 million** to the **United Nations Relief and Works Agency (UNRWA)** for Palestinian Refugees in the Near East as part of its **annual contribution of USD 5 million** for the year 2024-25.

- UNRWA has been carrying out **direct relief and work programmes** for registered Palestinian refugees **since 1950** and is making efforts to continue functioning amidst the **Israel-Hamas war** in Gaza.
- India has provided financial support of **USD 35 million till 2023-24** for UNRWA's core programmes and services, including education, healthcare, relief, and social services for Palestinian refugees.

United Nations Relief and Works Agency (UNRWA):

- It was established in **1949** by the **UN General Assembly** after the **1948 Arab-Israeli war.**
- Its mandate is to provide **aid and protection to Palestinian refugees** who were displaced following the 1948 Arab-Israeli conflict, as well as their descendants.
- It operates in Gaza, the West Bank, Lebanon, Syria, and Jordan.
- It is funded almost entirely by voluntary contributions from UN member states.
- India's support to UNRWA includes financial assistance as well as providing medicines based on the agency's specific request.

Read more: **Israel-Hamas Conflict and its Global Impact**

Last Universal Common Ancestor (LUCA)

Source: TH

Why in News?

Recently, in a new study, scientists have said the **last universal common ancestor (LUCA)** could have **formed just 300 million years** after the earth formed.

What are the Recent Key Highlights of the Research?

- **About:**
  - Researchers believe all three branches of life namely **bacteria, archaea,** and **eukarya** originated from a single cell, called the last universal common ancestor (LUCA).
  - LUCA had a **small genome with about 2.5 million bases** and 2,600 proteins, sufficient for survival in its unique environment.
  - LUCA's metabolites might have created a secondary ecosystem for other microbes to emerge, and it possibly had **immunity** genes to fight off viruses.
  - Though there is no **fossil evidence** to support the existence of LUCA, modern genomes share so many features that provide some insights.
  - However, the **theory of the molecular clock** allowed scientists to **reconstruct the 'tree of life'.**
    - As per **theory**, the rate at which **mutations are added or removed** from a population's genome is proportional to the **rate of acquiring new mutations,** which is constant.
      - The mutation rate varies between species.
    - Based on the findings, researchers created a method to estimate the time between evolutionary events by using known mutation rates and linking genomes to specific events like the evolution of the first mammal or the age of fossils as benchmarks.
  - Based on the earlier **findings of fossils in the Pilbara Craton in Australia,** the earliest life forms were believed to be **date back to 3.4 billion years ago.**
- **Significance of Findings:**
  - Overall, these findings are **crucial for understanding how life began** and evolved on Earth and for seeking similar life forms elsewhere in the universe.
  - These evolutionary insights will **boost efforts to engineer synthetic organisms** for various processes on Earth and to create or manage ecosystems on other planets in the future.

What are Various Competing Theories of Life's Origin?

- **Oparin-Haldane Hypothesis**: In 1924 and 1929, Oparin and Haldane respectively suggested the **first molecules making up the earliest life forms gradually self-organised from a "primordial soup"** in a young earth's tempestuous, prebiotic environment. This idea is today called the Oparin-Haldane hypothesis.
- **Miller-Urey Experiment**: It showed that **in the right conditions, inorganic compounds could give rise to complex organic compounds.**
  - Under it methane, ammonia, and water were mixed and applied an electric current to produce amino acids, the building blocks of proteins.
- **Panspermia Hypothesis**: It suggests that meteorites could have brought life's building blocks to Earth, supported by discoveries of extraterrestrial organic material and amino acids on asteroids.
  - In 2019, French and Italian scientists reported **discovering extra-terrestrial organic material 3.3 billion years old.**
  - Japan's Hayabusa 2 mission to the asteroid Ryugu also indicated the presence of more than 20 amino acids there.

Read More: [Earth's Mantle and Evolution of Life]

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims:

Q. Consider the following: (2013)

1. Electromagnetic radiation
2. Geothermal energy
3. Gravitational force
4. Plate movements
5. Rotation of the earth
6. Revolution of the earth

Which of the above are responsible for bringing dynamic changes on the surface of the earth?

(a) 1, 2, 3 and 4 only

(b) 1, 3, 5 and 6 only

(c) 2, 4, 5 and 6 only

(d) 1, 2, 3, 4, 5 and 6

Ans: (d)

Q. Which one of the following sets of elements was primarily responsible for the origin of life on the Earth? (2012)

(a) Hydrogen, Oxygen, Sodium

(b) Carbon, Hydrogen, Nitrogen

(c) Oxygen, Calcium, Phosphorus

(d) Carbon, Hydrogen, Potassium

Ans: (b)

E-Office Implementation in Government Bodies

Source: ET

The Indian government has announced that the **e-office platform** will be implemented across all attached, subordinate offices and autonomous bodies as part of the **100-day agenda of the Department of Administrative Reforms and Public Grievances (DARPG).**

- The e-office initiative aims to **digitise file handling and receipts across various government bodies**. This move follows the successful adoption of the e-office in the central secretariat between 2019 and 2024, where **94% of files and 95% of receipts were handled electronically.**
- Building on this success, the government has identified 133 entities for this initiative, following inter-ministerial consultations. Guidelines for the adoption were by DARPG, and the **National Informatics Centre (NIC).**
    - Each ministry and department will appoint nodal officers, establish data centres, and coordinate with NIC for a seamless, time-bound onboarding of the e-office system, reinforcing the government's commitment to digital transformation and administrative efficiency.

Read more: E- Governance in India

Caves on the Moon

Source: TH

Why in News?

Recently, scientists have confirmed the existence of a **cave on the moon,** located near the site where the **Apollo 11 mission** landed 55 years ago.

- This discovery has significant implications for **future lunar exploration** and the establishment of a **sustainable human presence** on the moon.

What are the Key Findings Related to the Moon?

- **Key Findings:**
  - An Italian-led team of researchers found evidence of a cave located in the **Sea of Tranquility,** just 400 kilometres from the **Apollo 11** landing site.
    - The pit, like more than 200 others discovered on the lunar surface, was created by the **collapse of a lava tube**.
  - Analysis of **radar** measurements by **NASA's Lunar Reconnaissance Orbiter** revealed that the cave is at least **40 meters wide and tens of meters long,** and likely even larger.
- **Significance/Implications:**
  - **Potential Shelter for Future Astronauts**: Lunar caves offer natural protection against cosmic rays, solar radiation, and micrometeorites, reducing the need for constructing habitats from scratch.
  - **Understanding Lunar Geology and Volcanic Activity:** The rocks and materials inside these caves, which have remained largely unaltered by the surface conditions over the eons.
    - It can help scientists better understand the evolution of the moon, particularly its volcanic activity
  - **Potential Water and Fuel Sources:** Permanently shadowed craters near the lunar south pole likely contain frozen water, a crucial resource for drinking and rocket fuel.
  - **Advancing Lunar Exploration:** Discovering lunar caves is a major step in understanding the moon's geology and resources, aiding future mission planning and the sustainability of human presence on the moon.

Moon Exploration

- In **1959,** the **Soviet Union's Luna 1** and 2 were the first robotic missions to visit the Moon.
- The **USA** sent 3 classes of robotic missions to the Moon between **1961** and **1968** before the **Apollo 11** mission.
- From 1969 to 1972, 12 American astronauts walked on the Moon's surface.
- In the 1990s, the USA resumed lunar exploration with robotic missions like Clementine and Lunar Prospector.
- In 2009, the USA launched the **Lunar Reconnaissance Orbiter (LRO)** and the **Lunar Crater Observation and Sensing Satellite (LCROSS)** for lunar missions.
- In 2011, NASA began the **ARTEMIS mission** for lunar exploration.
- The **Gravity Recovery and Interior Laboratory (GRAIL)** spacecraft studied the Moon's gravity in 2012.
- **China** landed two rovers on the Moon's surface, including the first-ever landing on the far side of the Moon in **2019**.

India’s (ISRO) Moon Mission

- Chandrayaan 1**: The Chandrayaan project started in 2007 through a collaboration between ISRO and Russia's ROSCOSMOS. The mission was initially postponed to 2016 due to delays in developing the lander by Russia.**
  - **Findings:** The **confirmed presence of lunar water**, evidence of lunar caves, and past tectonic activity on the lunar surface.
- **Chandrayaan-2** is India's second moon mission, consisting of an **Orbiter**, **Lander (Vikram**), and **Rover (Pragyan)**. The Rover Pragyan is housed inside the Vikram lander.
- **Chandrayaan-3**: Through this India made history by becoming the **first country** to land near the **lunar south pole** and ISRO became the **fourth** space agency to successfully land on the Moon, following **Roscosmos, NASA,** and the **CNSA.**

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims:

Q. Consider the following statements: (2016)

1. The Mangalyaan launched by ISRO
2. is also called the Mars Orbiter Mission
3. made India the second country to have a spacecraft orbit the Mars after USA
4. made India the only country to be successful in making its spacecraft orbit the Mars in its very first attempt

Which of the statements given above is/are correct?

(a) 1 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

Ans: C

Mains:

Q. Discuss India's achievements in the field of Space Science and Technology. How the application of this technology helped India in its socio-economic development? **(2016)**
