

LUNAR LIBRARY

Prelims: Science & Technology- Space Technology

Mains: GS-III- Awareness in the fields of IT, Space, Computers, robotics, nano-technology, bio-technology and issues relating to intellectual property rights.

Why in News?

- ▶ On February 21, an Israeli lunar lander called Beresheet (Hebrew for 'the beginning') began its journey to the Moon aboard a SpaceX rocket in its quest to be the first privately-funded spacecraft to land on the Moon.
- ▶ A month later, it was reported, Beresheet had crash-landed and was irredeemably broken except, for a curious, quirky payload called the Lunar Library.

Lunar Library:

- ▶ The Lunar Library contains a 30 million page archive of human history and civilization, covering all subjects, cultures, nations, languages, genres, and time periods.
- ▶ The Library is housed within a 100 gram nanotechnology device that resembles a 120mm DVD. However it is actually composed of 25 nickel discs, each only 40 microns thick, that were made for the Arch Mission Foundation by Nano Archival.
- ▶ The first four layers contain more than 60,000 analog images of pages of books, photographs, illustrations, and documents — etched as 150 to 200 dpi, at increasing levels of magnification, by optical nanolithography.
- ▶ The first analog layer is visible to the naked eye. It contains 1,500 pages of text and images, as well as holographic diffractive logos and text, and can be easily read with a 100X magnification optical microscope, or even a lower power magnifying glass.
- ▶ The next three analog layers each contain 20,000 images of pages of text and photos at 1,000X magnification, and require a slightly more powerful microscope to read. Each letter on these layers is the size of a bacillus bacterium.
- ▶ Beneath the analog layers of the Library are 21 layers of 40 micron thick nickel foils. Each of the foils house a DVD master, which contain more than 100GB of highly compressed datasets that decompress to almost 200GB of content, including the text and XML of the English Wikipedia, plus tens of thousands of PDFs of books — including fiction, non-fiction, a full reference library, textbooks, technical and scientific handbooks, and more.

- ▶▶ The Lunar Library contains a small sample from the Bodhi tree in India, along with material on learning Hindi, Urdu and information on music. It contains leaf from the Bodhi tree and some soil from under the Bodhi seat
- ▶▶ Lunar library also contains thousands of tardigrades — small, multicellular animals, first found by scientists in Antarctica, and known to be extremely resilient in hostile environments. They can survive without food and water for decades. Assuming that the Lunar library has survived they could be the first living organisms splashed across the surface of the moon.
- ▶▶ The first microbes on the Moon are those left behind in the human faeces from the astronauts aboard the Apollo missions of 1968-1972.

