DAILY CURRENT AFFAIRS 15-05-2024

GS-1

1. **Shinku La**

GS-2

2. **Orangutan Diplomacy**

GS-3

3. **Goldene**
4. **Chang'e-6 mission**
5. **Self healing road technology**

Shinku La

Syllabus: GS-1; Mountain Passes

Context

- *Recently, The police rescued 10 stranded labourers from Shinku La in Lahaul and Spiti district.*

Shinku La Tunnel specifications

- *Name of Tunnel: Shinku-La Tunnel*
- *Length of Tunnel: 4.25 KM (earlier 13.5km)*
- *Location:* **Lahaul, Himachal Pradesh and Zanskar, UT of Ladakh**
- *North Portal: Lakhang, Zanskar (Now 3 KM before Shinku-la top)*
- *South Portal: At KM 33, Just below Shinku-la top (Earlier it was Patseo, Lahaul)*
- *Altitude of tunnel (approximate): 15,900ft*
- *Altitude of Shinkula Pass: 16,580 ft*
- *Road: Manali-Padum-Nimmu*
- *Agency: BRO through its newly formed Project Yojak*

Significance

- *The Shinku La tunnel is aimed to* **provide all-weather road connectivity to Ladakh** *and this will be the shortest route to the border areas of the Union territory.*

- *However, according to local conditions, the road will not remain open 24 hours and all days in winter season due to heavy snowfall in the area which frequently blocks the approach road.*

Orangutan Diplomacy

Syllabus: GS-2; International Relations

Context

- **Malaysia's plan to gift orangutans to buyers of its palm oil** — *an industry that destroys the great apes' habitats — is drawing criticism from conservationists.*

More to know

- *Now, inspired by the success of* **China's "panda diplomacy"** *— few, after all, can resist the cuddly black-and-white bear — Malaysia's commodities minister Johari Abdul Ghani has said that orangutans will be gifted to trade partners who buy the country's palm oil.*
- *This, he believes, could be a way for Malaysia to distance itself from accusations of unsustainability made against palm oil plantations.*
- *History, however, shows that even the most exotic or beautiful of animals can't make up for everything.*

History

- *Further back in history is the example of Soliman* **the elephant, given as a wedding gift by King John III of Portugal to Archduke Maximilian of Austria in 1551.**
- *The pachyderm's arrival in Vienna reportedly led to a strain in the latter's marriage as not only did Soliman steal the spotlight during the royal couple's honeymoon, the Archduke himself paid more attention to the latest addition in his menagerie than to his new bride.*
- *The only one of the great apes in Asia, the orangutan is an endangered species that is found only in the tropical forests of Borneo (Malaysia and Indonesia) and Sumatra (Indonesia).*

Orangutan

- *Orangutans are* **great apes native to the rainforests of Indonesia and Malaysia.**
- *They are now found only in parts of Borneo and Sumatra, but during the Pleistocene they ranged throughout Southeast Asia and South China.*

Conservation and Threats

- *All orangutan species are considered* **critically endangered.**
- *Human activities have caused severe declines in populations and ranges.*
- *Threats to wild orangutan populations include poaching (for bushmeat and retaliation for consuming crops), habitat destruction and deforestation (for palm oil cultivation and logging), and the illegal pet trade.*
- *Several conservation and rehabilitation organisations are dedicated to the survival of orangutans in the wild.*

Goldene

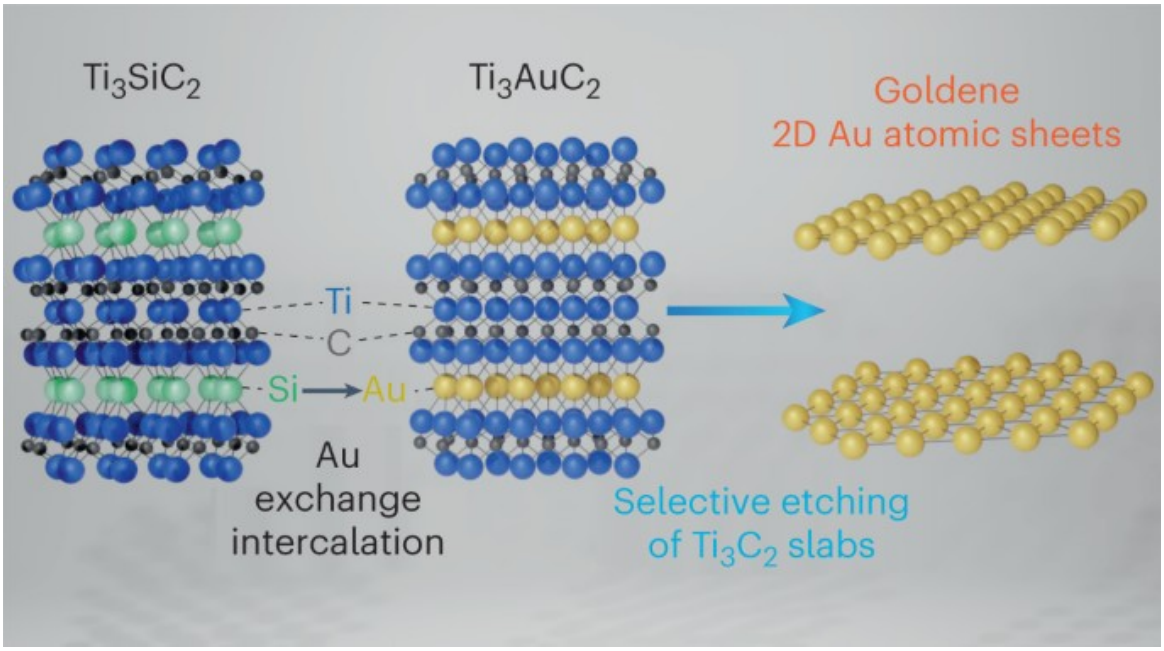
Syllabus: GS-3; Science and Technology – Material Science.

Context:

- *Researchers have made a very thin sheet of gold, just one atom thick.*
- *It's the first time gold has been turned into a flat, 2D sheet on its own.*
- *This achievement opens up many new possibilities for using gold in different ways.*

Creation Process:

- *Researchers sandwiched an atomic* **monolayer of silicon between layers of titanium carbide.**
- *Gold was deposited* **on top of this sandwich structure**, *allowing gold atoms to diffuse into the material and* **replace silicon atoms**, *forming a trapped monolayer of gold atoms.*
- *The* **titanium carbide** *layers were then* **etched away** *using an ancient Japanese technique, facilitated by a* **chemical known as Murakami's reagent**.
- *This process resulted in the creation of a* **free-standing, one atom thick layer of gold**.



Characteristics of 'Goldene':

- *The thickness of goldene sheets is estimated to be* **around 100 nanometers** *(a billionth of a meter), making them* **approximately 400 times thinner** *than the thinnest commercially available gold leaf.*
- **Challenges in Creating 'Goldene':**
- *Scientists from Sweden's Linköping University developed 'goldene', a one-atom thick sheet of gold.*
- *Despite the existence of other 2D materials since the discovery of graphene in 2004, creating atom-thin metallic sheets was difficult due to metals' tendency to form nanoparticles instead.*
- *Previous efforts resulted in gold sheets trapped between other materials, but 'goldene' is the first free-standing 2D metal.*

Applications:

Revolutionizing the Electronics Industry:

- *Goldene could* **significantly impact the electronics industry** *by serving as a catalyst.*
- **Its super-thin and light** *nature makes it economically viable compared to thicker, three-dimensional gold.*
- **Less gold atoms are needed** *for the same function, potentially reducing the amount of gold used in electronics while maintaining functionality.*

Applicability to Other Metals:

- *The technique used to create goldene could be applicable to other metallic objects.*
- *Scientists are already exploring the possibility of creating 2D sheets of iridium and platinum using similar methods.*

Special Properties of Goldene:

- *Goldene may possess unique properties similar to other 2D materials due to its atomic structure.*
- *Each gold atom in goldene has only six neighboring atoms, compared to 12 in a three-dimensional crystal.*

Potential Applications:

- *Future applications of goldene could include:*
- *Carbon dioxide conversion*
- *Hydrogen-generating catalysis*
- *Selective production of value-added chemicals*
- *Hydrogen production*
- *Water purification*

Significance:

Significance	Description
Economic Viability	*Goldene offers a more economically viable option for catalysis and electronics due to its super-thin nature, potentially reducing production costs.*
Technological Advancement	*The development of Goldene represents a significant technological advancement in materials science, paving the way for creating other 2D metallic sheets.*
Resource Efficiency	*Goldene's reduced usage of gold atoms contributes to resource efficiency and alleviates concerns about environmental and ethical impacts of gold extraction.*
Enhanced Performance	*Goldene's unique atomic structure suggests potential for enhanced performance in catalytic processes and electronic applications.*
Diverse Applications	*Goldene holds promise for diverse applications including carbon dioxide conversion, hydrogen production, and water purification.*
Economic Viability	*Goldene offers a more economically viable option for catalysis and electronics due to its super-thin nature, potentially reducing production costs.*
Technological Advancement	*The development of Goldene represents a significant technological advancement in materials science, paving the way for creating other 2D metallic sheets.*
Resource Efficiency	*Goldene's reduced usage of gold atoms contributes to resource efficiency and alleviates concerns about environmental and ethical impacts of gold extraction.*

Chang'e-6 mission

Syllabus: GS-3: Science and Technology – Space.

Context:

- *China launches lunar probe mission to collect samples for first time from far side of moon.*

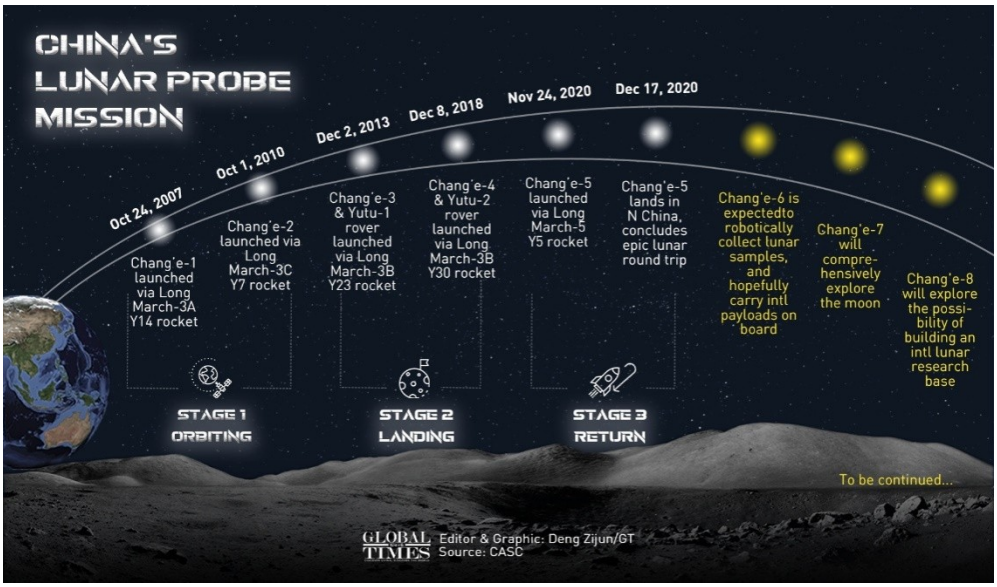
More about the Mission:

- **Mission Name:** *Chang'e 6*

- **Mission Type:** *Robotic lunar exploration*
- **Agency:** *Conducted by the China National Space Administration (CNSA)*
- **Objective:** *To obtain a sample of soil and rock from the far side of the Moon*
- **Status:** *China's second sample return mission*
- **Namesake:** *Named after the Chinese Moon goddess Chang'e*
- **Launch Date:** *May 3, 2024*
- **Expected Duration***: Approximately 53 days*

Phases of the Chinese Lunar Exploration Program:

- **Phase 1: Reach lunar orbit.**
  - *Chang'e 1 (2007) and Chang'e 2 (2010) achieved this.*
- **Phase 2: Land and rove on the Moon.**
  - *Chang'e 3 (2013) and Chang'e 4 (2019) accomplished this.*
- **Phase 3: Collect lunar samples and send them to Earth.**
  - *Chang'e 5 (2020) completed this, and Chang'e 6 is planned for this phase.*
- **Phase 4: Develop a robotic research station near the Moon's south pole.**
  - *Aiming for crewed lunar landings in the 2030s and possibly a crewed outpost near the lunar south pole.*



Chang'e 6 Mission Objectives:

- *Land and return material from the southern hemisphere of the lunar far side.*
- **Target area:** *Southern portion of the Apollo crater within the* **South Pole-Aitkin (SPA) impact basin.**
- *Hope to collect lunar mantle material ejected by the original impact creating the SPA basin.*

Mission Details:

- *Lander designed to collect up to 2 kilograms (4.4 lb) of lunar far-side material.*
- **Collection methods:** *Surface soil and rocks using a scoop, subsurface samples using a drill.*

Significance:

- *If successful, China will be the first nation to land, collect, and deliver samples back to Earth from the far side of the Moon.*
- **Technological Achievement:** *Successfully completing this mission would demonstrate China's advanced capabilities in space exploration, particularly in landing and operating on the far side of the Moon, which presents unique challenges due to the lack of direct communication with Earth.*
- **Scientific Discovery:** *Samples collected from the far side of the Moon could provide valuable insights into the geological composition and history of this unexplored region.*
- *Scientists anticipate that these samples could help unravel mysteries about the Moon's formation and evolution, shedding light on the early history of our solar system.*
- **Space Exploration Milestone:** *Landing and returning samples from the far side of the Moon would mark a significant milestone in humanity's exploration of space.*
- *It would expand our understanding of the Moon's geology and potentially pave the way for future lunar missions, including crewed missions and the establishment of lunar bases.*
- **Strategic Implications:** *China's successful mission could also have geopolitical implications, demonstrating its growing prowess in space exploration and potentially influencing international cooperation and competition in space.*

Some Important Lunar Missions:

Lunar Mission	**Country**	**Objectives**
Apollo 11	*United States*	*First manned lunar landing and sample return*
Luna 16	*Soviet Union*	*First robotic return of lunar soil*
Chandrayaan-1	*India*	*Lunar mapping and mineral composition analysis*
Chandrayaan-2	*India*	*Lander and rover deployment to study lunar surface (partially successful landing)*
Chandrayaan-3	*India*	*Soft landing and scientific exploration near the lunar south pole*
Lunar Polar Exploration Mission (LUPEX) (planned)	*India & Japan (joint mission)*	*Confirm presence and characteristics of water ice at the lunar south pole*
Beresheet (failed)	*Israel (private)*	*First privately funded lunar landing attempt*
HAKUTO-R M1	*Japan (private)*	*Commercial lunar lander mission, data collection and*

(planned)		*resource scouting*
Artemis Program (ongoing)	*United States (with potential international collaboration)*	*Returning humans to the Moon, establishing lunar base, and scientific exploration*

Self healing road technology

Syllabus: GS-3; Science and Technology, Infrastructure, Growth and Development

Context

The **National Highways Authority of India (NHAI)** *is planning to introduce a revolutionary technology for road maintenance in the country.*

About

- *This technology is expected to make a* **road capable of repairing itself with the help of a unique kind of asphalt.**
- *The new composite mixture will then be infused with* **bitumen and steel fiber**.
- *What makes the technology unique and interesting is the fact that in case a gap comes up on the road, the bitumen will actually spread to cover it with steel threads in order to potholes.*

Working of the self-healing roads

- *This technology of asphalt repair actually works by integrating small steel wool fragments in the composition in the bitumen.*
- *This is actually the adhesive component in the asphalt.*
- *The heating of the steel fibers are facilitated through an induction apparatus at the initial process.*
- *This melts and rebinds asphalts.*

Significance

- *The officials of the National Highway Authority of India, the technology will actually fix the problem of potholes.*
- *The issue of potholes on the roads have led to a wide array of fatalities and road accidents in India.*
- *However, what is still not known is the fact as to how long the asphalt will take in order to cover or, in other words, repair a gap or pothole in the road.*