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Artificial Sun

Why in News?

- Recently, scientists in South Korea have announced a new world record for the length of time they sustained temperatures of 100



million degrees Celsius - seven times hotter than the sun's core — during a nuclear fusion experiment, in what they say is an important step forward for this futuristic energy technology.

More About the News

- Nuclear fusion seeks to replicate the reaction that makes the sun and other stars shine, by fusing together two atoms to unleash huge amounts of energy. Often referred to as the holy grail of climate solutions, fusion has the potential to provide limitless energy without planet-warming carbon pollution.
- Often referred to as the 'holy grail' of clean energy, nuclear fusion offers the potential to provide near limitless energy by replicating the natural processes that occur within stars.

- It requires no finite raw materials like fossil fuels to operate, and produces no toxic waste like the nuclear fission process that powers commercial nuclear power plants.
- The most common way of achieving fusion energy involves a donut shaped reactor

called a tokamak in which hydrogen variants are heated to extraordinarily high temperatures to create a plasma.

- High temperature and high density plasmas, in which reactions can occur for long durations, are vital for the future of nuclear fusion reactors.
- The KSTAR Research Center at the Korean Institute of Fusion Energy (KFE)'s fusion research device which it refers to as an "artificial sun," managed to sustain plasma with temperatures of 100 million degrees for 48 seconds during tests between December 2023 and February 2024, beating the previous record of 30 seconds set in 2021.
- The ultimate aim is for KSTAR to be able to sustain plasma temperatures of 100 million degrees for 300 seconds by 2026, a "a

critical point" to be able to scale up fusion operations.

- It is one of several major efforts around the world to generate and contain plasma for the purpose of eventually producing electricity through nuclear fusion.

Rakhigarhi

Why in the News?

- Among the latest set of revisions that the National Council of Educational Research and Training (NCERT) has proposed in school textbooks are additions about findings from the DNA analysis of skeletal remains found at the archaeological site of Rakhigarhi in Haryana.



More About Rakhigarhi

- The archaeological site of Rakhigarhi is one of the oldest and largest cities of the subcontinent's earliest known Bronze Age urban culture—the Indus Valley or Harappan Civilization—located in the Hissar district of Haryana.
- The archaeological excavations revealed mature Harappan phase represented by planned township having mud-brick as well as burnt-brick houses with proper drainage system.
- The ceramic industry represented by red ware, which included dish-on-stand, vase, jar, bowl, beaker, perforated jar, goblet and handis.
- Animal sacrificial pit lined with mud brick and triangular and circular fire alters on the mud floor have also been excavated that signifies the ritual system of Harappans.

- A cylindrical seal with five Harappan characters on one side and a symbol of an alligator on the other is an important find from this site.
- The site was first discovered in the 1960s by the Archeological Survey of India. Since then, it has been excavated at three different points under the direction of three different excavators: Dr Amarendra Nath of the ASI (1997-2000), Prof. Vasant Shinde (2012-2016, except 2015), and Dr Sanjay Manjul (2022-present).
- The Indus Valley civilisation flourished for three thousand years before disappearing suddenly around 1500 BC. Theories range from the drying up of local rivers to an epidemic.
- Recently, research has focused on climate change undermining the irrigation-based agriculture on which an advanced urban society was ultimately dependent.

Project Akashteer

Why in the News?

- Recently, the Indian Army has started the induction of control and reporting systems under 'Project Akashdeep' to bolster its air defence capabilities. The deployment of the systems began with flagging off of the first batch of Control Centres from Bharat Electronics Limited (BEL) Ghaziabad on 4th April.

More About the News

- As the first batch of Akashteer Control Centres sets forth, India embarks on a trajectory towards a safer and more secure





tomorrow, fortified by indigenous innovation and technological excellence.

- In what marks a pivotal moment for India's defence arsenal, the Indian Army embarks on a transformative journey with the induction of the 'Akashteer Command and Control Systems' into its Corps of Army Air Defence.
- The commencement of this deployment signals the dawn of a new era, aptly dubbed the 'Year of Tech Infusion' by the Indian Army.
- Created under the banner of the 'Atmanirbhar Bharat' initiative, the Akashteer Project is a testament to India's growing technological prowess.

Advantage of Akashteer

- By digitizing the entire process, Akashteer promises to usher in unprecedented levels of efficiency and integration. In sync with the Indian Army's vision for technological advancement, 2024 has been earmarked as the "Year of Tech Absorption."
- The induction of Akashteer Control Centres stands as a cornerstone achievement in this journey of transformation, catering to both present exigencies and future challenges in air defence operations.

- At the heart of Akashteer lies its ability to seamlessly integrate radar and communication systems into a cohesive network. This holistic approach translates into enhanced situational awareness, enabling swift response to hostile threats while mitigating the risk of friendly fire incidents.
- Moreover, Akashteer's emphasis on mobility and resilience ensures operational readiness even in the most adverse conditions, bolstering India's defence posture.
- With Akashteer at the helm, India inches closer to realizing complete automation of air defence operations. This milestone not only signifies technological prowess but also underscores India's unwavering commitment to safeguarding its airspace.

Gulf of Khambhat

Why in the News?

- Recently, the Indian Coast Guard Station Pipavav evacuated one critically injured patient aged - 37 years, from an Indian Fishing Boat named Pushkar Raj, 50 Km from the coast in Gulf of Khambhat.



More About the Gulf of Khambat

- The Gulf of Khambhat, also known as the Gulf of Cambay, is a bay on the Arabian Sea coast of India, bordering the state of Gujarat just north of Mumbai and Diu Island.
- Although the importance of the gulf ports has been only local, the discovery and exploration of oil—particularly near Bharuch, around the head of the gulf, and in the offshore Mumbai High field—has caused a commercial revival in the region.
- The famous Harappan port town at Lothal is situated at the head of the Gulf of Khambhat.
- To the west of the Gulf, Asiatic lions inhabit the Gir Forest National Park and its surroundings, the region of Kathiawar or Saurashtra. To the east of the Gulf, the Dangs' Forest and Shoolpaneshwar Wildlife Sanctuary, where Gujarat meets Maharashtra and Madhya Pradesh, used to host Bengal tigers.
- The strong tides dominate currents in the gulf, which flow up to 4.5 miles per hour. The water is less than 65 feet deep in most parts, and receding tides expose intertidal areas of up to three miles wide. Thus, it is a great source of tidal energy.
- The Gulf of Khambhat is a tidal regime in the Arabian Sea formed at the mouth of major rivers Tapti, Narmada, Mahi, Sabarmati that form estuaries along the west coast.




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