Topics - MINDS MAPS included (Daily current affairs 16th January 2025

- Target UPSC CSE Prelims 2025
- Growing Naval Capability
- Nagarhole Tiger Reserve
- The Spotted Deer,
- Understanding Fermions and Bosons.
- Blue Ghost
- Understanding U.S. Exceptionalism vs. Isolationism
- Mains

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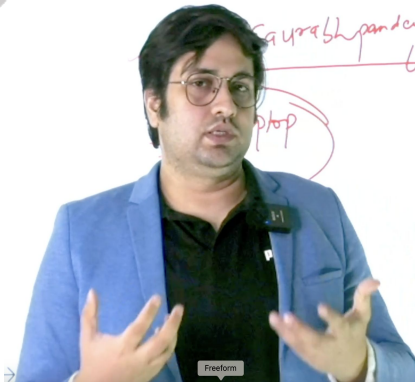

By saurabh Pandey

THE HINDU

Target Mains -2025/26 -

Q In the era of ”protectionism and exceptionalism” Dependency on dollar will bring new challenges . Examine

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Q1. The term Quadrantids often seen in news is associated with which among the following. (IE)

A) Are the annual meteor showers.

B) Are cyber attack groups.

C) Are Blockchain technology

systems.

D) Are gravitational waves detection

centers.

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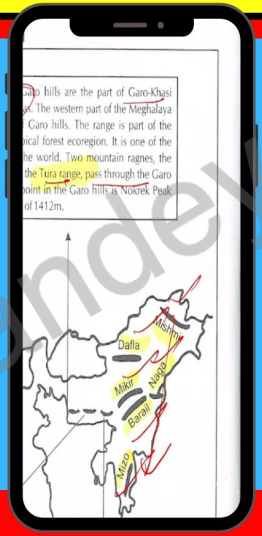

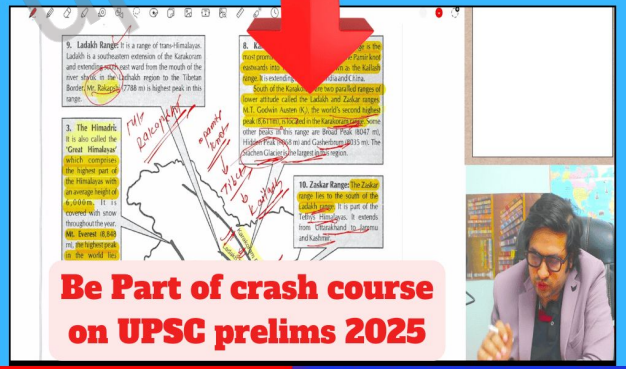

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Submarine, 2 warships commissioned in one go

Vinaya Deshpande Pandit
MUMBAI

In a first, three frontline platforms – *INS Nilgiri*, *INS Vaghsheer*, and *INS Surat* – were commissioned on the same day in the Navy on Wednesday.

Hailing the first tri-commissioning as a significant leap towards *Atmanirbhar Bharat*, Prime Minister Narendra Modi dedicated the naval platforms – two warships and a submarine – to the nation.

INS Nilgiri is the lead ship of Project 17A frigates, *INS Vaghsheer* is the sixth and the final submarine of Project 75 Kalvari class, and *INS Surat* is the fourth and final ship of Project 15B destroyers.

"We are becoming a major maritime power by taking inspiration from our rich naval history. *INS Nilgiri* is dedicated to the naval empire of the Cholas. *INS Surat* is dedicated to India's ancient connection to West Asia through Gujarat. I was there for the commissioning of the first Kalvari submarine. I am blessed to commission the sixth one - *INS Vaghsheer*," the Prime Minister said at the event held at the Naval dockyard on Wednesday morning.

Major boost: *INS Surat*, *INS Nilgiri* and *INS Vaghsheer* being commissioned at an event in Mumbai on Wednesday. ANI

'Not expansionist'

Outlining India's vision as a global power, Mr. Modi said, "India's position is not expansionist, but development-oriented. We are recognised as a reliable and responsible partner globally, especially in the Global South."

On the importance of *Atmanirbhar Bharat abhiyan* or indigenisation, he said the country's dependence on other countries at the time of any tension should be minimum. "Today, there are 5,000-plus equipment, which our defence personnel will not buy from other countries." He highlighted that of the 40 platforms commissioned in the Navy in the last few years, 39 were made in India.

Defence Minister Rajnath Singh said the "historic commissioning showcases India's growing prowess in the Indian Ocean region".

Chief of Naval Staff Admiral Dinesh Tripathi, Chief of Defence Staff Anil Chauhan, Maharashtra Governor C.P. Radhakrishnan, Minister of State for Defence Sanjay Seth, Maharashtra Chief Minister Devendra Fadnavis, Deputy Chief Ministers Eknath Shinde and Ajit Pawar were present at the event.

RED-LETTER DAY

» PAGE 4

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Topic - Growing Naval Capability

Tri-Commissioning: Three naval platforms commissioned simultaneously.

Significance: Major leap towards Atmanirbhar Bharat (self-reliant India).

Dedication: Platforms dedicated to the nation by PM Modi.

Details of the Naval Platforms

INS Nilgiri:

Type: Lead ship of Project 17A frigates.

Historical Significance: Named after the naval empire of the Cholas.

INS Vaghsheer:

Type: Sixth submarine of Project 75 Kalvari class.

Importance: Enhances underwater capabilities.

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INS Surat:

Type: Fourth ship of Project 15B destroyers.

Historical Significance: Reflects India's ancient ties to West Asia through Gujarat.

Strategic Vision

India's Global Position:

Not expansionist but development-oriented.

Recognized as a reliable partner in the Global South.

Indigenization Efforts:

Emphasis on reducing dependence on foreign equipment.

Over 5,000+ equipment are now manufactured in India.

Military Growth:

39 out of 40 platforms commissioned in recent years were made in India.

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28 spotted deer dot every sq. km of Nagarahole Tiger Reserve in Karnataka

K.C. Deepika
BENGALURU

Wildlife spotting at any reserve is a matter of time, luck, and patience. But those visiting the Nagarahole Tiger Reserve in Karnataka will most likely catch a glimpse of the spotted deer. Officials of the reserve say their population has seen a steady increase in recent years. At present, there are 28 spotted deer for every sq. km of the reserve.

The Nagarahole Tiger Reserve is located in the districts of Mysuru and Kodagu. It has an area of 847.981 sq. km, including a core area of 643.392 sq. km and a buffer area of 204.589 sq. km. The reserve is contiguous with the Wayanad Wildlife Sanctuary in Kerala to the south and Bandipur Tiger Reserve to the southeast.

Spotted deer at the Nagarahole Tiger Reserve. K.C. DEEPIKA

According to the reserve, these forests in the Western Ghats play host to many carnivores and herbivores, including tiger, leopard, Asiatic wild dog, sloth bear, Asiatic elephant, gaur, sambar, chital, four-horned antelope, and South-western langur, among others.

Seema. P.A., Deputy Conservator of Forests and Director of Nagarahole Tiger Reserve, told *The Hindu* that the increasing deer population is a sign of healthy prey-predator numbers. "Deer population is good in Nagarahole compared to other tiger reserves. It has been increasing for a few years. Prey and predator - both are balanced," she said. She also said the reserve had 142 tigers as of the 2023 census, the third-highest population in India.

Another official from the reserve said among the factors contributing to the population is the availability of grass and food, which is good for prey density and predator base. The official also said the terrain in the reserve is not entirely hilly and has a variety of forest types, from scrub to evergreen, which helps with the population.

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- **Topic → Nagarhole Tiger Reserve**

- Nagarhole Tiger Reserve is located in Karnataka, India, and is part of the Nilgiri Biosphere Reserve.
- The reserve covers an area of approximately 643 square kilometers, featuring a mix of deciduous forests, grasslands, and hills.
- It is home to a diverse range of wildlife, including tigers, elephants, leopards, and various species of birds.
- Nagarhole is known for its rich biodiversity and is a crucial habitat for many endangered species.
- The reserve offers opportunities for wildlife safaris, trekking, and bird watching, attracting nature enthusiasts and tourists.
- It was established as a national park in 1988 and later designated as a tiger reserve in 1999.

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- The reserve plays a significant role in conservation efforts and is monitored by the National Tiger Conservation Authority.

Summary: Nagarhole Tiger Reserve in Karnataka, India, is a vital wildlife habitat known for its rich biodiversity and conservation efforts.

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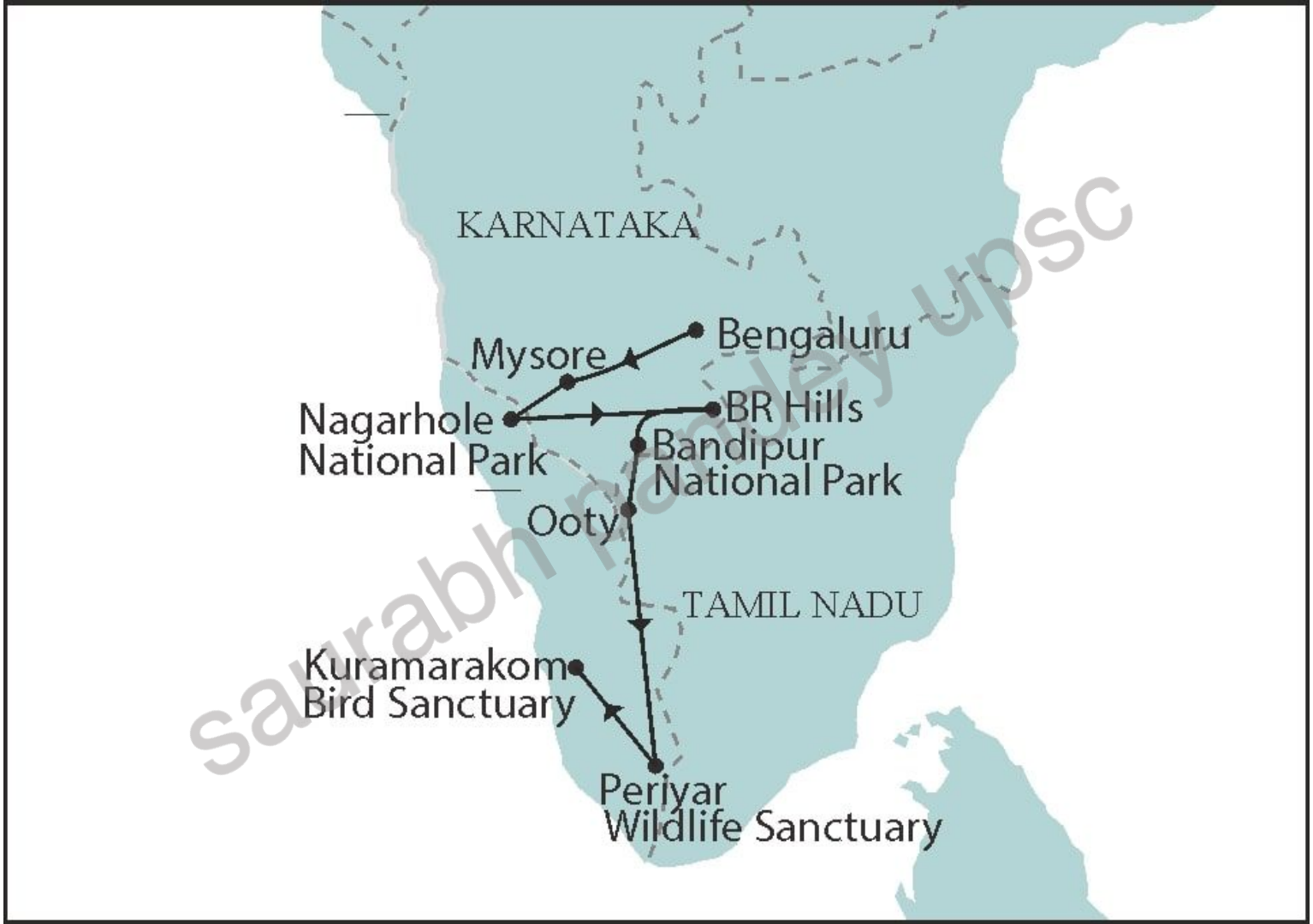

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Topic → The Spotted Deer,

The Spotted Deer, also known as the Chital, is a striking embodiment of grace in the animal kingdom. Known for their distinctive coat adorned with white spots, these deer are not just a sight to behold but play a pivotal role in maintaining.

Physical Characteristics

Spotted Deer are celebrated for their remarkable physical traits:

Distinctive Coat: Their reddish-brown fur is peppered with white spots, providing excellent camouflage in the dappled sunlight of their forest habitats.

Size: Adult males can weigh between 70-90 kg, while females are slightly smaller, averaging 50-70 kg.
Antlers: Male Spotted Deer boast impressive antlers that can reach up to a meter in length, which they shed annually.

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Habitat and Distribution

Spotted Deer thrive in a variety of habitats:

Preferred Locations: They predominantly inhabit deciduous forests, grasslands, and scrublands.
Geographic Range: Found mainly in India, Sri Lanka, and Nepal, they adapt well to different environmental conditions.

The spotted deer, also known as the chital, is listed as Least Concern on the IUCN Red List. This means that the species is not considered to be at high risk of extinction.

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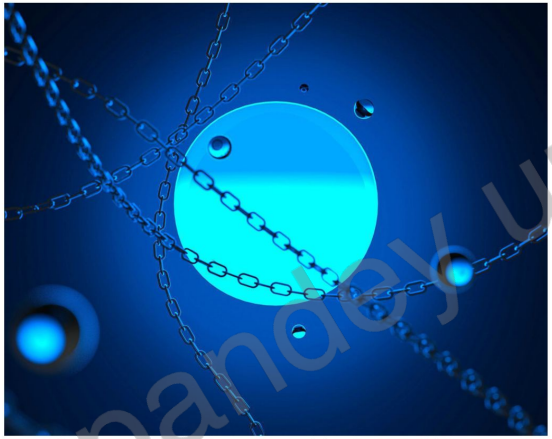
‘Strange’ particle possesses mass when moving in one direction, not another

Physicists stress subatomic particles to enable discovery. The CERN supercollider smashes billions of protons head on with as much energy as at the dawn of the universe. Recently, researchers used a magnetic field 27 lakh times stronger than the Earth’s to discover semi-Dirac fermions

Yasudevan Mukunth



Representative illustration. A semi-Dirac fermion has mass when it’s moving in one particular direction but not in a perpendicular direction. DIMA SOLOMIN

Since the start of the 20th century, physicists have discovered a veritable zoo of subatomic particles. Matter can be both wave and particle. If you take the particle route, these subatomic particles are what you could say the universe and everything in it is made of. There are many ways to further categorise them.

A common one is as fermions and bosons: fermions make up matter and bosons mediate the forces between matter. For example, electrons and protons are fermions whereas photons are bosons.

Fermions can be further classified as Dirac or Majorana fermions. Dirac fermions are fermions that may or may not have mass but are always different from their anti-particles. Majorana fermions are fermions that are also their own antiparticles (neutrinos are suspected to be Majorana fermions).

The zoo smells funny

Even if these distinctions seem too fine, they’re of considerable interest to physicists. They know something’s up in the subatomic zoo. Some animals that should obviously be there are missing, like the particle for the force of gravity. Some animals are much heavier than they should be (Higgs bosons and neutrinos). One enclosure, dark matter, remains empty even though physicists have been looking for it under every rock and leaf. Their knowledge of quite a few animals is just incomplete or at odds with what they studied in school. There’s a lot of work left if the zoo is to be a fully understood place without any surprises.

To simply this task, physicists have developed a common theory that collects all these animals under a single, unified description, called the Standard Model (SM) of particle physics. Physicists can explore ‘new physics’ in terms of whether it agrees or disagrees with the SM. Right now it’s like a big jigsaw puzzle with a few important pieces missing. If physicists find a new piece in their calculations or their particle collider experiments, they can check if it fits into the puzzle. If it doesn’t, maybe the puzzle itself needs to be changed.

In a sense, grouping fermions into fine categories is an exercise in meticulously cataloguing the exact shapes of the puzzle’s pieces.

This way, if physicists find a piece whose shape is new even in a very small way, they stand to make a big update.

Something strange comes this way

A particle as it exists in the wilderness of space is slightly different from a particle that exists inside solids and liquids. “In condensed-matter physics, every material can behave like a new universe,” IIT Kanpur assistant professor Adhip Agarwala said.

“Here strange particles can arise and be experimentally detectable, which are otherwise not usually seen in three dimensions.”

For example, two-dimensional materials can host particles called anyons whose properties lie somewhere between those of fermions and bosons.

Recently, researchers at Columbia University and Pennsylvania State University reported finding another strange particle called a semi-Dirac fermion.

Dirac fermions have mass and aren’t their own anti-particles. A semi-Dirac fermion has mass when it’s moving in one particular direction but not in a perpiendicular direction. This unusual characteristic, which makes semi-Dirac fermions very exotic, is the result of the fermion’s interaction with the electric and magnetic forces acting on it in certain materials.

The semi-Dirac fermion reported in the experiment is technically a quasiparticle. A quasiparticle is a clump of particles or energy-packets that, in some given conditions, behaves like a single particle. Protons are quasiparticles, for example: each proton is made of three quarks and the gluons holding them together. In most settings, what separates particles from quasiparticles is a distinction without a difference. If a quasiparticle is a fermion, it’s a fermion in the same way an electron is a fermion.

Location, location, location

When trying to find puzzle pieces with new shapes, physicists need to know exactly which material to look in or they could be searching forever. This is much like in life sciences research. By studying the 1-mm-long roundworm *Caenorhabditis elegans*, for example, scientists have discovered many fundamental principles of biology and have won four Nobel Prizes so far. The locale of choice in the new study was a layered crystalline material called zirconium silicon sulphide (ZrSiS).

When a magnetic field is applied to a metal, the electrons inside are accelerated along a curved path. (The protons are confined to the atomic nuclei.) The energy of these electrons is called cyclotron energy.

In the metal, the cyclotron energy increases linearly with the strength of the magnetic field. This relationship can be denoted as B^i, where B is the strength of the magnetic field and i is the exponent to which it is raised. In graphene, which is a single-layer sheet of carbon atoms linked together, the cyclotron energy increases in step with the square-root of the magnetic field strength. The relationship is thus $B^{1/2}$.In ZrSiS, the researchers found the cyclotron energy to increase as $B^{3/2}$. Previous theoretical research has found that this scaling factor is a unique signature of semi-Dirac fermions.

‘The same laws of nature’

The researchers didn’t land up at ZrSiS by accident; the locale is crucial, after all. Physicists in general knew for some time that there could be semi-Dirac fermions in graphene. But to reveal the quasiparticles’ presence, they had to first stretch graphene to such a degree that they often ended up tearing it apart. An older study also revealed some unusual electronic properties in zirconium silicon selenide (ZrSiSe), which has a similar structure, in the presence of a magnetic field.

The authors of the present study put these and other indications together and decided to look for semi-Dirac fermions in ZrSiS – and voila.

“This shows the magic of condensed matter physics, where every material, be it graphene or ZrSiS, can host exotic particles that one can discover in table-top experiments – whereas to discover subatomic particles we often need huge colliders,” professor Agarwala said. “It is the same laws of nature that guide them all.”

Physicists have developed a common theory that collects subatomic particles under a unified description, called the Standard Model. Physicists can explore ‘new physics’ in terms of whether it agrees or disagrees with the SM

The zoo expands

Physicists regularly subject subatomic particles to extreme conditions to elucidate the laws of nature at the edge of reality. The Large Hadron Collider in CERN in Europe smashes billions of protons head on with as much energy as there was just 0.00000000000004 seconds after the Big Bang. Even in the present study, the researchers subjected ZrSiS crystals to a magnetic field of up to 17.5 tesla – about 270,000-times stronger than the earth’s magnetic field.

The researchers have said they plan to continue their studies calculations to understand more about ZrSiS and try to explain some other unusual electronic behaviour they observed in their study.

The finding is a new animal in the particle zoo. As one more enclosure awaits its occupant and zoo authorities fill out the paperwork, the question arises: how will it change the zoo?

(The author thanks IISc assistant professor Nirmal Raj for feedback. mukunth.v@thehindu.co.in)

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Topic → Understanding Fermions and Bosons

Fermions and bosons are the fundamental building blocks of matter and energy:

Fermions: Particles that make up matter, such as electrons, protons, and neutrons.

Bosons: Particles that mediate forces between fermions, with photons being a prime example.

Classifications of Fermions

Fermions can be categorized into two main types:

Dirac Fermions: Particles that may or may not possess mass but are distinct from their antiparticles. An example is the electron, which has a corresponding positron.

Majorana Fermions: These particles are unique in that they are their own antiparticles. Neutrinos are suspected to be Majorana fermions, leading to intriguing implications for understanding dark matter and the universe's fundamental workings

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The Standard Model of Particle Physics

The Standard Model is a theoretical framework that integrates all known fundamental particles and their interactions:

It encompasses both fermions and bosons, delivering a comprehensive understanding of how particles interact through the electromagnetic, weak, and strong nuclear forces. The model has successfully predicted the existence of several particles, including the Higgs boson, further solidifying its validity.

Latest Discoveries and Theoretical Advances

Exciting developments in the field of particle physics have emerged recently:

Impossible Particle Discovery: Researchers have reported the discovery of an "impossible" particle that challenges existing theories.

Exotic Paraparticles: Physicists have described exotic 'paraparticles' that defy conventional categorization, indicating that our understanding of particle interactions may need significant revision.

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Cyclotron

⚛️ **Definition:** A cyclotron is a type of particle accelerator that uses a magnetic field to accelerate charged particles in a spiral path.

Functionality: It operates by applying a high-frequency alternating voltage to accelerate particles, allowing them to gain energy as they spiral outward.

Applications: Cyclotrons are commonly used in medical applications, particularly in the production of radioisotopes for PET scans and cancer treatment.

Types: There are various types of cyclotrons, including isochronous cyclotrons and compact cyclotrons, each designed for specific applications.

Research: Cyclotrons are also utilized in nuclear physics research and materials science for studying the properties of different materials.

Medical Advancements: The technology has significantly advanced the field of nuclear medicine, improving diagnostic imaging and treatment options.

Future Prospects: Ongoing research aims to enhance cyclotron efficiency and expand their applications in various scientific fields.

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A SpaceX Falcon 9 rocket launches with the Blue Ghost lunar lander and ispace's Resilience lander from the Kennedy Space Center, Florida, U.S., on Wednesday. REUTERS

U.S., Japan moon landers launch on single rocket

Agence France Presse

One rocket, two missions: lunar landers built by U.S. and Japanese companies launched their "rideshare" to the moon on Wednesday, showcasing the private sector's growing role in space exploration.

On board the SpaceX Falcon 9 rocket that took off from the Kennedy Space Center in Florida were Firefly Aerospace's Blue Ghost and ispace's Resilience from Japan, which will also deploy a micro rover.

Both uncrewed missions aim to build on the success of Texas-based Intuitive Machines, which last year became the first company to successfully touch down on the Earth's celestial neighbour.

Until recently, soft landings on the moon were achieved only by a handful of well-funded national space agencies, starting with the Soviet Union in 1966.

Now, however, several emerging U.S. companies are attempting to replicate this feat under NASA's experimental Commercial Lunar Payload Services (CLPS) programme, designed to cut costs and stimulate a lunar economy.

The U.S. plans to establish a sustained human presence on the moon later this decade under the Artemis programme, leveraging commercial partners to deliver critical hardware at a fraction of the cost of government-led missions.

On the Japanese side, Tokyo-based ispace's first attempt to land on the moon ended in an unsalvageable "hard landing" in April 2023.

Blue Ghost is stacked atop Resilience inside the Falcon 9, SpaceX executive

The U.S. plans to establish a sustained human presence on the moon under the Artemis programme, leveraging commercial partners to deliver hardware at a fraction of the cost

Julianna Scheiman said, and will be deployed first, followed by Resilience nearly 30 minutes later.

The two spacecraft have different timelines for reaching the moon. Blue Ghost aims to complete its journey in 45 days, gradually lifting its orbit around the Earth before entering lunar orbit and touching down near Mons Latreille, a volcanic feature on the moon's northeast near side.

"With 10 NASA instruments on this flight, we're conducting scientific investigations... from characterising the earth's magnetosphere to understanding lunar dust and the moon's interior structure and thermal properties," NASA scientist Maria Banks said.

Blue Ghost also carries technology demonstrations focused on navigation and computing in the moon's harsh radiation environment.

Meanwhile, Resilience will take four to five months to reach its destination in Mare Frigoris, on the moon's far north.

Its payloads include scientific instruments, but the centrepiece is "Tenacious," a micro rover developed by ispace-Europe, a Luxembourg-based subsidiary.

The four-wheeled robot features a high-definition camera and will attempt to scoop up regolith, the moon's loose surface material.

These ambitious goals hinge on achieving a successful soft landing – a task fraught with challenges. Spacecraft must navigate treacherous boulders and craters and, in the absence of an atmosphere to support parachutes, rely entirely on thrusters for a controlled descent.

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Topic → Blue Ghost

Introduction

The excitement in the aerospace community reached a fever pitch when NASA and Firefly Aerospace successfully launched their new lunar mission today at 08:11 am Kyiv time. 🚀 Utilizing the reliable SpaceX Falcon 9 rocket, this ambitious mission is set to land on the Moon on March 2, delivering vital scientific cargo to help us understand the lunar surface and beyond.

The Blue Ghost Lander

The centerpiece of this mission is the innovative *Blue Ghost* lander, meticulously developed by Firefly Aerospace. This is not just any standard lander; it's designed to conduct a range of scientific experiments and tests that will pave the way for future lunar exploration.

Mission Objectives:

Deliver NASA cargo to the Moon.
Test drilling technologies and collect lunar regolith samples.
Evaluate new navigation systems and radiation-resistant computing methods.

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NASA's Scientific Cargo

This mission aims to transport 10 cargoes from NASA, each brimming with cutting-edge technology that will vastly enhance lunar studies. Here's a closer look at some of the key instruments being sent to the Moon:

Lunar Instrumentation for Subsurface Thermal Exploration with Rapidity (LISTER): Characterizes the heat flow from the Moon's interior.
Lunar PlanetVac (LPV): Designed to collect and analyze regolith samples.
Next Generation Lunar Retroreflector (NGLR): Aids in precise distance measurements between the Earth and the Moon while solving fundamental physics questions.
Regolith Adherence Characterization (RAC): Studies how lunar regolith interacts with various materials.
Radiation Tolerant Computer (RadPC): A robust computer capable of recovering from radiation-induced malfunctions.

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Electrodynamic Dust Shield (EDS): Uses electric fields to manage hazardous lunar dust.

Lunar Environment Heliospheric X-ray Imager (LEXI): Investigates solar wind interactions with Earth's magnetic field.
Lunar Magnetotelluric Sounder (LMS): Characterizes the Moon's mantle structure.
Lunar GNSS Receiver Experiment (LuGRE): Demonstrates signal tracking from global satellite systems.
Stereo Camera for Lunar Plume-Surface Studies (SCALPSS): Captures rocket plume impacts on regolith during lander descent.

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Mission Timeline and Operations

The Blue Ghost will embark on a fascinating journey, remaining in Earth orbit for 8 hours before transitioning to the lunar orbit for 4 days. The lander is expected to operate on the lunar surface for an impressive 14 days, equivalent to a lunar day. This extended operational time will enable extensive data collection and experimentation

IR IN NEWS

U.S., Japan moon landers launch on single rocket.

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Burrow tragedy

India must learn from its mining disasters and enforce regulations

With four deaths so far, the coal mining tragedy in Assam's Dima Hasao district has revived a long-standing debate on the hazardous nature of rat-hole coal mining in India. As opposed to modern coal mining, which is mechanised, the 'rat-hole' points to the crude and antiquated technique of employing people, and even children, to burrow into the ground to scoop out the underground coal. Depending on the depths that they plumb, the odds are high that their pickaxes will often unleash a torrent of water from a hidden aquifer that can suddenly inundate the excavated tunnel – as it is suspected to have happened at Dima Hasao. Because such accidents have recurred over the decades, along with the attendant health and environmental hazards, this mode of mining was banned by the National Green Tribunal (NGT) in 2014. The use of proper geological surveys and appropriate machinery would have made the mine economically unviable. The Assam Chief Minister has stated that the mine appeared to be "prime facie... illegal" and one abandoned by the State's Mines and Minerals Department. If that is the case, it reflects poorly on the State administration that such mines can be exploited by unscrupulous elements with such ease, despite the ban. Surely, this is only a fraction of the unregulated mining that actually goes on.

The Supreme Court of India, in 2019, had asked whether it was possible for such mining to continue without the "connivance" of officials, when it was examining the rescue of 15 miners trapped in a rat-hole mine in the East Jaintia Hills in December 2018. A report submitted by a monitoring committee set up by the NGT observed that despite the ban, the demand for coal to power cement manufacturing and thermal power plants in the northeast had sustained and supported rat-hole coal mining. On the other hand, when convenient, State authorities have sought out and even felicitated rat-hole miners, some from Assam, as in 2023, when they were called in as a last resort after advanced machinery and the expertise of professional geologists and earth scientists had failed to rescue 41 construction workers trapped in the large, over-ground Silkiyara tunnel in Uttarkashi. The Dima Hasao operation too, like others, will end and the net success or failure of saving those trapped will induce a familiar amnesia that will be broken only by the next accident. Until decisive action to puncture the economics of rat-hole mining is taken, India is only burrowing the way to another tragedy.

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Understanding Rat-Hole Mining

Rat-hole mining refers to a primitive method where miners dig small holes to extract coal, often using only basic tools. This technique is notorious for its hazardous conditions, leading to frequent accidents.

Historical Context: Rat-hole mining has been prevalent in several parts of India, particularly in the northeastern region, where demand for coal remains high.

Risks:

Sudden flooding from hidden aquifers can inundate tunnels.
Lack of safety measures increases the likelihood of accidents.

The Dima Hasao Incident

The recent tragedy in Dima Hasao serves as a grim reminder of the dangers associated with rat-hole mining.

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The Ongoing Debate on Mining Regulations

The rat-hole mining practices have been officially banned by the National Green Tribunal (NGT) since 2014, yet illegal mining continues to flourish.

Regulatory Challenges:

The enforcement of mining bans has proven difficult, with reports of continued operations.

Investigations have raised questions about the complicity of local officials in allowing illegal mining to persist.

Political Ramifications:

The tragedy has ignited political debates, with accusations flying between parties regarding accountability and negligence.

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Strong dollar shows 'U.S. exceptionalism' isn't isolationism

Jamie McGeever
ORLANDO

While "U.S. exceptionalism" has undoubtedly helped drive Wall Street's record-busting returns in recent years, it should not be confused with isolationism.

The fourth-quarter U.S. earnings season that gets underway in earnest this week is a reminder that American firms–magnificent as some may be–still operate in a global marketplace. Weak economies and lackluster demand abroad, combined with a robust dollar, could erode American corporate profitability, calling into question whether the U.S. is so exceptional after all.

With the dollar appreciating broadly and rapidly, exchange rates will soon bite into corporate profits. The question is how deep.

Analysts at Apollo Global Management note that more than 41% of S&P 500 firms' revenues come from abroad. That's the highest since 2013 and not far behind the record high of 43.3% in 2011.

This leaves these firms vulnerable on two levels. First, sub-par growth in many key economies and trading partners such as China, Canada and Europe should cause demand for U.S. goods to weaken. And second, revenues accrued abroad will now be worth significantly less in dollar terms than they would have been a year ago.

The dollar is on a tear. It has risen 10% since late September and is up 7% year-over-year. It is now the strongest it has been in more than two years against a basket of G10 currencies, notching multi-year highs against sterling and the Canadian dollar.

Big exposure: More than 41% of S&P 500 firms' revenues come from abroad. REUTERS

There is little sign of this trend reversing any time soon, as resilient U.S. growth and sticky inflation lift Treasury yields and force investors to radically rethink their 2025 Fed outlook. Bank of America economists no longer expect any rate cuts this year and others are even suggesting the central bank's next move may be a hike.

Dollar idiosyncrasy

Although much of the classic economic play-book has been ripped up since the pandemic, theory still suggests a 10% year-on-year increase in the dollar should reduce S&P 500 earnings by 3%, according to BofA. Currently, estimates point to 9.5% growth in aggregate earnings per share for the fourth quarter, according to LSEG I/B/E/S. But fourth-quarter revenue growth is only estimated at 4.1%, a relatively slow pace in part due to the exchange rate.

Revenue "beats" tend to decline in periods of dollar strength compared with periods of dollar weakness, Goldman Sachs equity analysts say. So we can reasonably expect that the share of firms beating consensus sales forecasts this quarter will be lower than the 42% that did so in the previous period, when the dollar's year-on-year rise was only 2%.

But even though dollar strength is likely to feature in many CEO and CFO calls this earnings season, its impact on U.S. earnings may be more "idiosyncratic" than widespread, according to Morgan Stanley's Mike Wilson.

He has noted that the stocks of companies with "relatively low foreign sales exposure and low sensitivity to a stronger dollar from an EPS growth standpoint" have begun to outperform since the dollar started to strengthen in October 2024.

He characterizes "low" foreign exposure as companies that derive less than 15% of their revenues from abroad, giving them "minimal" sensitivity to the dollar's exchange rate. Some of the big names in this camp include United Healthcare, T-Mobile and Home Depot, while some large caps that derive more than 15% of their revenues from overseas include PepsiCo, IBM and Oracle.

The dollar's strength is not yet at a level that truly threatens corporate America's competitiveness and profitability. But if it persists, this earnings season could be a taste of what's to come.

(The opinions expressed here are those of the author, a Reuters columnist.)

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Topic → Understanding U.S. Exceptionalism vs. Isolationism

While “U.S. exceptionalism” has undeniably fueled Wall Street's phenomenal returns in recent years, it's critical not to conflate it with isolationism. This misconception could lead to a skewed understanding of how American firms operate globally.

‘

U.S. Exceptionalism Defined: A belief that the U.S. is inherently different from other nations, particularly in its values and role in the world.

Global Marketplace Dynamics: American firms, regardless of their domestic success, must navigate a complex international landscape where demand and economic health fluctuate

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The Fourth-Quarter Earnings Season: An Overview

As the fourth-quarter earnings season unfolds, expectations are tempered by the reality of a robust dollar and global economic headwinds. Analysts predict a mixed bag of results influenced by various factors, including exchange rates and international trade dynamics.

Key Indicators: Earnings growth estimates hover around 9.5%, while revenue growth lags at a mere 4.1%.

Impact of Global Demand: Weakness in economies like China and Europe may stymie U.S. goods demand, impacting overall revenue.

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The Strength of the Dollar: A Double-Edged Sword

The dollar's meteoric rise has left many S&P 500 firms vulnerable. With over 41% of their revenues sourced internationally, the implications of a strong dollar are profound. As the dollar appreciates, exchange rates will inevitably impact profit margins.

Recent Dollar Performance: Up 10% since September and 7% year-over-year, showing no signs of decline.

Consequences for Earnings: According to analysts, a 10% year-on-year dollar increase could reduce S&P 500 earnings by approximately 3%

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Future Outlook: What Lies Ahead for U.S. Corporations?

Looking forward, the trajectory of the dollar will significantly influence U.S. corporate earnings. Analysts anticipate that continued dollar strength could be a bellwether for a challenging earnings landscape.

Predictions: If the dollar maintains its strength, corporate America could face a tougher operating environment.

Key Sectors: Monitor sectors that are less sensitive to foreign revenue sources for potential investment opportunities

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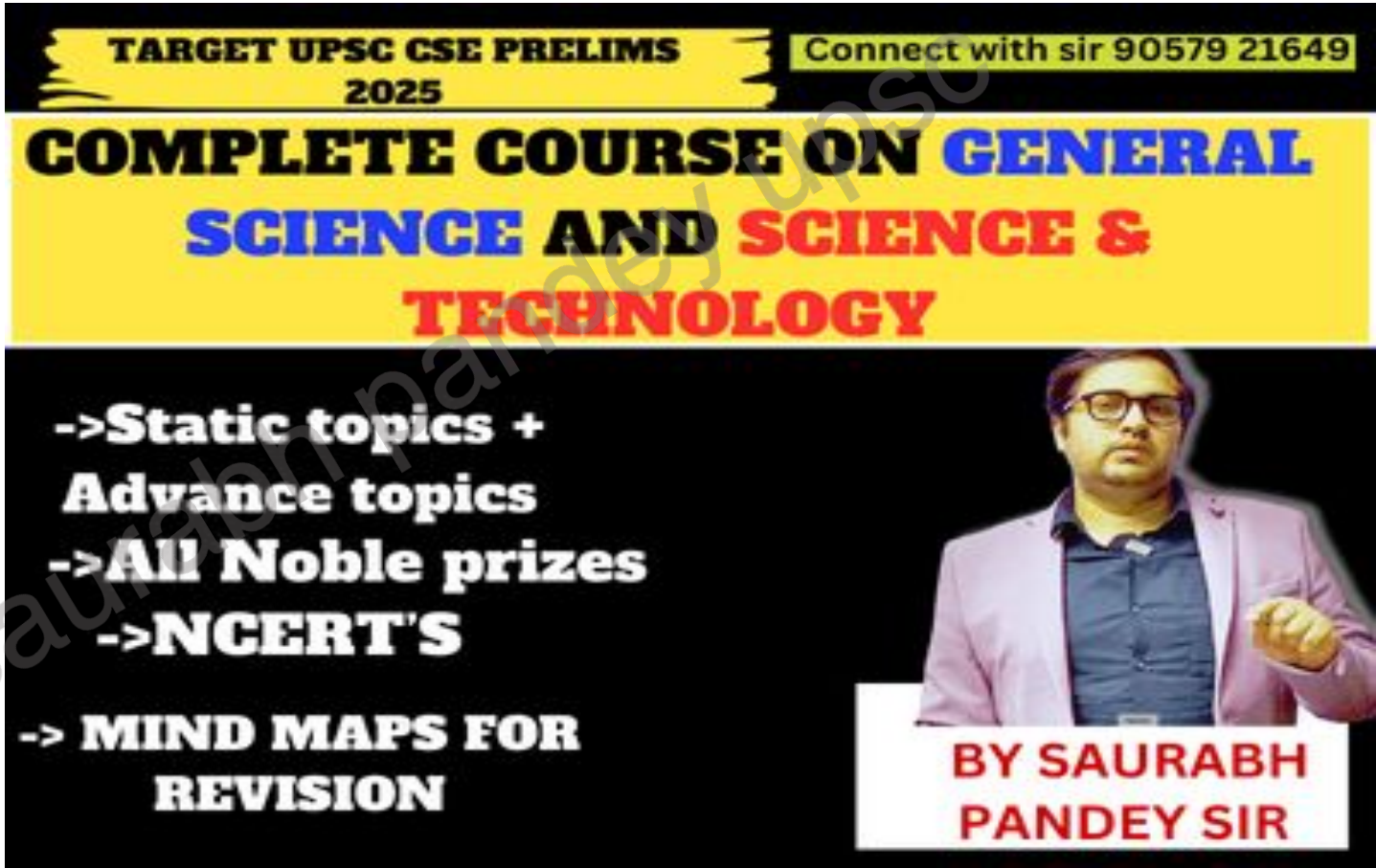

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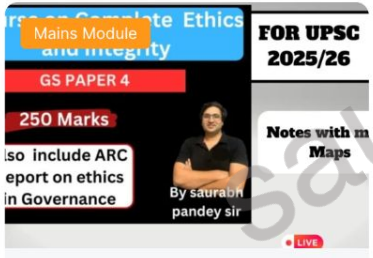

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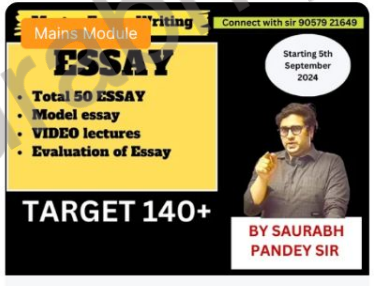

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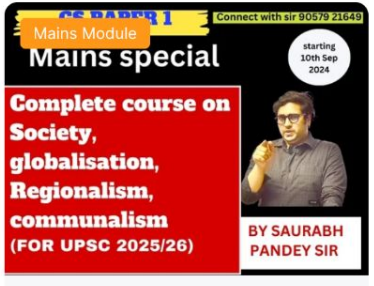

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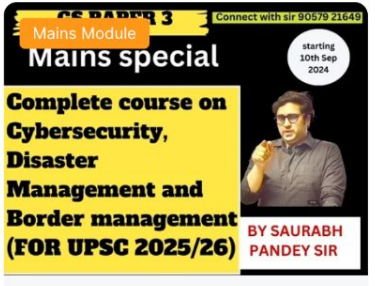

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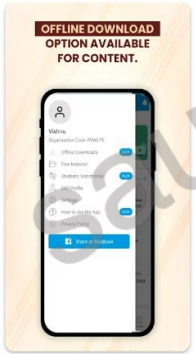

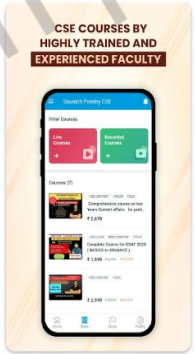

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Q1. The term Quadrantids often seen in news is associated with which among the following. (IE)

A) Are the annual meteor showers.

B) Are cyber attack groups.

C) Are Blockchain technology

systems.

D) Are gravitational waves detection

centers.

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Q In the era of ”protectionism and exceptionalism” Dependency on dollar will bring new challenges . Examine

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