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By saurabh Pandey



THE HINDU



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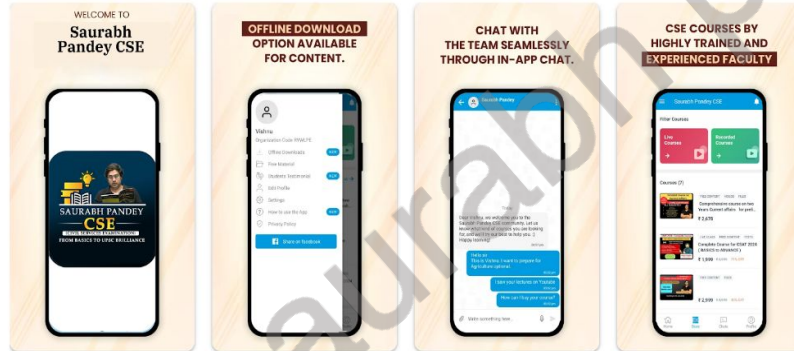
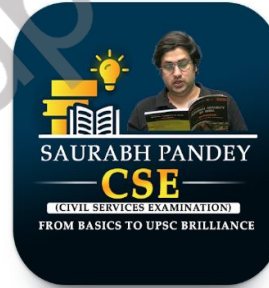
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## Target Mains -2024/25 -

Q Local governments require support from Union and State governments through funds, functionaries, and technical aid. Discuss

Q स्थानीय सरकारों को धन, पदाधिकारियों और तकनीकी सहायता के माध्यम से केंद्र और राज्य सरकारों से समर्थन की आवश्यकता होती है। चर्चा करना

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# Medha Patkar gets jail term for 'defaming' Delhi L-G

**Ishita Mishra**  
NEW DELHI

A Delhi court on Monday sentenced Medha Patkar, activist and founding member of the Narmada Bachao Andolan, to five months simple imprisonment in a 23-year-old criminal defamation case lodged against her by Delhi Lieutenant-Governor V.K. Saxena. The court also ordered her to pay ₹10 lakh compensation to Mr. Saxena.

Metropolitan Magistrate Raghav Sharma of the Saket court, who had convicted Ms. Patkar under Section 500 of the Indian Penal Code on May 24, said the order would remain suspended for 30 days. The court rejected her prayer to release her on probation, and said it was not imposing a jail term of a year or two, considering her age and health. "The offence entailed a maximum punishment of simple imprisonment of up to two years or fine or both," the court said.

Mr. Saxena was earlier the president of the National Council of Civil Liberties. In 2000, the non-governmental organisation published an advertisement against Ms. Patkar's movement which opposed the construction of a dam on the Narmada river. In a press statement soon after, she said Mr. Saxena was a "coward" and not a "patriot". Mr. Saxena approached a court in Ahmedabad which took cognisance of the offence.

Convicting Ms. Patkar, the court said her actions were deliberate and malicious. She imputed that Mr. Saxena was an agent of the Government of Gujarat, which and her comments were a direct attack on the petitioner's personal character and loyalty to the nation.



**probation means discharging a convict, subject to the regularity of conduct and good behaviour by imposing conditions upon his release.**

### **What Is Defamation?**

**Defamation is the act of communicating false statements about a person that injure the reputation of that person when observed through the eyes of ordinary man.**

**Any false and unprivileged statement published or spoken deliberately, intentionally, knowingly with the intention to damage someone's reputation is defamation.**

## **Defamation Law in India:**

**Article 19 of the Constitution grants various freedoms to its citizens.**

**However, Article 19(2) has imposed reasonable exemption to freedom of speech and expression granted under Article 19(1) (a). Contempt of court, defamation and incitement to an offence are some exceptions.**

Saurabh Pandey IAS

- Defamation is an offence under both the civil and criminal law. In civil law, defamation is punishable under the Law of Torts by imposing punishment in the form of damages to be awarded to the claimant.
- Under the Criminal law, Defamation is a bailable, non-cognizable offence and compoundable offence. Hence a policeman may arrest only with an arrest warrant issued by a magistrate.



## **Civil Defamation:**

The statements made need to be false and it must be made without the consent of the alleged defamed person. Monetary compensation can be claimed from the defendant for defamation.

## **Criminal Defamation:**

It is nothing but a defamation for which simple imprisonment may be awarded. Under a criminal suit, intention to defame is necessary. The allegation should be made with malice intent to defame another or at least the knowledge that the publication is likely to defame another is essential.

**Section 499 of the Indian Penal Code, 1860 defines what is defamation and its exceptions.**

**Words or signs imputed intending to harm or with the knowledge that such imputation will cause harm.**

**It may amount to defamation if anything is imputed against a deceased person, if such imputation would harm the reputation had the person been alive.**

# Kozhikode secures 'City of Literature' status at annual UCCN conference held in Portugal



**The Hindu Bureau**

KOZHIKODE

Kozhikode became part of the UNESCO Creative Cities Network (UCCN) as the city was awarded the title of "City of Literature" at the 16th annual conference of the network that began in Portugal on Monday.

Among the representatives of the 350 UNESCO 'Creatives Cities' in the world, Mayor Beena Philip and Corporation Secretary K.U. Bini were the face of Kozhikode. "This is a moment of pride for Kozhikode and so many people have been waiting for this moment," Ms. Philip said from Braga, a city in northern Portugal where the conference is being held.

The theme of the annual



Kozhikode Mayor Beena Philip and City Corporation Secretary K.U. Bini at the UCCN conference venue in Braga, Portugal, on Monday. Besides, Gwalior was also awarded a title by UCCN. SPECIAL ARRANGEMENT

conference of UCCN this year is "Bringing youth to the table for the next decade". The forenoon session on the first day of the five-day conference began with an introduction on

the topic and this was followed by an integration ceremony for the new members including Kozhikode. The older members presented their activities in clusters, offering a road-

map for the new members of the network to take their works forward.

President of Portugal Marcelo Rebelo de Sousa and senior UN officials took part in the conferenc-

e's opening ceremony.

The new members, including Kozhikode and Gwalior, which was awarded the "City of Music" title, will get an opportunity to make a presentation on their respective traditions and cultures in a session on Tuesday. Ms. Philip will speak on behalf of Kozhikode on the occasion.

UNESCO offers 'Creative Cities' status to cities across the globe based on their cultural contributions and traditions in categories like design, film, literature, music and folk art.

The annual conference will provide the member cities with a platform to share knowledge, experiences and good practices towards building sustainable cities of tomorrow.

## **UNESCO Creative Cities Network (UCCN)**

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- **The theme of the annual conference of UCCN this year is “Bringing youth to the table for the next decade”**

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# Field evaluation trials of submarine bids under Project-75I complete

**Dinakar Peri**

NEW DELHI

The Navy's mega-submarine deal under Project-75I, estimated at over ₹43,000 crore, has crossed a major milestone in the process with the field evaluation trials (FET) – to check the compliance of the bids received – now complete. There are two contenders in the fray: Germany's Thyssenkrupp Marine Systems (TKMS) and Navantia of Spain.

While an Indian Navy team visited the TKMS shipyard in March for FET, the evaluation of Navantia's offer was conducted last week, officials confirmed.

The evaluation report will now be compiled and presented to the Defence Ministry, which will declare the technical complaint bids which is expected to take about two months, a defence official explained.

Diplomatic sources said that Navantia would be de-



**Moving forward:** Navantia of Spain has offered a vessel based on its new S80 class of submarines. SPECIAL ARRANGEMENT

monstrating the Air Independent Propulsion (AIP) system fitted in a submarine operating on the surface and not submerged and that the submerged performance would be demonstrated in due course.

The design offered by TKMS, which has partnered with Mazagon Dock Shipbuilders Limited (MDL), is based on its highly successful Class 214 submarine as well as Class 212CD. Navantia, which has tied up with Larsen & Toubro, has offered a vessel based on its new S80 class

of submarines, the first of which was launched in 2021 and was commissioned into the Spanish Navy as S-81 'Isaac Peral' in November 2023.

The Request For Proposal (RFP) issued by the Navy, detailing the specifications required, states that the first submarine should have indigenous content (IC) of 45% which should go up to 60% for the sixth and last submarine.

The key determinant, however, to qualify for P-75I is the AIP system which enhances the endu-

rance of a submarine.

In the backdrop of a decision on the deal, the top leaders of Germany and Spain are scheduled to visit India in the next few months during which they are expected to make a pitch for an inter-governmental agreement.

German Chancellor Olaf Scholz is scheduled to visit India in the second half of October for inter-governmental consultations. Spain's President Pedro Sanchez is also expected to visit in the next few months.

Only Germany and Spain submitted bids for the deal. The deal is being progressed under the Strategic Partnership model of the defence acquisition procedure and L&T and MDL are the two Indian shipyards shortlisted to partner with foreign submarine manufacturers to produce six advanced conventional submarines in India under technology transfer.

# Project - 75I & API

- **The Navy's mega-submarine deal under Project-75I, estimated at over ₹43,000 crore, has crossed a major milestone in the process with the field evaluation trials (FET) — to check the compliance of the bids received — now complete.**
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## AIP Module

- Air-independent propulsion (AIP), or air-independent power, is any **marine propulsion** technology that allows a non-nuclear **submarine** to operate without access to **atmospheric oxygen** (by surfacing or using a **snorkel**).
- AIP can augment or replace the **diesel-electric propulsion system** of non-nuclear vessels.



- 
- **Modern non-nuclear submarines are potentially stealthier than nuclear submarines;**
  - **although some modern submarine reactors are designed to rely on natural circulation,**
  - **most naval nuclear reactors use pumps to constantly circulate the reactor coolant, generating some amount of detectable noise.**

- **Non-nuclear submarines running on battery power or AIP, on the other hand, can be virtually silent.**
- **While nuclear-powered designs still dominate in submergence times, speed, range and deep-ocean performance;**
- **small, high-tech non-nuclear attack submarines can be highly effective in coastal operations and pose a significant threat to less-stealthy and less-maneuverable nuclear submarine**

# Why are scientists looking for the Higgs boson's best friend?

The top quark is the universe's heaviest elementary particle. Each one weighs three-times as much as a copper atom. Its high mass implies that of all elementary particles, it interacts most strongly with the Higgs boson particle – and this makes physicists wonder whether our universe is unstable

Vandevan Mukunth

Scientists at the world's largest physics experiment have reported the most precise measurement yet of the most massive subatomic particle we know. The finding sounds esoteric but it wouldn't be an understatement to say it has implications for the whole universe.

The Greek philosopher Empedocles surmised 2,400 years ago that matter could be broken up into smaller and smaller pieces until we're left with air, earth, fire, and water. Since the early 20th century, physicists have broken up matter into smaller and smaller pieces to find many different subatomic particles instead – as many as to fill a zoo.

**The top quark.** Rather than a 'smaller' particle, contemporary particle physicists are concerned with elusive particles.

More energetic particles often break down into ones with less energy. The greater the difference in energy between that of a particle and the products of its decay, the less time the particle exists in its original form and more quickly it breaks down. By the mass-energy equivalence, a more massive particle is also a more energetic particle. And the most massive particle scientists have found to date is the top quark.

It is 10-times heavier than a water molecule, about three-times as much as a copper atom, and 95% as much as a full caffeine molecule.

As a result, the top quark is so unstable that it could break up into lighter, more stable particles in less than  $10^{-25}$  seconds.

The top quark's mass is very important in physics. A particle's mass is equal to the sum of masses contributed from multiple sources. An important source for all elementary particles is the Higgs field, which pervades the entire universe. A "field" is like a sea of energy and excitations in the field are called particles. This way, for example, an excitation of the Higgs field is called the Higgs boson just as an electron can be considered to be an excitation of an electron field.

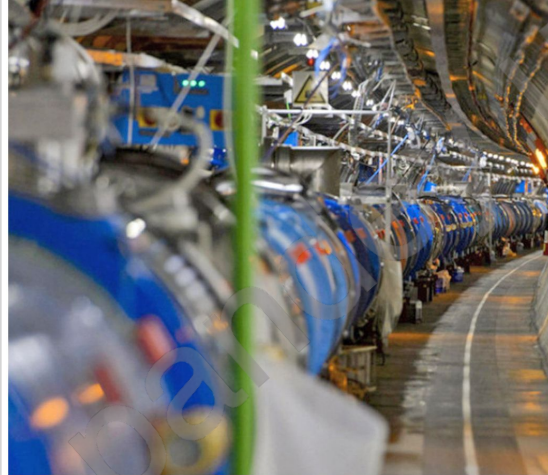
All these fields engage with each other in specific ways. When the electron field interacts with the Higgs field, it acquires much less than 100 GeV, for example, the electron particle will acquire some mass.

The same thing goes for other elementary particles: GeV or giga-electron-volt, is a unit of energy used in the context of subatomic particles. 1 joule = 6.24 billion GeV.

If the top quark is the most massive subatomic particle, it is because Higgs bosons interact most strongly with it. By measuring the top quark's mass as precisely as possible, then, physicists can learn a lot about the Higgs boson as well.

"Physicists are intrigued by the top quark mass as there is something peculiar about it," Nirmit Raj, particle theorist and assistant professor at the Indian Institute of Science, Bengaluru, told *The Hindu*.

"On the one hand, it is the one closest to the Higgs boson's mass, which is what one would 'naturally' expect before measuring it. On the other, all other (particles like it) are much, much lighter, making one wonder if the top quark is actually an oddball, not a 'natural' species."



A tunnel inside the Large Hadron Collider during maintenance work. AFP

**The universe as we know it.** But the rabbit hole goes deeper.

Physicists are keen to study the Higgs boson also because of its own mass, which it acquires by interacting with other Higgs bosons. Importantly, the Higgs boson is more massive than expected – which is to say the Higgs field is more energy-laden than expected. And because it pervades the universe, the universe can be said to be more energetic than expected. This "expectation" comes from calculations physicists have performed and they don't have reason to believe they are wrong. Why does the Higgs field have so much energy?

Physicists also have a theory as to how the Higgs field originally formed (at the birth of the universe). If they are right, there is a small yet non-zero chance that one day in future, the field could go through a sort of self-adjustment that reduces its energy and modifies the universe in drastic ways.

They know the field has some potential energy today and there is a way it could shed some of it to have less and become more stable. There are two ways to get to this stable state. One is for the field to gain some energy first before losing it and more, like climbing one side of a mountain to get into a deeper valley on the other side. The other is for an event called quantum tunnelling happens, whereby the field's potential energy would "tunnel" through the mountain instead of having to climb over it and



The Greek philosopher Empedocles surmised 2,400 years ago that matter could be broken up into smaller and smaller pieces until we're left with air, earth, fire, and water

drop into the valley under.

This is why Stephen Hawking said in 2016 the Higgs boson could spell the "end of the universe" as we know it. Even if the Higgs field is slightly stronger than it is now, the atoms of most chemical elements will be destroyed, taking stars, galaxies, and earthlike with them. But while Hawking was technically correct, other physicists quickly said the frequency of the tunnelling event was 1 in  $10^{300}$  years.

The Higgs boson's mass – 126 GeV/e (a unit used for subatomic particles) – is also just about enough to keep the universe in its current state; anything else and the "end" would happen. Such a finely tuned value is obviously curious and physicists would like to know which natural processes contribute to it. The top quark is part of this picture by virtue of being the most massive particle, in a sense the Higgs boson's closest friend.

"Measuring the top quark mass precisely has implications for whether our universe will tunnel out of existence," Dr. Raj said.

**Finding the top quark**

Physicists discovered the top quark in 1995 at a particle accelerator in the US called the Tevatron, measuring its mass to be 151.97 GeV/e. The Tevatron was shut down in 2011; physicists continued to analyse data it had collected and updated the value three years later to 174.98 GeV/e. Other experiments and research groups yielded more precise values over time. On June 27, physicists at the Large Hadron Collider (LHC) in Europe reported the most precise figure yet: 172.52 GeV/e.

Measuring a top quark's mass is difficult when its lifetime is around  $10^{-25}$  seconds. Typically, a particle-smasher will produce an ultra-hot soup of particles. If a top quark is present in this soup, it will quickly decay into specific groups of lighter particles. Detectors look out for these events, and when they happen track and record their properties. Finally, computers collect this data and physicists analyse them to reconstruct the physical properties of the top quark.

Now researchers will incorporate the top quark's mass measurement into calculations that inform our understanding of our universe's particles. Some of them will use it to also quest for an even more precise value. According to Dr. Raj, precisely measuring the top quark's mass is also key to knowing whether some other particle with mass close to that of the top quark could be hiding in the data.

# Top Quark

- **More energetic particles often break down into ones with less energy.**
- **The greater the difference in energy between that of a particle and the products of its decay, the less time the particle exists in its original form and more quickly it breaks down.**
- **By the mass-energy equivalence, a more massive particle is also a more energetic particle.**

- **And the most massive particle scientists have found to date is the top quark.**
- **It is 10-times heavier than a water molecule, about three-times as much as a copper atom, and 95% as much as a full caffeine molecule.**
- **As a result, the top quark is so unstable that it could break up into lighter, more stable particles in less than 10–25 seconds.**
- **The top quark's mass is very important in physics. A particle's mass is equal to the sum of masses contributed from multiple sources.**

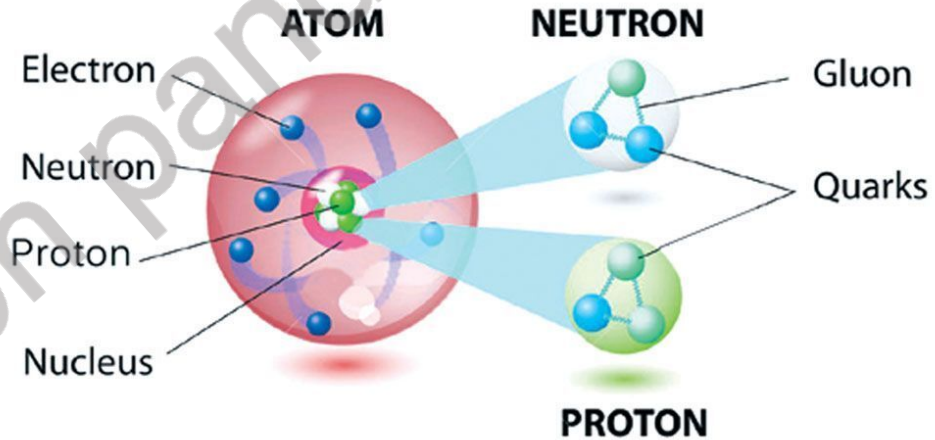
- **An important source for all elementary particles is the Higgs  $\square$  field, which pervades the entire universe.**
- **A “ $\square$  field” is like a sea of energy and excitations in the  $\square$  field are called particles.**
- **This way, for example, an excitation of the Higgs  $\square$  field is called the Higgs boson just as an electron can be considered to be an excitation of an ‘electron  $\square$  field’.**
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- **The same thing goes for other elementary particles. (GeV, or giga-electron-volt, is a unit of energy used in the context of subatomic particles: 1 joule = 6.24 billion GeV.)**
- **If the top quark is the most massive subatomic particle, it is because Higgs bosons interact most strongly with it.**
- **By measuring the top quark's mass as precisely as possible, then, physicists can learn a lot about the Higgs boson as well**

## What is Higg Boson ?

- The Higgs boson, sometimes called the Higgs particle, is an elementary particle in the Standard Model of particle physics produced by the quantum fields in particle physics

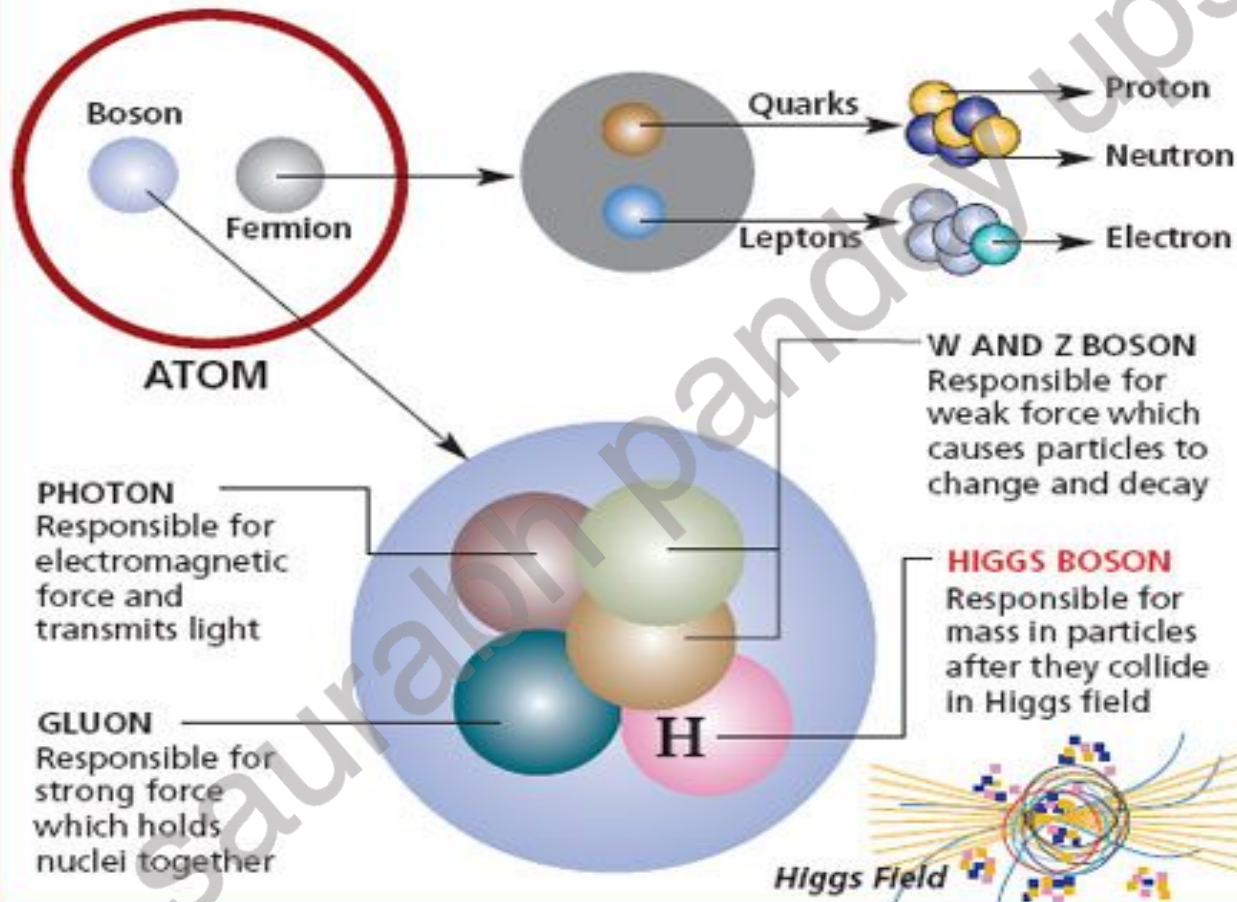
# HIGGS BOSON

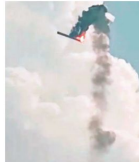




# PARTICLE PHYSICS BASICS

*How fermions and bosons make up atoms and how they acquire mass*





The first stage of the Tianlong-3 rocket falls back to earth. The smoke from its engine shows the stage's ascent trail following its accidental lift-off. XINHUA

## Chinese rocket engine goes Awol during hot testing

Reuters

Beijing Tianlong Technology Co. said on Sunday that the first stage of its Tianlong-3 rocket under development had detached from its launch pad during a test due to a structural failure and landed in a hilly area of the city of Gongyi in central China.

There were no reports of casualties after an initial investigation, Beijing Tianlong, also known as Space Pioneer, said in a statement on its official WeChat account.

Parts of the rocket stage were scattered within a "safe area" but caused a local fire, according to a separate statement by the Gongyi emergency management bureau.

The fire has since been extinguished and no one has been hurt, the bureau said.

The two-stage Tianlong-3 (the name is Mandarin for "Red Dragon") is a partly reusable rocket under development by Space Pioneer, one of a small group of private-sector rocket makers that have grown rapidly over the past five years.

Falling rocket lifts in China after launches is not unheard of, but it is very rare anywhere in the world for part of a rocket under development to make an unplanned flight out of its test site and

**The two-stage Tianlong-3 is a partly reusable rocket under development by Space Pioneer, one of a small group of private-sector rocket makers that have seen rapid growth recently**

crash.

According to Space Pioneer, the first stage of the Tianlong-3 ignited normally during a hot test but later detached from the test bench due to structural failure and landed in hilly areas 1.5 km away.

A hot test is one in which fuel is flowed into the rocket motor being tested and it is allowed to fire in conditions mimicking those during lift-off.

A rocket can consist of several stages, with the first, or lowest, stage igniting and propelling the rocket upwards upon its launch.

When the fuel is exhausted, the first stage falls off, and the second stage ignites, keeping the rocket in propulsion. Some rockets have third stages. India's Polar Satellite Launch Vehicle (PSLV) has four stages.

Space Pioneer says the performance of Tianlong-3 is comparable to SpaceX's Falcon 9, which is also a two-stage rocket.

In April 2022, Space Pioneer launched a kerolene-oxygen rocket, the Tianlong-2, becoming the first private Chinese firm to send a liquid-propellant rocket into space.

Chinese commercial space companies have rushed into the sector since 2014, when private investment in the industry was allowed by the state.

Many started making satellites while others including Space Pioneer, focused on developing reusable rockets that can significantly cut mission costs.

The test sites of such companies can be found along China's coastal areas, located by the sea due to safety reasons.

But some are also sited deep in the country's interior such as Space Pioneer's test centre in Gongyi, a city of 800,000 people in the central province of Henan.



## Tianlong-3

- **Tianlong-3 is a medium-lift orbital launch vehicle developed by the Chinese private aerospace manufacturer Space Pioneer.**
- **It is designed to be partially reusable, with the first stage capable of performing an autonomous vertical landing and being reused up to 10 times**

- **Tianlong-3 is part of Space Pioneer's efforts to develop low-cost, reusable launch vehicles to compete in the growing commercial launch market.**
- **It aims to provide launch services for medium-sized payloads to **low Earth orbit (LEO)** and **sun-synchronous orbit (SSO)****

# Will the Hosur airport become a reality?

What are the challenges and obstacles to the Hosur airport project proposed by the Tamil Nadu government? Why is the project being proposed for Hosur? How can an airport gain clearance from the Civil Aviation Ministry? What is the process to be followed?

## EXPLAINER

Sanjay Vijayakumar

### The story so far:

Tamil Nadu Chief Minister M.K. Stalin announced in the legislative assembly plans for setting up an international airport on 2,000 acres of land, with the capacity to handle three crore passengers annually, in the industrial town of Hosur, which is 40 kms away from Bengaluru. While the airport has been a long standing demand of the industrialists in the area, one of the hurdles is that the concession agreement signed between the Centre and the Bangalore International Airport Ltd (BIAL), the operator of Kempegowda International Airport Bengaluru, does not allow for new or existing airports (except for Mysore and Hassan airports) within an aerial distance of 150 kms before 2033.

### What is the significance of Hosur?

Hosur in Krishnagiri district is located on the border of Tamil Nadu and Karnataka. Hosur is situated at 3,000 metres above sea level and according to a report by online publisher Visual Capitalist in 2021, it was ranked 13 in the world among the list of cities with the fastest population growth with an annual growth rate of 5.38%. Hosur has emerged as a flourishing industrial town with prominent companies such as Tata Electronics, TVS, Ashok Leyland, Titan, and Rolls-Royce (IAMPL) establishing significant operations in the area. It has emerged as a nucleus for auto and electric vehicle manufacturing, advanced manufacturing, logistics and electronics. The industrial town is also strong in traditional sectors like floriculture and horticulture. Estimates suggest that around 3,000 MSMEs are present in the region, engaged in engineering fabrication, tooling, and polishing, among others.

The State Industries Promotion Corporation of Tamil Nadu Limited



ISTOCKPHOTO

(SIPCOT), the State government's nodal agency to promote industrial infrastructure, has established industrial parks in Hosur in two phases spread over 2,093 acres. SIPCOT is currently in the process of acquiring land of 3,382.84 acres for expanding and setting up new industrial parks in the region. Private industrial parks have also come up in the region. To meet the water requirement of the industries located in the Hosur area, SIPCOT is establishing a 20 megalitres per day Tertiary Treatment Reverse Osmosis (TTRO) plant at Kelavarapalli, which is expected to be completed by September.

According to Tamil Nadu Industries Minister T.R.B Rajaa, the airport project in Hosur will enhance connectivity and stimulate economic growth, benefiting not only Hosur but also neighbouring districts such as Dharmapuri and Salem.

He has also pointed out that the new airport will foster a twin-city ecosystem with Bengaluru, propelling growth in both Tamil Nadu and Karnataka.

### What about the previous plan?

Hosur airport is owned by Taneja Aerospace and Aviation Limited. In 2023, replying to a question by Dravida Munnetra Kazhagam (DMK) Rajya Sabha MP P. Wilson, the then Union Minister of State for Civil Aviation General (retired) V.K. Singh said in the first round of bidding under the Regional Connectivity Scheme (RCS)- Ude Desh Ka Aam Nagrik (UDAN), a bid was received for the routes Chennai-Hosur-Chennai and due to the concession agreement with BIAL the route was not awarded and Hosur airport was deleted from UDAN document for future round of bidding.

### What does the Union Civil Aviation Ministry's guidelines state?

As per the present guidelines of the Civil Aviation Ministry, the regulator Directorate General of Civil Aviation (DGCA) while granting licence to operate a greenfield airport should take into account that no greenfield airport would be allowed within an aerial distance of 150 kms of an existing civilian airport. In case a greenfield airport is proposed to be set up within 150 kms of an existing airport, the impact on the existing airport would be examined and such cases would be decided by the government on a case to case basis. Such an application shall be first considered by the Steering Committee, headed by the Secretary of Civil Aviation. After considering the application, the Steering Committee shall make a suitable recommendation to the Ministry of Civil Aviation. The Ministry shall place the matter before the Union Cabinet for its consideration and the DGCA would grant a licence only after their approval.

In 2017, the Centre granted in-principle approval for a greenfield airport at Jewar in Greater Noida based on the recommendations of the Steering Committee on Greenfield Airports. The Noida International Airport is located 72 kms from the Indira Gandhi International (IGI) Airport, Delhi and 65 kms from the Hindon Air Force station Ghaziabad. The Centre said the airport in Delhi NCR region will help decongest the IGI Airport and will serve the people of Delhi, Noida, Ghaziabad, Aligarh, Agra, and Faridabad.

### What next?

Airport projects have a long gestation period to come on stream. Given that the DMK government is part of the Opposition alliance, it has to negotiate hard with the Centre to get the necessary relaxation in norms for setting up the airport, besides other regulatory and environmental clearances. Setting up the necessary supporting infrastructure for the airport is another challenge which needs to be overcome.

## THE GIST

▼ Tamil Nadu Chief Minister M.K. Stalin announced plans for setting up an international airport on 2,000 acres of land, with the capacity to handle three crore passengers annually, in the industrial town of Hosur, which is 40 kms away from Bengaluru.

▼ As per the present guidelines of the Civil Aviation Ministry, no greenfield airport would be allowed within an aerial distance of 150 kms of an existing civilian airport.

▼ Given that the DMK government is part of the Opposition alliance, it has to negotiate hard with the Centre to get the necessary relaxation in norms for setting up the airport.

## Hosur Airport

- **Tamil Nadu Chief Minister M.K. Stalin announced in the legislative assembly plans for setting up an international airport on 2,000 acres of land, with the capacity to handle three crore passengers annually, in the industrial town of Hosur, which is 40 kms away from Bengaluru.**

- **While the airport has been a long standing demand of the industrialists in the area, one of the hurdles is that the concession agreement signed between the Centre and the Bangalore International Airport Ltd (BIAL), the operator of Kempegowda International Airport Bengaluru, does not allow for new or existing airports (except for Mysore and Hassan airports) within an aerial distance of 150 kms before 2033.**

## **What does the Union Civil Aviation Ministry's guidelines state?**

- **As per the present guidelines of the Civil Aviation Ministry, the regulator Directorate General of Civil Aviation (DGCA) while granting licence to operate a greenfield airport should take into account that no greenfield airport would be allowed within an aerial distance of 150 kms of an existing civilian airport.**
- **In case a greenfield airport is proposed to be set up within 150 kms of an existing civilian airport, the impact on the existing airport would be examined and such cases would be decided by the government on a case to case basis.**



- **Such an application shall be first considered by the Steering Committee, headed by the Secretary of Civil Aviation.**
- **After considering the application, the Steering Committee shall make a suitable recommendation to the Ministry of Civil Aviation.**
- **The Ministry shall place the matter before the Union Cabinet for its consideration and the DGCA would grant a licence only after their approval.**
- **In 2017, the Centre granted in-principle approval for a greenfield airport at Jewar in Greater Noida based on the recommendations of the Steering Committee on Greenfield Airports.**

## What are Greenfield Airports?

- Greenfield airports are aviation facilities built from scratch on previously undeveloped or empty land.
- The term "greenfield" emphasises their environmentally friendly characteristics, as they aim to minimise the impact on nature during the construction and commissioning processes

- Kalaburagi (project cost Rs 175.57 crore)
- Orvakal (Kurnool) (project cost Rs 187 crore)
- Sindhudurg (project cost Rs 520 crore)
- Itanagar (project cost Rs 646 crore)
- Kushinagar (project cost Rs 448 crore)
- Mopa (project cost Rs 2870 crore)

Of these, Kushinagar and Mopa are international airports.



## THE GIST

Despite the efforts of five commissions since the 11th Finance Commission, financial devolution to cities remain inadequate. The fiscal health of municipalities is poor, affecting both city productivity and quality of life.

The 13th Finance Commission observed that “parallel agencies and bodies are emasculating local governments both financially and operationally.”

The 16th FC must consider India’s urbanisation dynamism and ensure IGTs to urban areas are at least doubled.

# What is on the agenda for the 16th Finance Commission?

How do other countries devolve funds to their local governments? Why is the Census significant?

**Tikender Singh Panwar**

### The story so far:

The 16th Finance Commission (FC) has begun its work, established under Article 280 of the Indian Constitution, primarily focusing on the devolution of the consolidated fund. Since the 73rd and 74th constitutional amendments, local bodies have gained significant recognition within the federal system. These amendments introduced sub-clauses 280 (3) (bb) and (c), which mandate the FC to recommend measures to augment State consolidated funds for supporting State panchayats and municipalities.

### What about cities?

The National Commission on Urbanisation in the mid-80s described cities as “engines of growth.” Although this view is somewhat narrow, the reality is that cities contribute around 66% of India’s GDP and about 90% of total government revenues. Cities, thus, are an

important spatial zone for the overall development of the country. However, our economic scale is insufficient to meet rising needs. The World Bank estimates that \$840 billion is needed for basic urban infrastructure in the next decade.

Despite the efforts of five commissions since the 11th Finance Commission, financial devolution to cities remain inadequate. The fiscal health of municipalities is poor, affecting both city productivity and quality of life. Rapid urbanisation without appropriate fiscal action has adverse effects on development. Intergovernmental transfers (IGTs) to Urban Local Bodies (ULBs) in India are about 0.5% of GDP, much lower than the 2-5% typical of other developing nations. For instance, South Africa allocates 2.6%, Mexico 1.6%, the Philippines 2.5%, and Brazil 5.1% of their GDPs to their cities. Although IGTs make up about 40% of ULBs’ total revenue, issues persist regarding their predictability, earmarking for vulnerable groups, and horizontal equity. IGTs are

crucial for ULBs, given their financial state and the need for stable support until their own revenues improve.

### What about the taxation system?

The introduction of the Goods and Service Tax (GST) has reduced ULBs’ tax revenue (excluding property tax) from about 23% in 2012-13 to around 9% in 2017-18. IGTs from States to ULBs are very low, with State Finance Commissions recommending only about 7% of States’ own revenue in 2018-19. Increasing the quantum of IGTs as a percentage of GDP is necessary. Despite the 74th constitutional amendment’s aim to financially strengthen ULBs, progress over three decades has fallen short.

The 13th Finance Commission observed that “parallel agencies and bodies are emasculating local governments both financially and operationally.” Local governments require support from Union and State governments through funds, functionaries, and technical aid. However,

the growth of parallel agencies has distorted local governments’ roles. Programs like the Member of Parliament Local Area Development Scheme and the Member of Legislative Assembly Local Area Development Scheme exacerbate this issue, distorting the federal structure.

### How important is the Census?

In the absence of the 2021 Census, reliance on 2011 data is inadequate for evidence-based fiscal devolution. India has approximately 4,000 statutory towns and an equal number of Census towns, with an estimated 23,000 villages, all of which are effectively urban. These figures must be captured by the 16th FC, including the significant migration to Tier-2 and 3 cities.

Thus, the 15th FC’s nine guiding principles require a revisit. Not all of them but reference to enhancement in property tax collection in tandem to the State’s GST; maintenance of accounts; resource allocation for mitigating pollution; focus on primary health care, solid waste management, drinking water, etc., deserve attention. The 16th FC must consider India’s urbanisation dynamism and ensure IGTs to urban areas are at least doubled. A McKinsey Global Institute report warns that if India continues investing in urban infrastructure at current rates, urban infrastructure will fall short, leading to water supply issues and untreated sewage.

*Author is former Deputy Mayor, Shimla, and Member, Kerala Urban Commission.*

## The 16th Finance Commission (FC) and Local bodies

- The 16th Finance Commission (FC) has begun its work, established under Article 280 of the Indian Constitution, primarily focusing on the devolution of the consolidated fund. Since the 73rd and 74th constitutional amendments, local bodies have gained significant recognition within the federal system.
- These amendments introduced sub-clauses 280 (3) (bb) and (c), which mandate the FC to recommend measures to augment State consolidated funds for supporting panchayats and municipalities.

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**Old is gold:** A close-up of one of two IMAX cameras seen at the Smithsonian National Air and Space Museum in Washington. REUTERS

## How cinema is captured and presented through the IMAX format

IMAX is one of the most popular film formats being employed in commercial filmmaking in cinema today; its continued use in the production pipelines of many major films, suggests that it is here to stay

Prathmesh Kher

Cinema has always been a home to spectacle. Most theatrically released cinematic works, especially till the development of digital photography, employed the use of 35 mm film stock to capture the stunning vistas and cinematic protagonists. For the bulk of its history, almost all movies were shot using this 35mm film. Most modern cinematic productions have since replaced the 35mm film stock with a digital sensor. But film purists argue that film stock provides for superior resolution.

Standard film stock is a photochemical emulsion with a total width of 35mm, which records images passing vertically through a camera. Some of that frame width needs to be used to accommodate sprocket holes, which are called perforations (or perf, if you will), that pass the film through the camera. A standard 35mm film stock has four perforations. As must be self-evident, a larger surface area on a piece of film would allow for more photographic information to be captured. This was made possible through the use of 70mm film stock. The expansive imagery of the American West in Raoul Walsh's 1950 film *The Big Trail* was brought to light through the use of 70mm film. But it wasn't until television started stealing viewers away from Hollywood in the 1950s that the industry recognised the benefit of making 70mm a major event.

This period led to the release of epics such as *Lawrence of Arabia* and *The Sound of Music* in the 1960s. The numbers bore out the impact that the 70mm format had with its visual resolution and superior sound quality.

It was in this period that Graeme Ferguson, Roman Kroitor, Robert Kerr, and William C. Shaw came together to develop what would become IMAX.

What is IMAX?

IMAX is a motion picture film format. It consists of a production pipeline of high-resolution cameras, film formats, projectors, and theatres. Developed in Canada in the 1970s, IMAX seeks to give the viewer an immersive movie-watching experience with its large screens. IMAX theatre screens have a tall aspect ratio of 1.43:1, meaning that the width of the screen is 1.43 times the height of the screen. The screens can be 18 by 24 metres in size, with the largest screen in Leutberg, Germany, measuring 38.8 metres by 21 metres.

The IMAX negative frame has a size of 70x84mm, nearly eight times the size of what a traditional cinema film stock can capture. The IMAX format uses 70 mm film run horizontally through the projector. In normal film projection theatres, a 35 mm or a 70 mm film is run vertically. Because of this horizontal orientation, the IMAX format produces images that can be screened at 8.3 times the size as a regular 35 mm film or 3.4 times as large as the regular 70 mm film. The larger the surface area of a piece of film, the more photographic information it will contain. This means that an IMAX image yields more detail in the image.

IMAX cameras are notably larger and bulkier compared to standard cinema cameras. This size is primarily due to the large film format they use. This larger film size allows for higher resolution and clarity. Digital IMAX cameras, while smaller than their film counterparts, are still larger than most standard digital cinema cameras due to their advanced sensors and technology. The IMAX film format provides an extremely high resolution via its 35mm counterpart. In fact, theoreticians estimate that a standard 35mm film would have a digital resolution of around 4k, whereas a standard 70mm film would resolve at around 8k. In comparison, the IMAX

format is estimated at having an equivalent digital resolution of 18k.

As a capture and storage medium, film can last indefinitely. This means that future generations could witness even more detail lurking within an IMAX frame when digital projection technology catches up.

Big screen, big business

*The Dark Knight* was the first major motion picture to be filmed with high resolution IMAX cameras, and its billion dollar box office result along with its many award nominations, including for its cinematography, cemented IMAX's potential as a motion picture format. The success of Christopher Nolan's other movies, *The Dark Knight Rises*, *Inception*, *Dunkirk*, and his most recent *Oppenheimer*, all of which employed the IMAX format, have made its commercial potential evident. It has also sparked an interest in other filmmakers such as JJ Abrams (*Star Wars: The Force Awakens*), Michael Bay (*Transformers: Revenge of the Fallen*) and Damien Chazelle (*First Man*) who also employed the format.

There is also a trend of conventionally shot films being upscaled to be projected on IMAX screens; the improved sound quality and visual appearance is supposed to enhance the viewing experience. IMAX has, in recent years, also ventured into digital filmmaking with its own slew of certified high-fidelity digital cameras that can be used to create IMAX-format films. The first film to employ such a camera was *Captain America: Civil War* following which many blockbuster movies including *Top Gun: Maverick* as well as the *Dune* films were shot using this format. With films being converted to the IMAX format, the market seems to be saturating with the format. There is also concern that with such a vast stockpile of digital productions in their pipeline, the IMAX film format which is

what cemented its position in the first place might become a thing of the past. However, there are filmmakers such as Christopher Nolan, Jordan Peele, Ryan Coogler and others who continue to boost the IMAX film format.

Heavy lies the crown

As with all things in life, IMAX does come with its own downsides.

The first, and possibly the most evident, drawback is cost. IMAX film cameras are notoriously expensive to rent. This combined with the cost of buying and processing the amount of 65mm film, which because in IMAX's film runs horizontally, is also considerably higher. With 15 perforations per frame moving through the camera's gate 24 times per second, over 300 feet of 70mm film is required for every minute that is shot. The IMAX cameras are also incredibly noisy given that 15 perforations of film need to run through the camera much faster than a regular four perforations 35mm film. This makes it difficult if not impossible to record synchronous audio and forces filmmakers to do Automated Dialogue Replacement (ADR). This additional cost of dubbing the dialogue over is compounded by the bulkiness of the IMAX cameras. The heavy cameras were not designed to be handheld forcing filmmakers to use additional equipment such as a dolly, cranes, tripods, and other devices to mount the cumbersome IMAX camera. IMAX-format films. The first film to employ this format was *Captain America: Civil War* following which many blockbuster movies including *Top Gun: Maverick* as well as the *Dune* films were shot using this format. With films being converted to the IMAX format, the market seems to be saturating with the format. There is also concern that with such a vast stockpile of digital productions in their pipeline, the IMAX film format which is

However, given its increasing demand in tentpole films, IMAX has said it is working to improve the specifications on its camera technology. This would theoretically make their hulking cameras more mobile and also reduce its mechanical noise. These technical developments, as well as the continued use of the format in the production pipelines of many major films, suggests that IMAX is here to stay.

## What is IMAX?

- **IMAX is a motion picture film format. It consists of a production pipeline of high-resolution cameras, film formats, projectors, and theatres.**
- **Developed in Canada in the 1970s, IMAX seeks to give the viewer an immersive movie-watching experience with its large screens.**
- **IMAX theatre screens have a tall aspect ratio of 1.43:1, meaning that the width of the screen is 1.9 times the height of the screen**

# SEBI tightens rules to curb mule a/c trading

**Asley Coutinho**  
MUMBAI

Securities and Exchange Board of India (SEBI) tightened norms to detect fraud and market abuse at stock brokers' end via mule and proprietary accounts.

The regulator has asked brokers to beef up systems to detect potential mule accounts or suspicious activity. It wants brokers to establish 'know your client' surveillance systems and obtain information to verify identification of clients.

## Difficult task

Brokers' trading terminals should be used only by employees and/or authorised persons and only at locations approved by the stock exchanges – and not by clients, it said.

"It will be very difficult for a broker to detect mule accounts, especially for online clients," said a broking official. According to him, there are ways to detect unusual activity in an account but these may not necessarily be mule accounts. Also, the new rules place no responsibility on authorised persons, who are quite a few in number.

Banks, not brokers, may be the best entities to detect mule activity, he said.

"There are several traders involved in arbitrage who are given terminals and operate from remote locations. They will get impacted because they are not operated by brokers or authorised persons. Liquidity coming from this activity could get impacted if the new rules are applied," the broker said.

A mule account is a trading account maintained with a stock broker or a dematerialised account or bank account linked with such trading account that



is controlled by another person. These could be used for illegal activities such as money laundering.

The additional compliance burden may hit hard small and mid-sized brokers. "The new rules are in addition to the existing PMLA requirements and place a lot of onerous liabilities on brokers," said another broker. "However, the norms will help check the activity of brokers directly involved in the creation of mule accounts."

## IPO violations

In January, SEBI had said it was in the process of gathering data and identifying the modus operandi to crack down on mule accounts. The regulator had found evidence of a large number of IPO applications being filed through fictitious demat accounts.

"IPO applications are filed in a manner they get rejected. This is done to make the subscription numbers look good. In the interest of investors, we will review policy and enforcement actions in such areas," SEBI Chairperson Madhabi Puri Buch said.

The new rules put greater onus on senior management to maintain surveillance for detecting potential fraud or market abuse by clients, staff or authorised persons.

*(The writer is with The Hindu businessline)*

# Mule Account

- A mule account is a trading account maintained with a stock broker or a dematerialised account or bank account linked with such trading account that is controlled by another person.
- These accounts could be used for illegal activities such as money laundering and avoiding taxes.

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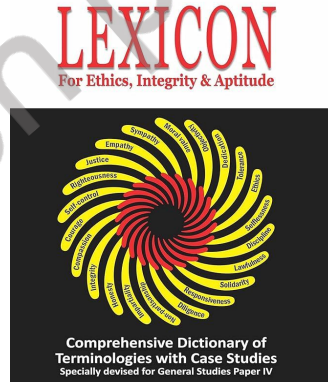
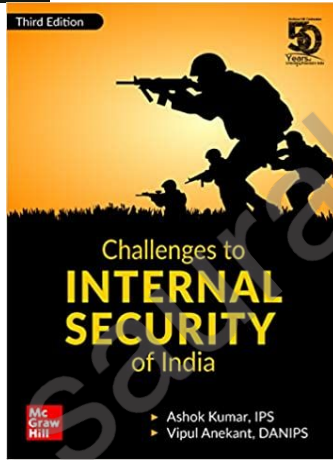
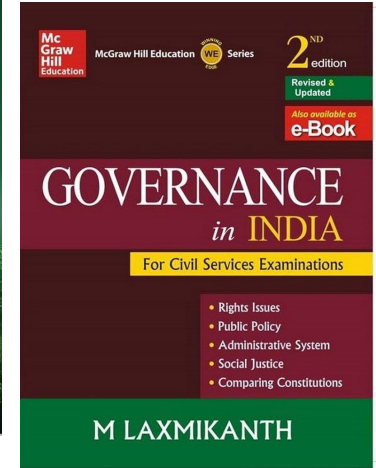
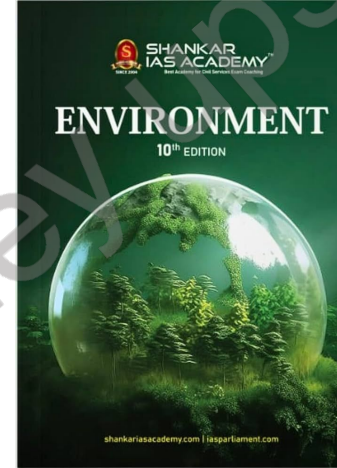
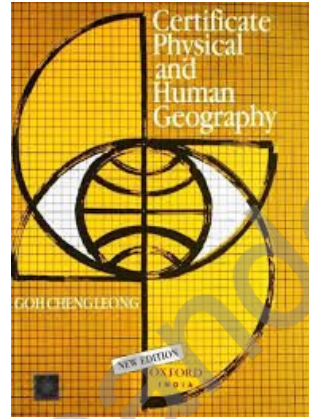
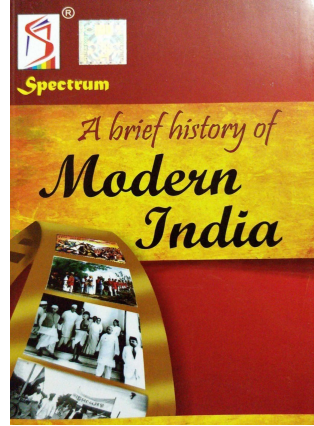
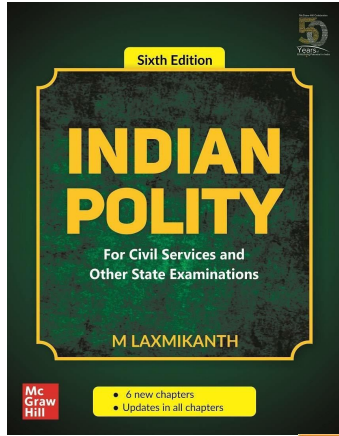
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