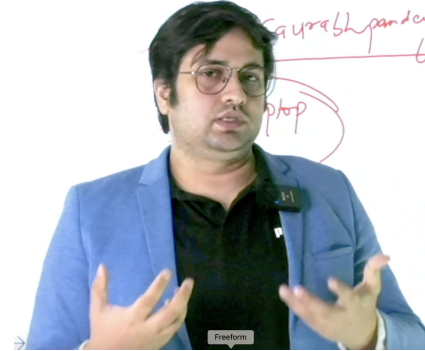


Topics - MINDS MAPS included

- CRISPR Fncas9
- Can States tax mining activities?
- The Inflation Reduction Act (IRA) (International relations)
- The Yazidi community
- Mains



By saurabh Pandey



THE HINDU

Target Mains -2024/25 -

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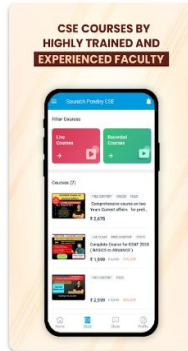
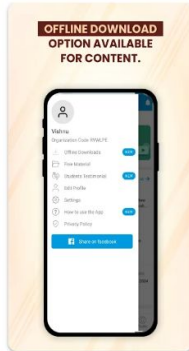
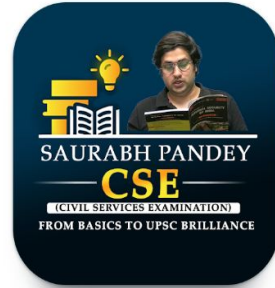
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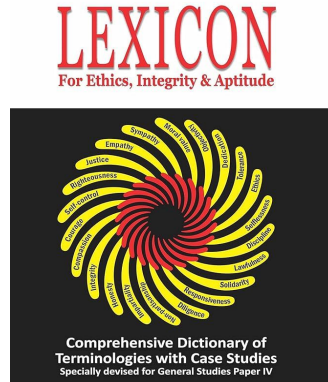
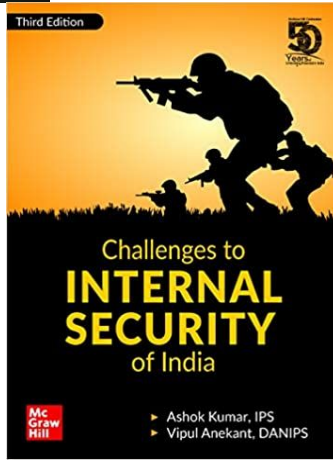
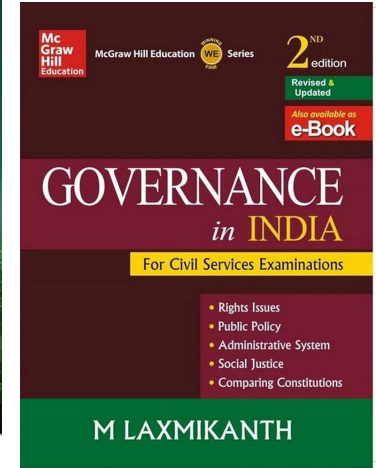
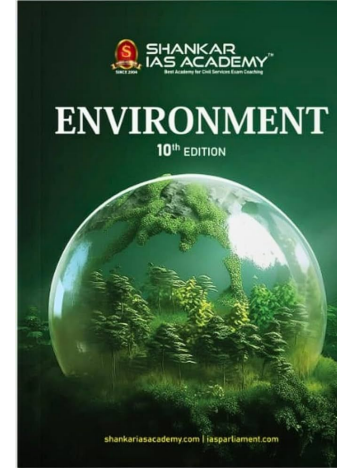
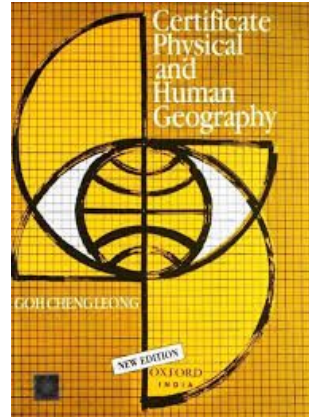
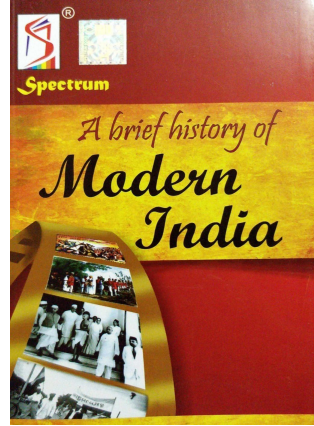
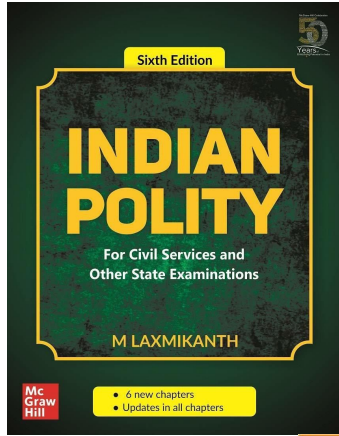
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Topic -1 CRISPR Fncas9 (science and technology)



- **Indian scientists build breakthrough gene-editor, are aiming for patent**
- **A CRISPR system built to use the FnCas9 enzyme was found to edit genomes more efficiently and with less unintended damage than existing technologies, researchers at CSIR-IGIB and the L.V. Prasad Eye Institute have reported**
- **Scientists from the CSIR-Institute of Genomics and Integrative Biology, New Delhi, have developed an enhanced genome-editing system that can modify DNA more precisely and more efficiently than existing CRISPR-based technologies.**
- **CRISPR's off-target problem**
-



- **Today, using CRISPR-Cas9, researchers can add, remove, or alter specific DNA sequences in the genomes of animals.**
- **This system has been used in various fields, including in agriculture – to improve the nutritional value of plants and increase their yield – and in healthcare to diagnose several diseases and treat genetic disorders.**
- **The CRISPR-Cas9 gene editing tool uses a guide RNA (gRNA) designed to find and bind to a specific part of the target genome.**
- **The gRNA directs an enzyme, Cas9, to the target site, which is followed by a short DNA sequence called the protospacer adjacent motif (PAM).**
- **Cas9 recognises and binds to the PAM sequence, and acts as a molecular scissor that snips some damaged DNA.**

⋮



- **This repair system triggers the cell's DNA automatically, which repairs the snipped part to insert the correct DNA sequence.**
- **But the CRISPR-Cas9 system can also recognise and cut parts of the genome other than the intended portion.**
- **Such "off-target" effects are more common when using the SpCas9 enzyme derived from *Streptococcus pyogenes* bacteria. Scientists have been able to engineer versions of SpCas9 with higher fidelity but only at the cost of editing efficiency.**
- **Switching SpCas9 with FnCas9**

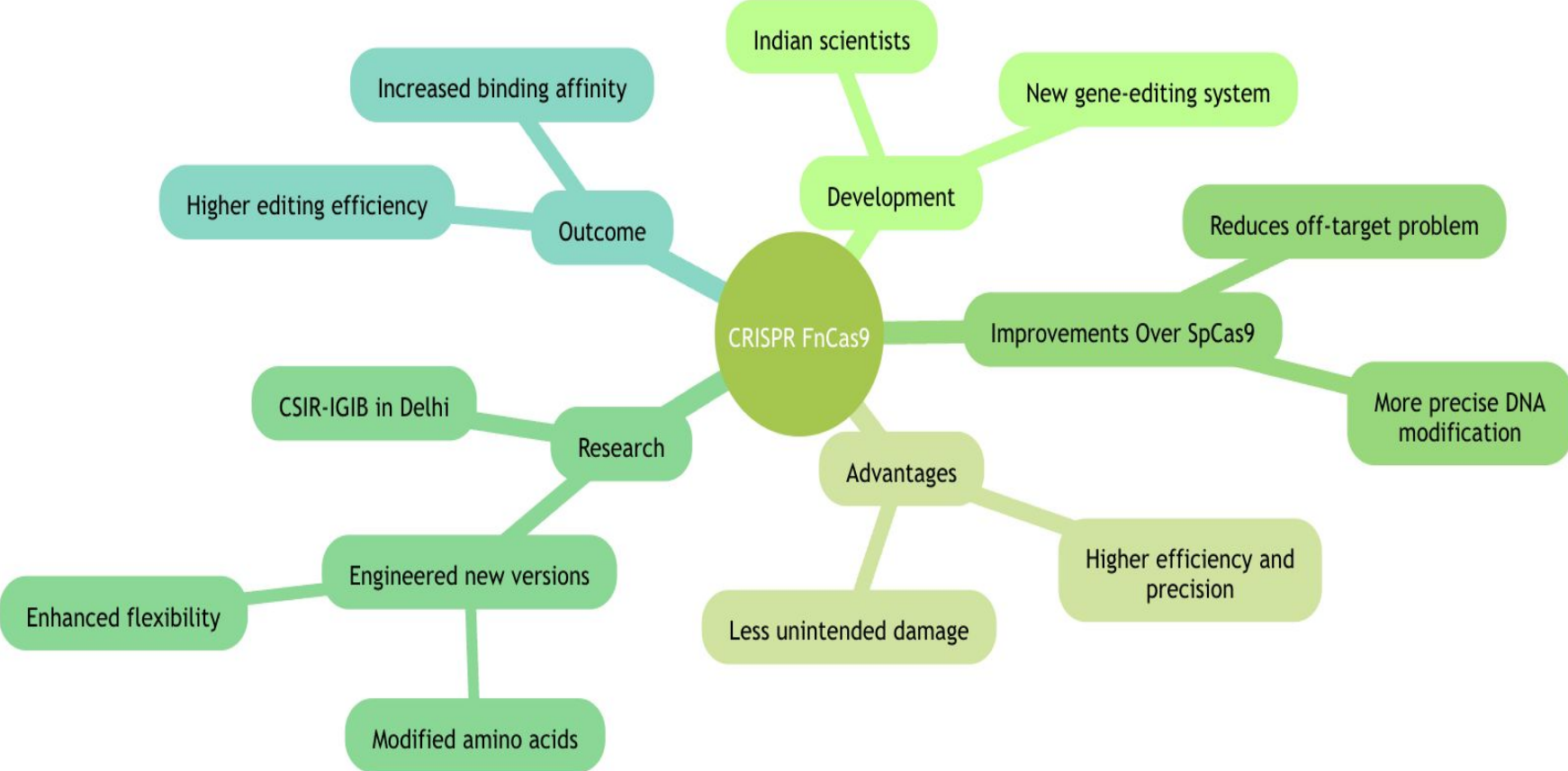


- **To overcome these issues, researchers are exploring Cas9 enzymes from *Francisella novicida* bacteria.**
- **While it has low efficiency, is highly precise, this Cas9, called FnCas9 is well.**
- **To enhance it without compromising specificity, researchers at CSIR-IGIB in Delhi recently tested lab-modified and engineered new versions of FnCas9.**
- **The researchers tinkered with amino acids in FnCas9 that recognise and interact with the PAM sequence on the host genome. "By doing this, we increase the binding affinity of the Cas protein with the PAM sequence," Dr. Chakraborty said.**
-



- **"The Cas9 can then sit on the DNA in a stronger configuration, and you've got editing moments much more efficient."**
- **The researchers also engineered the end regions of FnCas9 to be more flexible and released the PAM on the genome at the otherwise harder to access. "This opens up more avenues for gene editing**

figures:
figure 1.1 mindmap:



Topic-2 Can States tax mining activities? (Polity)



Why was an earlier judgment on the matter by a seven-judge Bench called into question?

What are the provisions of the Mines and Minerals (Development and Regulation) Act, 1957? Are royalties the same as tax? What did the latest verdict on the issue state

- **The story so far:**

- In a landmark ruling on July 25, the Supreme Court affirmed that States have the legislative authority to impose taxes on minerals in addition to the royalty levied by the Centre.
- Upholding the principles of federalism, the verdict clarified that the power of State legislatures to tax mineral activities within their respective territories is not constrained by Parliament's Mines and Minerals (Development and Regulation) Act, 1957 (MMDR Act).



- **The case which has been pending for more than a quarter century was decided by an 8:1 ruling with Chief Justice of India (CJI) N.V. Ramana authoring the majority opinion.**
- **Justice B.V. Nagarathna gave a dissenting opinion where she cautioned that allowing States to impose additional levies could hinder the development of the nation's mineral resources and disproportionately advantage mineral-rich States.**



- **The Mines and Minerals (Development and Regulation) Act, 1957 (MMDR Act) provides the framework for the regulation of mining activities in India.**
- **It requires those who obtain leases to conduct mining activities to pay "royalty" in respect of any mineral removed to the individual or corporation who leased the land to them.**



What was the case?

- **Section 9 of the MMDR Act requires those who obtain leases to conduct mining activities to pay "royalty" in respect of any mineral removed/ to the individual or corporation who leased the land to them.**
- **The key question for consideration was whether the royalties paid by mine leaseholders to State governments under the 1957 Act could be classified as "tax."**
- **Additionally, the court needed to determine whether or if the Centre could impose such charges the Centre States possessed the sole authority to levy them within their jurisdictions.**



- **The case has its genesis in a dispute between Central Cement Ltd and the Tamil Nadu government which arose after the company incurred a mining lease in Tamil Nadu.**
- **Although the government already pegs a royalties, Indian Tax and was receiving an additional tax on the imposed payments, including royalties.**
- **The company challenged this in the Madras High Court contending that the taxes on royalties effectively constitute a tax on royalties, the imposition of which exceeded the State's legislative authority.**

⋮



- **In 1989, a seven-judge Bench of the Supreme Court in India Cement Ltd. v. State of Tamil Nadu decided in favour of India Cement by restraining the States to not impose taxes on mining activities and pointed out the tax on royalty payments likely overstepped the outer government control over the authority over the development of minerals by mineral regulation, as specified under §54 of the "Union list" under Entry 54 (in this case, the 1957 Act).**
- **Thus, States are not empowered to levy additional taxes on this subject.**
- **What is the difference between royalty and tax?**
 - **The majority ruling clarified the distinction between royalty and tax. It deemed royalty as "the contractual consideration"**



Can States tax mining activities?

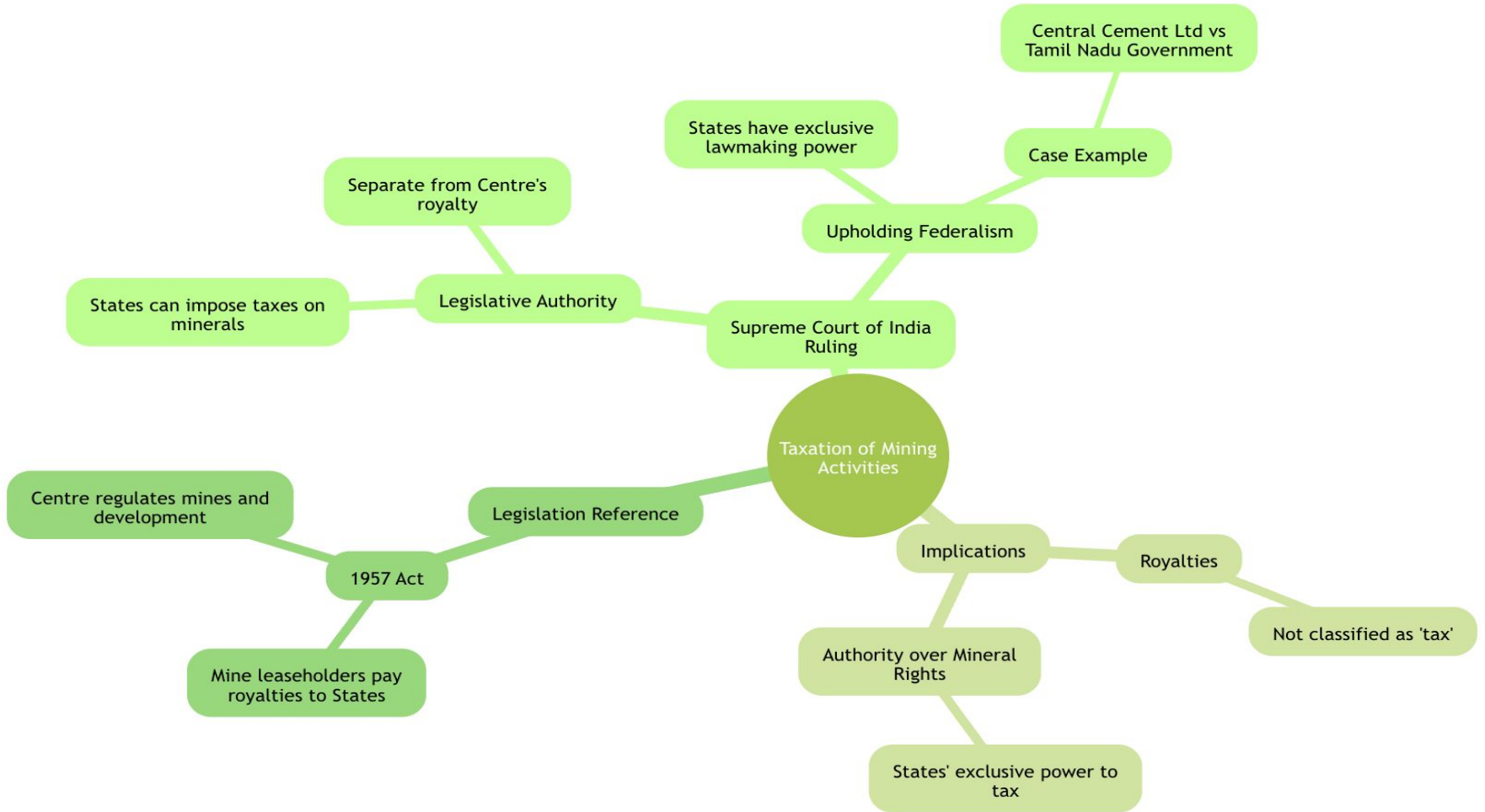
Entry 50 of the State List under the seventh Schedule of the Constitution gives States the exclusive authority to make laws regarding “taxes on mineral rights”, but this power is limited by any laws Parliament may pass concerning mineral development.

On the other hand, Entry 54 of the Union List gives the Centre the power to regulate “mines and mineral development,” especially when Parliament decides it is necessary in public interest.



- **During the proceedings, the Centre argued that Entry 50 in the State List had allowed Parliament to impose “any limitations” on taxes on mineral rights through the promulgation of laws relating to mineral development — in this case, the 1957 Act.**
- **However, the majority reasoned that since royalties could not be classified as a tax, they do not fall within the category of “taxes on mineral rights” as defined in Entry 50 of the State List.**
- **As a result, it was held that the 1957 Act merely provided States with another source of revenue through royalties, without interfering with their authority to levy taxes on mineral rights under Entry 50**

figure 1.1 mindmap:



Topic-3-The Inflation Reduction Act (IRA) (International relations)



- The Inflation Reduction Act (IRA) is a significant piece of legislation in the United States that was signed into law on August 16, 2022.
- It is designed to address several key issues, including climate change, healthcare, and tax reform, with a primary goal of reducing inflation and improving the economy.

Some of the key provisions and aspects of the Inflation Reduction Act:

Climate and Energy:

The IRA includes provisions that aim to combat climate change by investing in clean energy and reducing greenhouse gas emissions.

It provides subsidies and tax credits for consumers purchasing electric vehicles and home energy efficiency improvements, as well as incentives for renewable energy production and storage.





Healthcare: The Act extends the Affordable Care Act subsidies through 2025, which helps reduce premiums for millions of Americans buying health insurance on the exchanges.

- It also allows Medicare to negotiate prices on certain prescription drugs for the first time, potentially leading to lower drug prices for Medicare beneficiaries



Tax Reform:

- **The IRA includes a 15% minimum tax on corporations with more than \$1 billion in profits, aiming to ensure that large corporations pay their fair share of taxes.**
- **It also provides funding for the Internal Revenue Service (IRS) to improve tax enforcement, which is expected to lead to increased tax revenue from wealthy individuals and corporations who may have been underpaying their taxes.**



Deficit Reduction: The Congressional Budget Office (CBO) estimated that the IRA would reduce the federal deficit by about \$300 billion over ten years, which is one of the ways the Act is expected to help combat inflation.



Inflation Targeting: While the Act is named the "Inflation Reduction Act," its impact on inflation is subject to debate.

Some economists believe that the measures taken to address climate change and healthcare will have a positive effect on the economy over the long term, potentially reducing inflationary pressures. Others argue that the short-term impact on inflation may not be as significant.



- **The Inflation Reduction Act is considered a major legislative victory for the Biden administration and Democrats in Congress, as it represents a significant step towards addressing some of the country's most pressing issues.**
- **The Act's long-term effects on the economy, inflation, and the environment will be closely watched in the coming years**

figures:

figure 1.1 mindmap:





Topic -3 The Yazidi community (Prelims)

- **The Yazidi community is an ethnoreligious group indigenous to the Kurdish regions of Iraq, specifically the Nineveh Plain in the north of the country, with smaller communities in neighboring countries such as Syria, Turkey, and Armenia.**
- **The Yazidis are known for their unique religion, which is monotheistic but incorporates elements of angel worship and has a complex cosmology that includes several divine beings and spirits.**

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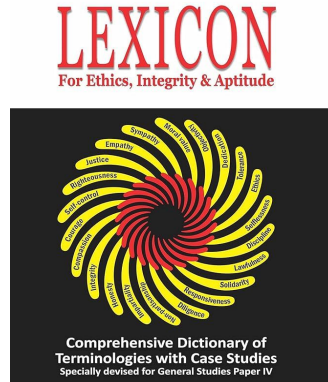
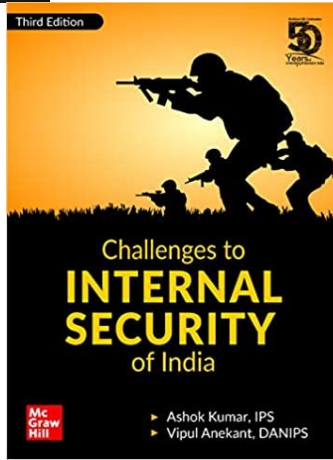
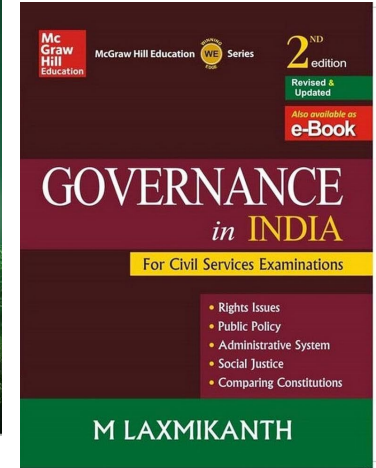
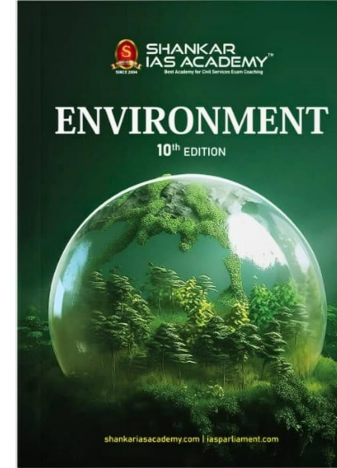
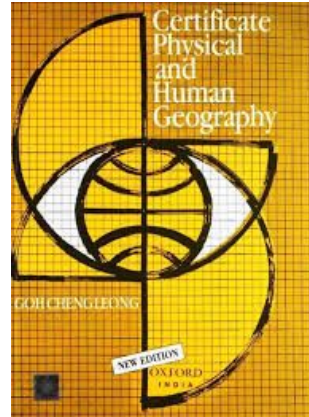
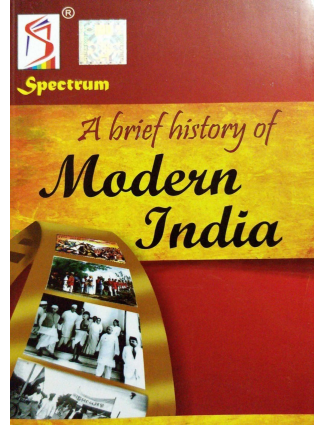
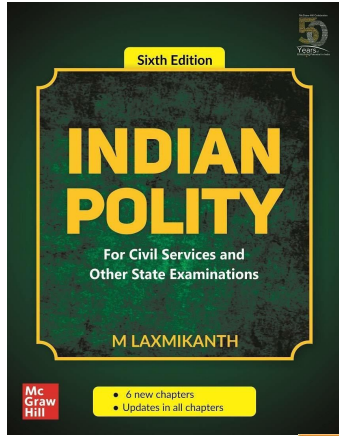
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