Topics - MINDS MAPS included

SAURABH PANDEY

CSE

ENGINEER BANGERING

ROM BANGE TO UPPE BRILLANG

- Cities growth and urbanisation
- Climate change and food security
- India's Geopolitical Engagement in South Asia
- Conflict Between Sudan Armed Forces and Rapid Support Force
- Collegium system versus NJAC
- Deception detection tests (DDTs)
- Mains





Topics - MINDS MAPS included

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ROM FARSE TO UPPE RESILANCE

- Zinc Roofs
- Unified pension scheme
- How Does Space Stay Affect Astronauts?
- Morality Law in Afghanistan Against Women
- Songbirds and Zebra finches
- Honey bees in virus transmission
- Fireflies
- Mains





Target Mains -2024/25 -

Q "New phase of urbanisation requires new types of urban infrastructure growth" Discuss

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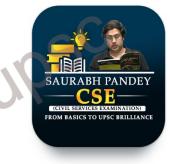
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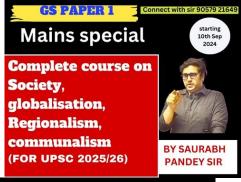
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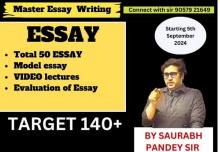
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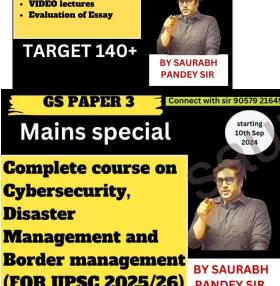
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Topic- Cities growth and urbanisation

- Cities around the world, but especially in Asia, are growing upwards faster than they are spreading outwards, a new study published in Nature Cities has found.
- In an increasingly urban and urbanising world, taller buildings can accommodate more people in less space but they can also negatively affect existing infrastructure, the local environment, and even the climate.
- "Urban population, roughly from 1990 to 2020, increased by about two billion people,



- Vertical growth can increase population density, and if the costs are reasonable, can also house many more people (i.e. greater density).
- But such growth needs to be supported with more jobs and good public transport to reduce transport emissions and improve walkability.
- Strong infrastructure with decent sewage and water systems are also required to sustain a large number of people.
- Taller buildings will also need specialised resources and will have a greater energy demand.

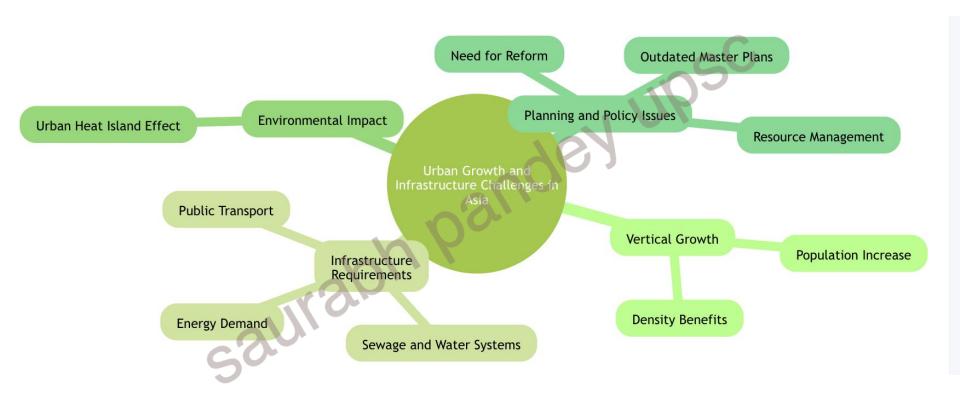


- the majority of Indians are still in rural, dispersed settlements,
 which he said are more efficient and climate-resilient.
- More tall buildings without any tree cover can also cause an urban "heat island" effect, which can affect temperatures and rainfall in cities.



- Most cities and States in India, including Bengaluru, are working with dated master plans, which decide how land will be occupied by different urban structures.
- Most existing planning laws don't even acknowledge transportation, energy, water, resources, waste-water management, and solid waste,
- "We need to revisit and rewrite our master planning acts, with a more progressive law that is enforceable and can stand the test of time,"







Topic-Climate change and food security

- Grappling with a rice shortage after extreme weather ravaged last year's crop, Japan is hoping new heat-resistant varieties of its staple food can help stave o□ future supply shocks.
- Last summer's high temperatures and dry conditions led to lower rice yields in key growing regions and damaged the quality of grains



- The local government in Saitama, a prefecture north of Tokyo that is one of the hottest regions in Japan, hopes science can avert future shortages and is pushing ahead with one of several projects to develop more resilient rice.
- High heat disrupts the accumulation of starch inside rice grains, causing them to appear more opaque, mottled with white □flecks and less desirable for human consumption, impacting the crop's market value.
- "The more this cloudy, white phenomenon there is on rice, the grade of rice decreases, which leads to declines in farmers' income,"



Topic-India's Geopolitical Engagement in South Asia 🌏

Overview

India's Role in South Asia: India acts as a stabilizing force in the region.

Geopolitical Interests: Focus on fostering relationships while navigating challenges.

Key Relationships

Sri Lanka 🗓

Financial support during crises.

Strengthened bilateral ties.

Maldives **Maldives**

Support for the new government.

Efforts to stabilize relations.

Afghanistan

Engagement with the Taliban to secure interests.

Historical investment in local projects.



Nepal ≿

Friendship amidst political instability.

Lessons learned from previous pressure tactics.

Challenges

Myanmar 🔀

Risk of civil war.

Need for engagement with ethnic groups.

Bangladesh 🔳

Struggle for democracy.

Building understanding with diverse political parties.



India's Developmental Support

Influence through Development: Projects beneficial for local populations.

Long-term Engagement: Importance of sustained relations for stability.

Future Directions

Democratic Resilience: Support for democratic movements.

Regional Cooperation: Collaborate against anti-India forces.

Engagement Strategy: Proactive involvement in regional development.





Topic- Sudan /WANA

West Asia-North Africa (WANA).

- The conflict between the Sudan Armed Forces (SAF) led by General
 Abdel Fattah al-Burhan and the Rapid Support Force (RSF) led by Gen.
- Mohamed Hamdan Dagalo, also known as Hemayti ("My Protector") has devastated Sudan.
- The estimates vary widely, but the □gures are horriffic: up to 1,50,000 deaths, nearly 10 million people displaced, of whom 2.5 million have been forced abroad.





Conflict Between Sudan Armed Forces and Rapid Support Force

Overview of the Conflict

Key Players:

Sudan Armed Forces (SAF) led by General Abdel Fattah al-Burhan Rapid Support Force (RSF) led by Gen. Mohamed Hamdan Dagalo ("Hemayti")

Impact:

Estimated 150,000 deaths

Nearly 10 million displaced (2.5 million forced abroad)



Foreign Involvement:

Geostrategic interests from various countries Resources:

Natural resources: crude oil, gold, fertile land

The conflict has led to a humanitarian crisis, with devastating socio-economic impacts and foreign interests exploiting the situation



Foreign Interests and Involvement

Egypt: Supports SAF

Iran: Supports SAF

Russia:

Wagner Group supports RSF

Interest in a naval base in Port Sudan

United Arab Emirates (UAE):

Top backer of RSF

Supplies weapons and laundered gold

Chad and Libya: Support RSF through military and resources

Mercenaries:

Involvement from South Sudan, Russia, and Ukraine





Topic-Collegium system versus NJAC



- The problem of appointment of judges, which is linked to the problem of pendency of cases, has always been a matter of debate in India.
- Delays in appointments are often caused by a standoff between the executive and the judiciary.
- This was exacerbated when the Supreme Court struck down as unconstitutional the National Judicial Appointments Commission (NJAC) Act, 2014, and the 99th Constitution Amendment, 2014, which sought to give politicians and civil society a □nal say in the appointment of judges to the highest courts.

- The Court held that the collegium system, which is in place, protects the independence of the judiciary.
- Since the world over, the judiciary is not the sole body which appoints judges, this argument has always appeared weak.
- Furthermore, the collegium system has frequently been criticised for its lack of accountability and transparency, and the prevalence of nepotism.
- Parliament in its wisdom enacted the NJAC Act.



- The proposed body would have replaced the collegium system.
- In order to give it credence, the NJAC was to be headed by the Chief
 Justice of India, and include the Law Minister, two eminent persons, and
 two senior judges.
- The judiciary contended that the NJAC would give the government excessive control over selection of judges, therefore undermining its independence.
- The Court determined that the NJAC may jeopardise impartiality and objectivity in the appointment process, thus endangering judicial independence



- Eg Many countries have switched to an appointments commission system.
- South Africa has a Judicial Service Commission (JSC) that advises the President to appoint judges.
- The current JSC comprises the Chief Justice of South Africa, the
 President of the Supreme Court of Appeal, a Judge President, the
 Minister of Justice, two practicing advocates, two practicing attorneys, a
 professor of law, six persons designated by the National Assembly, four
 persons designated by the President, and four permanent delegates to
 the National Council of Provinces



- In France, the President of the Republic holds the constitutional duty to safeguard the independence of the judiciary but does not directly select judges.
- Judges are chosen through a process involving the High Council of the Judiciary (Conseil Supérieur de la Magistrature) or, in the case of lower courts, by the Minister of Justice who may consult or receive advice from the High Council.

Reworking NJAC



- The NJAC was an elegant reform. It could have resulted in faster nominations of judges because of its democratic structure.
- In its present form, the collegium system, under which the Chief Justice along with four/two senior-most Supreme Court judges, recommend appointments and transfers of judges, is opaque. No one knows what the criteria are to select judges.
- The system offers room for favouritism, which could prevent competent and deserving judges from being appointed.
- Despite its supposed faults, the NJAC can be reworked by taking into account the views of the judiciary, the executive, and civil society, and the need to strike a balance between judicial independence and accountability.



- The NJAC could provide a more efficient method of appointing judges, encouraging communication between the arms of the state, and addressing some of the perceived drawbacks of the collegium system.
- The way forward ultimately necessitates a nuanced strategy that balances the justi able concerns of all parties involved and guarantees that the new system will increase efficiency without jeopardising the integrity of judicial appointments.



Figure 1.2: Key Comparisons



Topic-What are deception detection tests?

- Deception detection tests (DDTs) are scientific procedures employed to detect probable deception during interrogation. These tests include narco-analysis, polygraph tests, and brain mapping.
- A polygraph test operates on the presumption that speci □ c
 physiological responses are triggered when a person is lying.
- Typically, the test is administered by attaching instruments like cardio-cuffs or sensitive electrodes to the suspect to measure variables such as blood pressure, galvanic skin response (a proxy for sweat), breathing and pulse rate.



- As questions are posed, each physiological response is assigned a numerical value to determine whether the individual is telling the truth or being deceptive.
- In contrast, narco-analysis involves the injection of a drug called sodium pentothal into the accused, inducing a hypnotic or sedated state.
- The assumption is that a subject in such a state is less inhibited and is more likely to divulge information.
- Because the drug is thought to weaken the subject's resolve to lie, it is often referred to as a "truth serum."



- The third method, brain mapping, measures a subject's neural activity
 speci□cally brainwaves using electrodes attached to the face and neck.
- It operates on the principle that the brain generates distinctive brainwaves when exposed to familiar stimuli, such as an image or a sound.



- the Supreme Court in 2010 in the case of Selvi vs. State of Karnataka ruled that no lie detector tests should be administered "except on the basis of consent of the accused" in accordance with the fundamental right against self-incrimination as enshrined under Article 20(3) of the Constitution.
- A Bench comprising former Chief Justice of India (CJI) K.G.
 Balakrishnan and Justices R.V. Raveendran and J.M. Panchal further elucidated that a person's right to make a statement or remain silent is integral to their right to privacy.
- Thus, they underscored, compelling an individual to make a statement would also constitute a violation of Article 21 of the Constitution.

- The Court also noted that little empirical evidence is present to bolster the argument that these tests provide reliable leads for investigators.
 It accordingly cautioned that the results of these tests cannot be regarded
- It accordingly cautioned that the results of these tests cannot be regarded as "confessions." However, if any information or material is subsequently discovered "with the help of voluntarily administered test results," such evidence can be admitted in court.
- For instance, if an accused discloses the location of a murder weapon during the test, and the investigating agency later □ finds the weapon at that location, the accused's statement itself will not be admitted as evidence, but the weapon will be.
- The Court further mandated that individuals volunteering for such tests must have access to a lawyer and be apprised of the physical, emotional, and legal implications of undergoing the test.
- Additionally, it required that the subject's consent be formally recorded before a judicial magistrate and that the guidelines set out by the National Human Rights



Topic-Zinc Roofs

- The zinc covering the roofs of central Paris has given the French capital's skyline its distinctive grey hue for almost two centuries.
- Now the roofs and the workers who create and care for them are aiming to enter a select heritage club to showcase a profession adapting to the challenges of climate change.
- The French Culture Ministry has chosen the zinc roofers as the country's entry for the UNESCO list of Intangible Cultural Heritage to be decided at the UN body's session in Paraguayan capital Asuncion in December





Introduction to the Unified Pension Scheme

- **Government Initiative**: The Unified Pension Scheme (UPS) is a comprehensive retirement benefit program initiated by the government to streamline and integrate diverse pension schemes into a single, unified system.
- Eligibility Criteria: To qualify for the UPS, employees must have completed a minimum of 25 years of service, ensuring long-term financial security and stability during retirement.
- Key Objective: The primary goal of the UPS is to provide a guaranteed and sustainable pension to government employees, ensuring a dignified post-retirement life.

1.2: Employer Contribution and Structure



- **Employer Contribution**: Under the UPS, the employer's contribution is set at 18.5% of the employee's basic salary and dearness allowance, ensuring a robust financial foundation for the pension fund.
- **Pension Calculation**: The pension amount is calculated as 50% of the average basic pay drawn over the last 12 months, providing a reliable and consistent source of post-retirement income.
- **Lump Sum Payment**: Employees are also entitled to a lump sum payment at the time of superannuation, calculated as 1/10th of the monthly pension, offering additional financial flexibility.

1.3: Integration and Simplification

 Streamlined Process: The UPS integrates various pension schemes under a unified umbrella, simplifying administrative processes and ensuring greater efficiency in pension disbursement.

- Clarity and Transparency: By consolidating disparate schemes, the UPS offers greater clarity and transparency in pension-related matters, enhancing the overall experience for employees.
- **Expected Implementation**: The UPS is scheduled to be implemented from April 1, 2025, with an estimated reach of around 230,000 central government employees, signifying a significant milestone in pension reform.

: Ensuring Financial Security

- **Guaranteed Pension**: The UPS assures a guaranteed pension to employees who have completed the minimum qualifying service period, providing a reliable source of income post-retirement.
- Long-Term Benefits: With a focus on sustainability, the UPS offers a proportional pension or a fixed amount of Rs. 10,000 per month, ensuring long-term financial security for retirees.
- Enhanced Retirement Benefits: The UPS represents a substantial enhancement in retirement benefits for government employees, offering a secure and dignified post-service life.

Benefits and Features of the Scheme



Financial Stability and Predictability

- Stable Pension Structure: The UPS provides a fixed pension amount, offering employees 50% of their average pay over the preceding 12 months after 25 years of service, ensuring financial stability during retirement.
- **Predictable Retirement Income**: With a focus on predictability, the UPS offers a guaranteed pension of 50% of the average basic pay drawn over the last 12 months, providing retirees with a reliable source of income.
- **Long-Term Financial Planning**: The UPS empowers employees to engage in effective long-term financial planning, ensuring a secure and stable post-retirement financial outlook.

Implementation and Outreach



- **Scheduled Implementation**: The UPS is set to be implemented from April 1, 2025, marking a significant milestone in pension reform and ensuring that eligible employees can access its benefits in a timely manner.
- Reach and Coverage: With an estimated reach of around 230,000 central government employees, the UPS is poised to have a substantial impact on retirement benefits and financial security across a wide demographic.
- Government Commitment: The implementation of the UPS reflects the government's commitment to enhancing retirement benefits and social security for its employees, underscoring its dedication to long-term financial well-being.



Topic- How Does Space Stay Affect Astronauts? 🚀

Key Points

Physical Changes: Astronauts experience changes in muscle mass, bone density, and cardiovascular health.

Psychological Effects: Isolation and confinement can lead to stress, anxiety, and depression.

Health Risks: Conditions like space anemia and fluid shifts pose significant health threats.

Adaptation Strategies: Exercise, nutrition, and psychological support are essential for maintaining astronaut health.



Figure 1.1: Mindmap





What is "space omics"?

"Space omics" is a set of studies involved in understanding all the ways in which the body can be a □ected by the space environment



Topic- Morality Law in Afghanistan Against Women

- Recent developments in Afghanistan's morality laws targeting women's rights
- Implications for women's freedom and safety
- International response and condemnation







Topic- Songbirds and Zebra finches

- A study on songbirds sheds light on the power of social interaction to facilitate learning, insights that potentially apply to human development.
- Researchers discovered that zebra □finches deprived of early social experiences could still form strong bonds with a partner later.
- Once placed into cohabitation with a male, females that had never heard a mating song before could quickly develop a preference for his melody.

Zebra Finches 🐦



Overview of Zebra Finches

Scientific Name: Taeniopygia guttata

Habitat: Native to Australia

Diet: Seeds, fruits, and insects

Communication and Behavior

Song:

Males sing to attract females 🎶

Complexity of songs influences mate choice

Courtship:

Visual displays during mating rituals Importance of physical presence in courtship

Research Insights



Mate Selection:

Females prefer males with specific song patterns
Studies on song learning and hemisphere dominance

Environmental Impact:

Effects of noise pollution on nesting and growth
Behavioral responses to mirrors and self-recognition tests



Conservation and Challenges

Threats:

Habitat loss due to urbanization

Impact of climate change on breeding patterns

Conservation Efforts:

Importance of habitat restoration

Awareness and education on their ecological role



Topic - Honey bees in virus transmission

- Honey bees may play a role in increasing virus levels in wild bumble bees each spring, according to researchers who analysed seasonal trends of parasite and virus transmission in bees.
- It found that honey bees had higher levels of viruses. While both types
 of bees had lower virus prevalence in the winter, only bumble bees
 experienced negligible levels by spring.
- Honey bees may be reinfecting bumble bees that otherwise would have very low virus prevalence.

Topic- Fireflies



- Fireflies rely on □flashing signals to communicate with other □fire□flies using light-emitting lanterns on their abdomens.
- In □fireflies of the species Abscondita terminalis, males make multi-pulse □ashes with two lanterns to attract females, and females make single-pulse □ashes with their one lantern to attract males.
- Researchers now have evidence that an orb-weaving spider (Araneus ventricosus) manipulates the □ashing signals of male □fire□flies ensnared in its web such that they mimic the typical □ashes of a female □ fire□fly, thereby luring other males to serve as their next meal.
- They found that the spider's web more often captured male □fire□flies when the spider was present





- manganese, selenium, and vitamin B6: three human nutrients that garlic is particularly rich in. Many of the other constituents – thiosul □ nates, lectins, saponins and □ flavonoids, to name a few - can play protective roles in humans too.
- It is not surprising that humans have a long history of incorporating garlic into their diets. Sumerian clay tablets from 4000 years ago have recipes that use garlic



- Allicin is not present in fresh garlic. It is produced when an odour-free precursor called allicin is acted upon by an enzyme.
- The two are brought together when garlic is chopped, crushed, or even chewed
- Allicin interacts with receptors found on sensory neurons in the trigeminal nerve, which gathers sensations from the mouth and the nose.
- The pungent taste of garlic is a result of this interaction.



- Allicin and other garlic constituents such as diallyl disulphide de have an influence on inflammatory processes.
- Beneficial effects include the regulation of blood pressure and positive trends in cardiovascular health.
- Another constituent, the □flavonoid luteolin, inhibits the formation and aggregation of amyloid beta plaques, which are major hallmarks of Alzheimer's disease.



- Impressive varieties of garlic such as the Riya van come from Neemuch and Ratlam in Madhya Pradesh, the largest garlic-producing State.
- In South India, Karnataka's Gadag local varieties, with their strong, pungent □flavor and aroma sell very well.
- And then there are the Kashmiri varieties

The first step towards targeted chemotherapy

IACS researchers have discovered a new target for killing cancer cells

- The new target that has been discovered is used by cancer cells to regulate DNA repair during cell division
- Cancer cells can develop resistance to treatment by using intrinsic DNA repair mechanism
- A combinatorial targeting of two key molecules — the CDK1 protein and the TDP1 enzyme — may lead to novel anti-cancer therapeutics
- Currently, anti-cancer drugs target a molecule
 (Top1) involved in DNA replication and transcription
- While drugs that target
 Top1 can disrupt its activity
 leading to the death of
 cancer cells, cancer cells
 can activate their repair
 mechanisms to counteract
 the drug effects
- Targeting another protein (CDK1) that disrupts the Top1-mediated repair process can potentially kill the cancer cells



IACS researchers are currently using mouse models to test the combination drug therapies using in vivo tumours

 Combining CDK1 inhibitors with Top1 inhibitors can prove lethal for cancer cells





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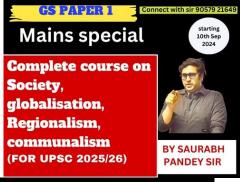
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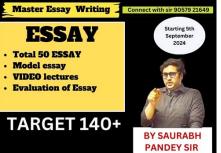
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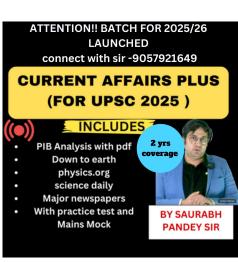
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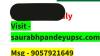






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