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By saurabh Pandey

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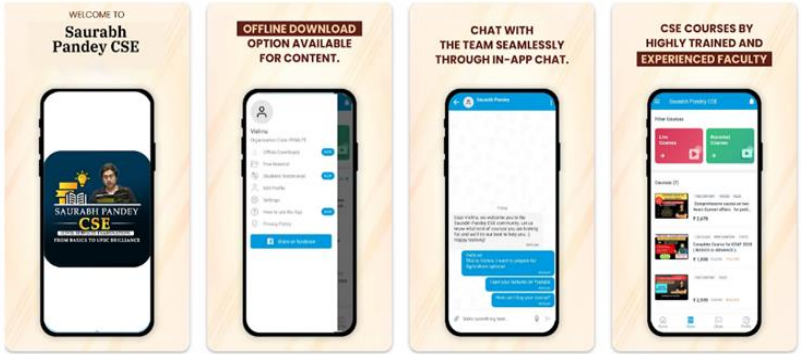

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India ready to host its first multinational air exercise 'Tarang Shakti' in August

Dinakar Peri
NEW DELHI

The Indian Air Force's first multinational air exercise, Tarang Shakti-2024, will be held in August, and is likely to see the participation of 10 countries, in addition to a few others acting as observers.

"Enriched with the Red Flag exercise experience, the IAF keenly looks forward to hosting the participating contingents from other countries during Tarang Shakti-2024, which is the first ever Indian multinational air exercise to be held later this year," the IAF said on Sunday in a statement on the just concluded Red Flag exercise hosted by the U.S. Air Force.

The plan is to invite friendly foreign countries with whom the IAF interacts regularly and has a certain degree of interoperability, officials said. Tarang Shakti was earlier planned to be held at the end of 2023, but got deferred. The exercise is now scheduled to be held in two phases.

Two IAF Rafale jets being refuelled mid-air by an IL-78 aircraft on their way to Exercise Red Flag in Alaska.

The first will be held in southern India in the first two weeks of August and the second will be in the western sector from the end of August to mid-September, officials said. Some countries will participate in both phases, while others will join one of the two phases, it has been learnt.

Among the countries sending contingents are Australia, France, Germany, Japan, Spain, the United Arab Emirates, the United Kingdom, and the United States. Germany will deploy fighter jets and also an A-400M transport aircraft, as reported by *The Hindu* earlier. The A-400M aircraft will be on showcase for the IAF, given that it is a contender for the open tender for medium transport aircraft.

U.S. event

The Red Flag exercise, hosted by the U.S. Air Force (USAF) from June 4 to 14, concluded at the Eielson Air Force Base, Alaska. This was the second edition of Red Flag this year; the exercise is hosted four times a year by the USAF. Apart from the IAF, this edition saw the participation of the Singapore Air Force, the U.K.'s Royal Air Force, the Royal Netherlands Air Force, and the German Luftwaffe. The IAF deployed eight Rafale fighters, a first at Red Flag, supported by IL-78 mid-air refuellers for the transatlantic ferry, as well as C-17 Globemaster aircraft.

Tarang Shakti 2024

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PM to release Kisan Samman Nidhi fund

The Hindu Bureau
LUCKNOW

Prime Minister Narendra Modi will visit Varanasi, his Lok Sabha constituency in Uttar Pradesh, on Tuesday for the first time after taking oath for a third consecutive term.

He is expected to release the 17th instalment of the PM-Kisan Samman Nidhi, amounting to over ₹20,000 crore, for 92.6 million beneficiary farmers across the country.

Income support

The scheme, fully funded by the Union government, extends income support of ₹6,000 a year in three equal instalments to all land-holding farmer families, with a family defined as husband, wife, and minor children.

Earlier, on June 14, Uttar Pradesh Chief Minister Yogi Adityanath arrived in Varanasi to review preparations for Mr. Modi's visit. The venue for the programme is Mehndiganj, Sevapuri. Mr. Adityanath reviewed the Prime Minister's security, parking, public movement, and the routes planned.

During his visit, Mr. Modi will give away certificates to over 30,000 members of self-help groups trained as 'Krishi Sakhis' to work as para-extension workers, supporting fellow farmers in farm practices.

The Pradhan Mantri Kisan Samman Nidhi Yojana

- **The Pradhan Mantri Kisan Samman Nidhi Yojana is a central government scheme which aims to provide financial support to all small and marginal farmers of India.**
- **The Scheme offers additional financial aid to farmers for procuring diverse inputs needed for agriculture and related activities, including ensuring good crop yield and health while meeting their domestic necessities.**

- **PM-Kisan scheme aiding annually with the financial help of Rs. 6000 per year in 3 installments of 2000 to all landholding farmers' families of India.**
- **The Central Government of India is funding 100% for this scheme.**
- **The identification of the eligible farmer families will be done by the state and UT governments for the financial aid. In the scheme the monetary help will be directly transferred to the eligible beneficiaries bank account.**

Overview of PMKSNY	
Scheme	PM Kisan
Full-Form	PM Kisan Samman Nidhi Yojana
Date of Launch	24th February 2019
Scheme Objective	• To provide Financial support to all land-holding eligible farmer families • To double the income of farmers by 2022

Indirect evidence builds, yet the ‘dark’ universe remains murky

By mapping the position of thousands of galaxies over many years, we can keep measuring how much the universe's expansion is accelerating due to dark energy. But for now, we have no choice but to draw all our inferences about dark matter and dark energy from indirect evidence alone

Qudsia Gani

The general theory of relativity has been very successful at explaining gravity and an astonishing array of other related phenomena, such as gravitational waves, gravitational lensing, gravitational red shift, the existence of black holes, and time dilation. This theory refines Isaac Newton's laws and provides a unified description of gravity as a geometric property of spacetime.

We have observed gravity operating at different scales, from microscopic to macroscopic. But as we zoom out to look at the universe as a whole, it seems as if space is permeated with a mysterious form of gravity-defying energy. This so-called dark energy – which physicists have come to believe is made up 70% of energy that the Big Bang blew out 13.8 billion years ago – creates a sort of negative pressure that stretches the fabric of spacetime and allows celestial objects like stars and galaxies to drift apart. This is in contrast to the Newtonian idea of gravity: as an attractive force that causes objects to come closer together.

In places with lots of matter, gravity has more of an effect than dark energy. But when space is empty of matter, dark energy dominates.

A ‘hidden’ universe

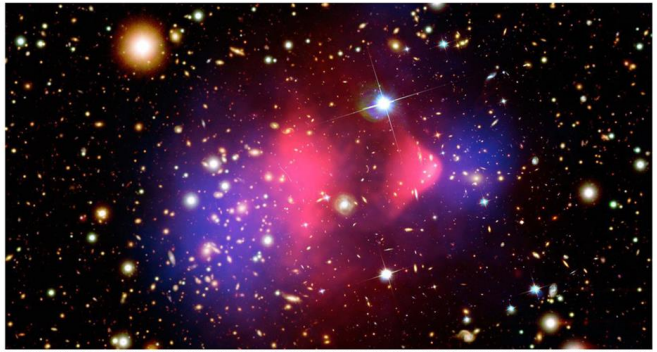
Similarly, based on some cosmological observations, researchers have proposed the presence of an invisible form of matter called dark matter. In fact, 44 years ago this month, astronomer Vera Rubin published her famous paper with indirect evidence about the need for dark matter.

Theories of gravity say the rotation rate is highest near the galaxies' centre and lowest at the outer rim. Yet scientists like Dr. Rubin found many rotating galaxies in which the velocities of the stars didn't decrease away from the galactic centre. One way to explain this is if the galaxy had more matter than was visible, exerting more gravitational force that pushed stars at the rim to move faster than they would otherwise. This additional matter is dark matter.

Both dark matter and dark energy are assumptions. They have a very strong hypothetical basis but we haven't been able to find physical evidence of them. Scientists postulated the existence of these two entities so that they can explain their observations without having to break the general theory of relativity.

Not all scientists agree with this approach. Some have attempted to create an alternate paradigm of gravity – one in which some unknown properties of the force could cause the observed phenomena without invoking dark matter or dark energy.

However, these alternatives suffer from an important problem: they don't explain away all the disparities, whereas the dark matter and dark energy hypotheses do.



The Bullet Cluster formed after the collision of two large clusters of galaxies. Most of the matter in the clusters (blue) is clearly separate from the normal matter (pink), indicating that nearly all of the matter in the clusters is dark. NASA/CXC/CFA/M. MARKEVITCH

What have we found?

If we need to fully understand the general theory of relativity, we need to figure out what dark matter and dark energy are. Many researchers are working on this around the world, including in India.

Their studies make heavy use of simulations to understand how the universe would look if there were certain kinds of dark matter or dark energy. For example, a study published on April 16 in the *Monthly Notices of the Royal Astronomical Society* by researchers in the U.S. reported being able to explain the observed behaviour of real galaxies and the motions of their stars and gases in simulations that assumed the galaxies contain dark matter.

We also have telescopes constantly making new observations of space. They have been becoming more sophisticated, allowing scientists to collect more fine-tuned data they can use to improve their theories.

For example, an April 11 paper in *The Astrophysical Journal Letters* reported that the James Webb Space Telescope had observed indirect evidence of normal

> The general theory of relativity refines Isaac Newton's laws and provides a unified description of gravity as a geometric property of spacetime

regular and dark matter in the ring of an old galaxy named JWST-ERIg.

When looking for something that is really hard to find, it's also useful if researchers share information about where they *couldn't* find dark matter, allowing others to focus on places where it can be. On March 28, for example, scientists published the first results of the Broadband Search for Dark Photon Dark Matter (BREAD) experiment. The preliminary data ruled out dark-matter particles in a certain mass range.

Turning on lambda

Similarly, the Dark Energy Spectroscopic Instrument (DESI) in Arizona, in the U.S., is attempting to make the largest 3D map of the universe.

This mountain-top telescope is fitted with 5,000 small robots that help it look 11 billion years into the past with greater precision than before.

So far, data from DESI has agreed at a basic level with the λCDM model of the universe, our best mathematical model to explain the Big Bang and the universe today. ‘CDM’ is short for ‘cold dark matter’.

λ (lambda) is the cosmological constant: it represents the energy density of space and is closely associated with dark energy. It appears in equations of the general theory of relativity. Some studies have found that dark energy might be changing with time, which is at odds with assumptions of the CDM model.

In fact, λ also makes a surprising appearance in the modified theories of gravity that some researchers have been working on. One of them is MOND, an acronym of ‘modified Newtonian dynamics’. It doesn't require the existence of dark energy; instead, it proposes that when gravity is weak, such as at the outer rims of large galaxies, it also behaves differently. While it enjoys some popularity, one research group reported on April 5 that data from the Cassini mission (1997-2017) showed no sign that Saturn's orbit had a slight deviation that MOND says there should be.

By mapping the position of thousands of galaxies over many years, we can keep measuring how much the universe's expansion is accelerating due to dark energy. But for now, we have no choice but to draw all our inferences about dark matter and dark energy from indirect evidence alone.

(Qudsia Gani is an assistant professor in the Department of Physics, Government Degree College Pattan, Baramulla.)

THE GIST

Dark energy apparently creates a negative pressure that stretches the fabric of spacetime and allows celestial objects to drift apart. In places with lots of matter, gravity has more of an effect than dark energy. But when space is empty of matter, dark energy dominates

Scientists found that in many rotating galaxies the velocities of stars didn't decrease away from the centre. One explanation is that the galaxy has more matter than visible, exerting gravitational force that pushes stars at the rim to move faster. This additional matter is dark matter

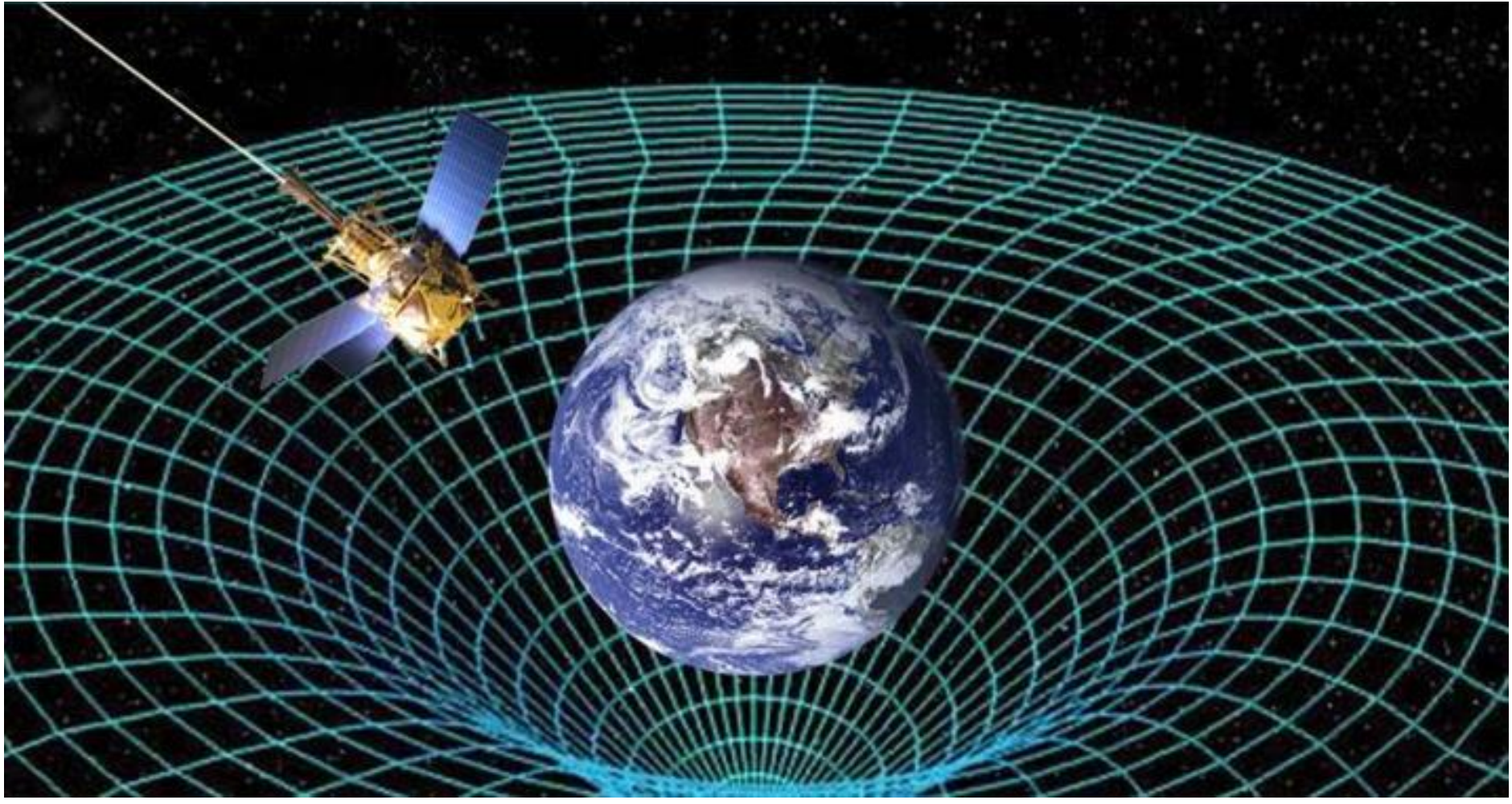
Dark matter and dark energy are assumptions. They have a very strong hypothetical basis but no physical evidence of them has been found. Scientists postulated the existence of these two entities so that they can explain their observations without having to break the general theory of relativity

- **T he general theory of relativity has been very successful at explaining gravity and an astonishing array of other related phenomena, such as gravitational waves, gravitational lensing, gravitational red shift, the existence of black holes, and time dilation.**
- **This theory refines Isaac Newton’s laws and provides a unified description of gravity as a geometric property of spacetime**

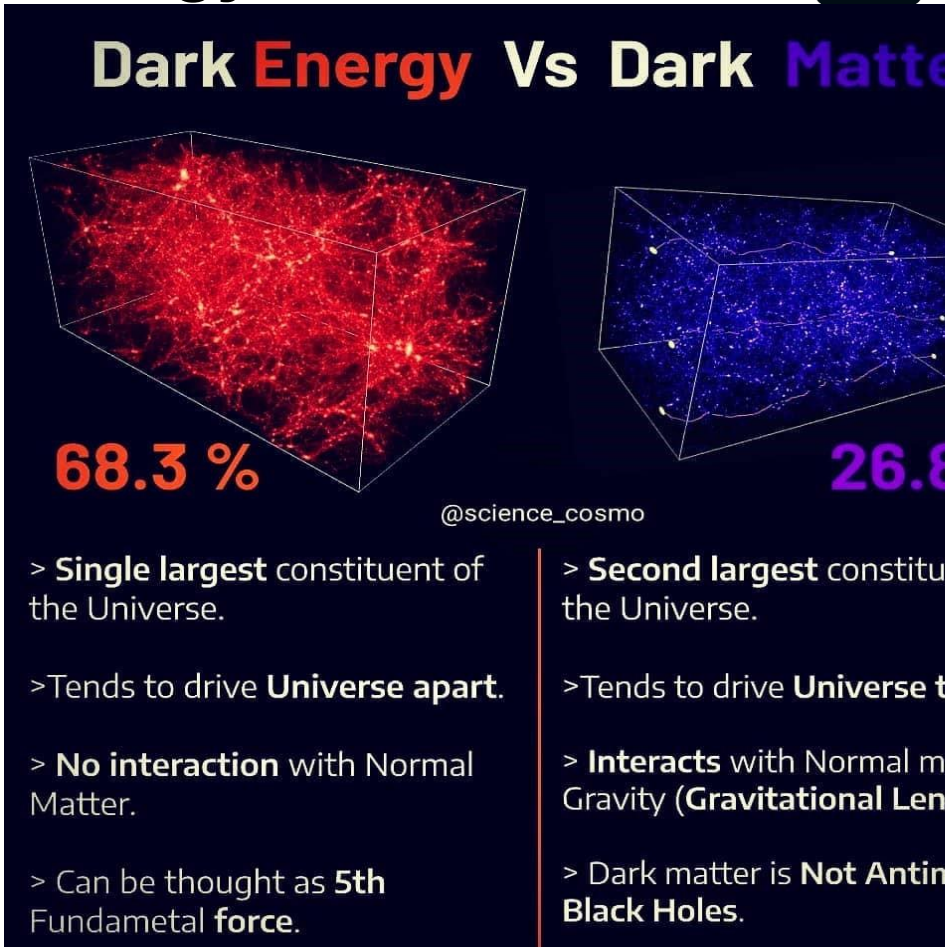
General theory of relativity

- General relativity is physicist Albert Einstein's understanding of how gravity affects the fabric of space-time.
- The theory, which Einstein published in 1915, expanded the theory of special relativity that he had published 10 years earlier. Special relativity argued that space and time are inextricably connected, but that theory didn't acknowledge the existence of gravity.

- General relativity follows from Einstein's principle of equivalence: on a local scale it is impossible to distinguish between physical effects due to gravity and those due to acceleration.
- Gravity is treated as a geometric phenomenon that arises from the curvature of space-time.
- The solution of the field equations that describe general relativity can yield answers to different physical situations, such as planetary dynamics, the birth and death of stars, black holes, and the evolution of the universe.



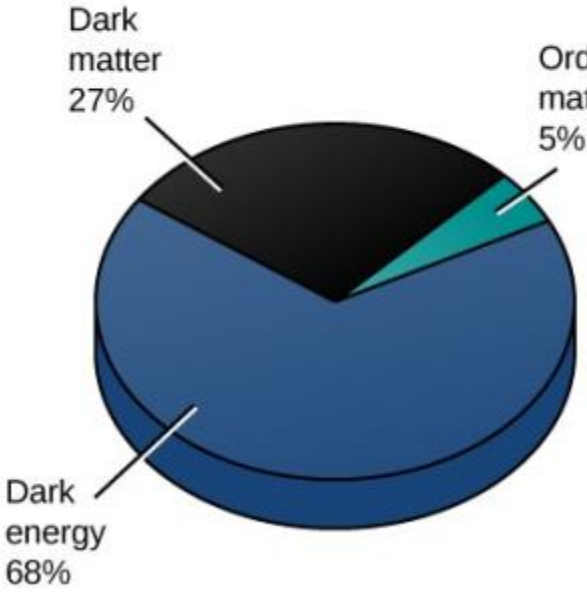
Dark matter and Dark energy



Composition of the Universe

Dark matter
27%

Dark energy
68%



Ordinary matter
4% H and He
<1% Stars
<1% Other

- **Dark matter isn’t simply dark: it’s invisible. Light of all types seems to pass through as though it’s completely transparent. However, dark matter does have mass, which we see by its gravitational influence.**
- **Studies of galaxies show stars and gas moving as though there’s a lot more mass than we can see pulling them along.**
- **Based on the motion of what we can observe, galactic dark matter resides in a “halo” surrounding the ordinary matter of the galaxy.**
- **Astronomers also study dwarf galaxies, which are less bright and therefore harder to observe, but which contain a higher fraction of dark matter than their larger cousins.**

- **Galaxy clusters can contain hundreds or thousands of galaxies, each of which have their own dark matter halo.**
- **However, the cluster has its own dark matter, which outweighs everything else put together. This dark matter influences how individual galaxies and hot gas move inside the cluster.**

- Dark energy apparently creates a negative pressure that stretches the fabric of spacetime and allows celestial objects to drift apart.
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- One explanation is that the galaxy has more matter than visible, exerting gravitational force that pushes stars at the rim to move faster.
- This additional matter is dark matter
- Dark matter and dark energy are assumptions.
- They have a very strong hypothetical basis but no physical evidence of them has been found.

- dark energy fills all space. It has repulsive gravity and is thought to be pushing galaxies apart and accelerating the expansion of the Universe. Whereas dark matter is a mystery, dark energy is perhaps the biggest mystery in the Universe
- **The Bullet Cluster** formed after the collision of two large clusters of galaxies.
- **λ (lambda)** is the cosmological constant: it represents the energy density of space and is closely associated with dark energy. It appears in equations of the general theory of relativity

WHAT IS IT?

Electromagnet: driven by current

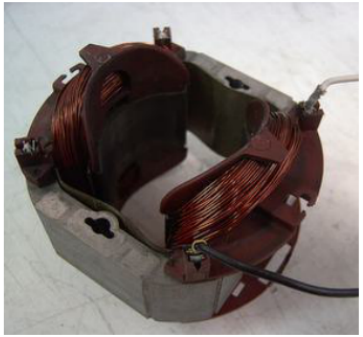
The Hindu Bureau

Invented in 1824 by the British physicist William Sturgeon, electromagnets are a fixture of modern life, appearing in loudspeakers, motors, magnetic resonance imaging (MRI) machines, maglev trains, and particle accelerators.

When an electric current flows through a wire, it creates a magnetic field around the wire. So when the wire is coiled, the magnetic field becomes concentrated in the coil's hole. This is an electromagnet: a device in which an electric current produces the magnetic field. When the wire is coiled around a magnetic material, the material — called the core — amplifies the strength of the magnetic field.

This is because ferromagnetic metals like iron already contain small magnetic fields inside their bulk produced by its atoms. Because these fields point in random directions, the fields cancel themselves out. When the iron is used as the core in an electromagnet and a current is passed, the magnetic field it produces penetrates the iron's bulk and forces the tiny fields to align along the external field's direction. This way, the domains' fields add to the external field, producing a stronger field overall.

A magnetic field will be produced as long as a current flows through the coil. When the current is switched off, some core materials remain weakly magnetised. In a superconducting electromagnet, such as in an MRI, superconducting wire is coiled around a core to produce magnetic fields of up to 30 tesla (600,000-times as powerful as the earth's). In Bitter electromagnets, current flows in wires coiled through a helical stack of electromagnets, producing magnetic fields of up to 40 tesla.



The stator of a vacuum cleaner showing two electromagnets. MARRRCI (CC BY-SA 3.0)

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Electromagnet

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Two steps back

India needs to close the gender gap in education and politics

Gender parity may be climbing upwards worldwide with the global gender gap standing at 68.5% closed in 2024, but the glacial pace of change – it was 68.4% in 2023 – is a grim statistic. At this rate, it will take 134 years to reach full parity, the Global Gender Gap report released by the World Economic Forum (WEF) last week pointed out, "roughly five generations beyond the 2030 Sustainable Development Goal (SDG) target". Iceland maintains its number 1 rank (93.5%), and is also the only economy to have closed over 90% of its gender gap. India has slipped two places to 129 out of 146 countries. Last year, it was ranked 127, after having jumped eight places from 135 in 2022. India has closed 64.1% of its gender gap in 2024, the report noted, leaving policy-makers with a huge window of opportunity to do better. The "slight regression," according to the report, is mainly due to "small declines" in the spheres of education and political empowerment. With a population of over 140 crore, even two steps back mean staggering numbers. Though India, it pointed out, had shown a slight improvement in economic participation and opportunity for the last few years, it would need 6.2 percentage points more to match its 2012 score of 46%.

One way of achieving the objective will be through bridging gender gaps in, say, the labour force participation rate (45.9%). To do that, a slew of measures must be in place, from ensuring that girls do not drop out of higher education, providing them job skills, ensuring safety at the workplace, and helping them keep a job after marriage by sharing responsibility for chores at home. In education, the gap between men and women's literacy rate is 17.2 percentage points wide, leaving India ranked 124th on this indicator. India has fared better in the political empowerment index, but women's representation in Parliament continues to be low. For confirmation, look no further than the newly elected Lok Sabha. Close to 800 women contestants were in the fray, but the number of women Members of Parliament has dipped to 74 from 78 (2019) of 543 members, which is 13.6% of the total. These numbers are not a good sign in the backdrop of the Women's Reservation Bill, 2023, yet to come into effect, which aims to reserve one-third of the seats in the Lok Sabha and State legislative Assemblies for women. All under-performing countries, including India, must heed WEF Managing Director Saadia Zahidi's words, calling for "Governments to strengthen the framework conditions needed for business and civil society to work together to make gender parity an economic imperative".

Gender gap report (world economic forum)

- **The global gender gap score in 2024 for all 146 countries included in this edition stands at 68.5% closed. Compared against the constant sample of 143 countries included in last year’s edition, the global gender gap has been closed by a further +.1 percentage point, from 68.5% to 68.6%.**
- **When considering the 101 countries covered continuously from 2006 to 2024, the gap has also improved +.1 points and reached 68.6%.**

Based on current data, it will take 134 years to reach full parity – roughly five generations beyond the 2030 Sustainable Development Goal (SDG) target. In addition:

- **The 2024 Global Gender Gap Index shows that while no country has achieved full gender parity, 97% of the economies included in this edition have closed more than 60% of their gap, compared to 85% in 2006.**
- **Iceland (93.5%) is again ranked 1st and has been leading the index for a decade and a half. It also continues to be the only economy to have closed over 90% of its gender gap. Out of the remaining nine economies in the top 10, eight have closed over 80% of their gap.**

- **European economies occupy seven spots out of the global top 10. In addition to Iceland, these include Finland (2nd, 87.5%), Norway (3rd, 87.5%), Sweden (5th , 81.6%), Germany (7th, 81%), Ireland (9th, 80.2%) and Spain (10th, 79.7%).**
- **The remaining three spots are occupied by economies from Eastern Asia and the Pacific (New Zealand, 4th, 83.5%), Latin America and the Caribbean (Nicaragua, 6th, 81.1%), and Sub-Saharan Africa (Namibia, 8th, 80.5%). Lithuania (11th, 79.3%) and Belgium (12th, 79.3%) dropped out of the top 10, with Spain and Ireland climbing +8 and +2 ranks, respectively, to join the top performers in 2024.**

- **Among the 146 economies covered in the 2024 index, the Health and Survival gender gap has closed by 96%, the Educational Attainment gap by 94.9%, the Economic Participation and Opportunity gap by 60.5%, and the Political Empowerment gap by 22.5%.**
- **Since 2006, subindexes have shifted at different paces, based on the constant sample of 101 countries.**
- **Overall, the most significant shift occurs in Political Empowerment, where parity has jumped a total of 8.3 percentage points to 22.8% over the past 18 editions. In Economic Participation and Opportunity and Educational Attainment, parity has gained 4.8 and 4.2 percentage points respectively.**

- Health and Survival is the only subindex where there has been a moderate decline from 2006 (-0.2 points).
    - With the evolving pace of each individual subindex affecting their respective timelines to parity, results from this year have extended the wait for parity in Educational Attainment to 20 years (+4 years from 2023) and Political Empowerment to 169 years (+7 years from 2023), yet brought forth the timeline for Economic Participation and Opportunity to 152 years (-17 years from 2023).

Case of india

- **With a population of over 140 crore, even two steps back mean staggering numbers.**
- **Though India, it pointed out, had shown a slight improvement in economic participation and opportunity for the last few years, it would need 6.2 percentage points more to match its 2012 score of 46%.**
- **One way of achieving the objective will be through bridging gender gaps in, say, the labour force participation rate (45.9%).**

- **To do that, a slew of measures must be in place, from ensuring that girls do not drop out of higher education, providing them job skills, ensuring safety at the workplace, and helping them keep a job after marriage by sharing responsibility for chores at home.**
- **In education, the gap between men and women's literacy rate is 17.2 percentage points wide, leaving India ranked 124th on this indicator. India has fared better in the political empowerment index, but women's representation in Parliament continues to be low.**

High Court's take on Marriage Act, an erosion of rights

A problematic order from the Madhya Pradesh High Court has given rise to the likelihood of a misinterpretation of the law around inter-faith marriages and a calling into question the scope of the Special Marriage Act, 1954. If unresolved, this could potentially lead to consequences contrary to the objectives of the Act, which sought to provide a viable legal avenue for inter-religious marriages.

The issue has risen out of a petition that sought protection for an inter-faith marriage, jointly filed by an unmarried Hindu-Muslim couple before the Madhya Pradesh High Court. While hearing the arguments, the High Court went into the question of whether such a marriage of "a Muslim boy with a Hindu girl" under the Act would constitute a "valid marriage or not". The High Court then proceeded to not grant police protection to the unmarried couple on the grounds that theirs would amount to an invalid marriage. By doing so, the High Court has reversed the gains in the jurisprudence on the right to choice of partner and has rewritten the well-settled objectives of the Special Marriage Act.

Manuraj Shunmuga-sundaram

is a media spokesperson for the Dravida Munnetra Kazhagam (DMK) and advocate practising before the High Court of Madras. He appeared for the petitioners in the case where the Madras High Court granted protection to a same-sex couple

Haripriya Venkatakrishnan

is an advocate practising before the High Court of Madras

The M.P. High Court order goes against the very basis of the Special Marriage Act

Erroneous considerations

It is common practice that when a petition seeking police protection is filed under Article 226 of the Constitution of India, the High Court looks into the violation of rights of the petitioners and the extent of threat faced by them. Such petitions are usually filed by couples in inter-faith and inter-caste marriages. However, it is now seen that even in cases of unmarried persons, High Courts have extended them protection after considering the various threats emanating from society. In similar circumstances, Justice N. Anand Venkatesh of the High Court of Madras recognised the precarious situation encountered by same-sex couples and granted police protection to a lesbian couple.

Similarly, the Punjab and Haryana High Court granted police protection to a live-in couple holding that "the key issue at hand is not the legality of the petitioners" relationship, qua which they may be liable for civil as well as criminal consequences in accordance with law, but whether they are entitled to protection of their fundamental right under Article 21 of the Constitution".

In contrast, the Madhya Pradesh High Court, without weighing in on the real and apparent dangers faced by an inter-faith couple and adjudicating on the prayer for protection based on a threat assessment, has gone into the merits of an impending marriage itself. Even if the couple does not get their marriage registered, their claim for protection ought to have been decided in accordance with Article 21 of the Constitution, which provides for the protection of the right to life and liberty of an individual.

Dilution of the Special Marriage Act

Another serious concern is that the order passed by the Madhya Pradesh High Court goes against the very basis and objects of the Special Marriage Act. The order refers to a precedent from the Supreme Court of India in *Mohammed Salim vs Shamsudeen* (2019), a case which dealt with the issue of property succession arising out of a marriage between a Muslim man and Hindu woman under the Mohammedan Laws. This judgment should never have been considered as a precedent in either deciding the validity of an inter-faith marriage or for police protection.

The order also goes into Section 4 of the Special Marriage Act which excludes marriages between persons within the "prohibited degrees of relationship". The reliance of the Madhya Pradesh High Court on this prohibition is entirely untenable and factually flawed as this provision only bars marriages between those who are related. By doing so, the High Court failed to recognise that the objective of the Act is to facilitate marriage between any two Indian nationals "irrespective of the faith with either party to the marriage may profess".

The India of today and special marriages

The Madhya Pradesh High Court order assumes importance in the current social and political climate, where there is a real threat of vigilantism against inter-faith and inter-caste marriages, which do not have the sanction of the parents. The love jihad conspiracy, right-wing propaganda and consequent vigilantism have directly challenged our constitutional morality. While these are yet to be resolved, there is also a batch of petitions challenging unconstitutional provisions within the Special Marriage Act, such as prior notice which are pending before the Supreme Court. Tying these together is a common thread of individual autonomy, liberty, and equality. The Supreme Court in *Shafin Jahan vs Asokan K.M.* (2018), held that "intimacies of marriage lie within a core zone of privacy, which is inviolable". Dealing with a case of inter-faith marriage, Justice D.Y. Chandrachud, as he was then, wrote that "social approval for intimate personal decisions is not the basis for recognising them" and further, that "the Constitution protects personal liberty from disapproving audiences".

The *ratio decidendi* of the Shafin Jahan case has the effect of prioritising the absolute right of an individual to choose a life partner over any consideration of faith or caste-based diktats. With the spirit of this judgment having been lost sight of in recent years, it is wholly necessary for constitutional courts across the country to keep in mind that the arc of jurisprudence bends towards autonomy, privacy and liberty.

Special marriage act

- All marriages in India can be registered under the respective personal law Hindu Marriage Act, 1955, Muslim Marriage Act, 1954, or under the Special Marriage Act, 1954.
- It is the duty of the judiciary to ensure that the rights of both the husband and wife are protected.
- The Special Marriage Act, 1954 is an Act of the Parliament of India with provision for civil marriage for people of India and all Indian nationals in foreign countries, irrespective of religion or faith followed by either party.

- **A marriage under the Special Marriage Act, 1954 allows people from two different religious backgrounds to come together in the bond of marriage.**
- **The Special Marriage Act, 1954 lays down the procedure for both solemnization and registration of marriage, where either of the husband or wife or both are not Hindus, Buddhists, Jains, or Sikhs.**
- **According to this Act, the couples have to serve a notice with the relevant documents to the Marriage Officer 30 days before the intended date of the marriage**

Under Kafala, workers are dispensable

Vani Saraswathi

is the director of projects and editor-at-large of Migrant-Rights.Org, a GCC-based research and advocacy organisation

Within hours of the fatal fire that killed 49 migrant workers – a majority of whom are Indians – in Mangaf area of Al Ahmadi municipality, Kuwait, several actions were taken immediately. Kuwait's Interior Minister Fahad Al-Yousuf Al-Sabah said the fatalities were due to the greed of the employer and building owner – in this instance, both parties being the same, NBTC; he announced the company officials would be held criminally liable; and officials of the municipality were suspended for their failure to maintain building codes.

In the coming days, more announcements will be made and a few heads will roll. The names of the 49 dead are unlikely to be shared officially by Kuwait but will appear in the media in India and the Philippines. It is easy to replace a number, recruit anew and bring in more workers to fill the gap left behind by those who perished. To humanise them would mean to acknowledge their presence as more than just labour and entail safeguarding all of the rights of the migrant population, and that would only be possible by dismantling the all-pervasive Kafala system – a complex of laws and practices that ensure state and citizens hold all the power, while individual migrants are treated as temporary even if the dependency on their labour is near-permanent. This is why any announcement by Kuwait promising action must be scrutinised minutely.

Kuwait (foreigners comprise 70% of its 4.3 million) and the rest of the GCC states (Saudi, UAE, Qatar, Bahrain and Oman), in essence, follow the same practice with varying degrees of control over migration and migrants. These six states are home to roughly 35 million migrant workers, accounting for 10% of all international migrants, and Indians constitute the single largest group amongst them.

Let us look at the immediate concern – crowded, unsafe and unhygienic labour accommodation that makes its residents most vulnerable to any exigencies that may arise in a country. Just a few years ago, when the world came to a standstill due to the COVID-19 pandemic, GCC states struggled to contain the spread of the virus in these labour accommodations. Kuwait had some of the most discriminatory lockdown practices, particularly in areas densely populated by migrant workers and announced an amnesty, deporting tens of thousands of workers at the height of the pandemic in April 2020. No lessons were learned then, and tragedies recur in different forms.

Kuwait does have some kind of code on standards for workers' accommodation but its focus has been more on evicting 'bachelors' from family zones and moving them to subpar living spaces than to actually ensure employers provide suitable accommodation. As per Kuwait's labour law, employers engaged in government contracts (such as NBTC) must provide suitable housing or an allowance – 25% of wages if they earn the minimum wage (KD75) or 15% if paid above the minimum wage. The cost of decent living is roughly KD200 per person, not including rent. The extremely low value placed on their labour determines their place in the economic hierarchy.

This huge discrepancy between the cost of living and minimum wage is one of the critical control factors of the Kafala system. Work and residence visas are tied to the employer, ensuring they have a stranglehold over their employees' lives. For the nearly three million migrants in Kuwait's low-income belt, this means absolute dependency on the employer for accommodation, food and transportation. The minimum salary requirement to sponsor a family in Kuwait is KD800, so the majority of migrants are unable to bring their families. By keeping wages so low, Kuwait and the other Gulf states ensure that workers are perpetually vulnerable. They have no choice but to live in the poor housing provided, struggle with the quality of food, and occupy as little socio-cultural space as possible in the countries they help build.

The Mangaf tragedy has been technically attributed to an electric short circuit. But the root cause clearly is the systemic indifference of the state towards the rights and well-being of low-income workers and the gross negligence of the employer.

There are many 'IFs' as to how this tragedy could have been averted. If the employer had better safety checks, if the state had deemed them important enough to earn better and live better, but most importantly, if the workers could organise themselves, then they would have had a collective voice to air their grievances and demand better treatment.

But GCC states do not take kindly to any form of labour organising or unionisation. To allow workers to have a voice is to allow them to challenge the status quo. The easiest way to prevent this is to keep wages low enough that the workers are in a constant state of financial insecurity, and then to deport them with ease at the first sign of protest or discontent. In the heat of the aftermath, Kuwaiti officials will make promises of better safety standards and more stringent penalties but will depend on policing of employers and workers to implement this, and shy away from systemic changes that would best enforce the law. That would be to empower workers, the 'beneficiary' of these reforms, to raise their voices against the injustices they may face.

Footnote: Domestic Workers, who constitute 27% of the entire labour force in Kuwait, are excluded from the labour law, and are amongst the most marginalised of the migrant population. This opinion piece does not have the scope to address the aggravated vulnerabilities they face.

Promises in the wake of the Kuwait fire need to be scrutinised, for it is far easier to replace labour than ensure safeguards for the migrant worker population

Kafala system

- The kafala system is a system used to monitor migrant laborers, working primarily in the construction and domestic sectors in Gulf Cooperation Council member states and a few neighboring countries, namely Qatar, Bahrain, Kuwait, Lebanon, Oman, Saudi Arabia and the United Arab Emirates.

Kafala كفالة

/verb./ to guarantee, take care of

GCC Countries that impose various limitations on workers through Kafala.

- Exit permit required.
- Exit permit not required but laws require sponsor.
- Implemented reforms that benefit migrant workers

Under the Kafala system, all migrant workers need to have an Emirati sponsor.

Employees need a **no-objection letter** to resign from a contract, effectively tying workers to their sponsor and immobilizing them in the job market.

PASS

Firms in free zones (Dubai) have "higher average labor productivity. pay higher wages and invest more in training for their workers."

- **The 'Kafala' system is a legal framework that has been continued for decades in the Gulf countries. It is utilized for the employment of foreign workers in Saudi Arabia, the United Arab Emirates, Bahrain, Qatar, Kuwait, and Oman. Jordan, Lebanon, and Iraq do not follow this system.**

On the size of council of ministers

What has been the composition of the Council of Ministers at the Centre and in States since India became a democracy? What were the instances when the council became too large and unwieldy? How were the laws brought in to rein in this trend?

EXPLAINER

Rangarajan R

The story so far:

The Union Council of Ministers (COM) headed by Prime Minister Narendra Modi was sworn in on June 9, 2024. The present COM consists of the Prime Minister, 30 Cabinet Ministers, 5 Ministers of State (MoS) with independent charge and 36 MoS.

Who constitutes the Council of Ministers?

India is a parliamentary democracy with the President as its nominal head. Article 74 of the Constitution provides that there shall be a COM headed by the Prime Minister (PM) to aid and advise the President. The real executive powers lie with the COM. A Minister should be a member of either the Lok Sabha or the Rajya Sabha and if not, should become one within six months of his/her appointment. A similar setup prevails in States with a COM headed by the Chief Minister (CM).

The COM consists of a Cabinet minister, MoS with independent charge, MoS and a Deputy Minister. The Constitution does not classify the members of the COM into different ranks. All this has been done informally, following the British practice. Cabinet Ministers are higher in rank and handle large portfolios while MoS assist the Cabinet Ministers and work under them. MoS with independent charge directly reports to the Prime Minister for their respective ministries.

What is the constitutional limit?

The first COM at the time of independence had only 15 Ministers headed by Prime Minister Jawaharlal Nehru. After the first general elections in 1952, Nehru inducted around 30 Ministers into his COM. Over the years, the size of the COM had gradually increased to around 50-60. Interestingly, it is the United Front governments led by Deve Gowda (June 1996) and I.K. Gujral (April 1997) that were sworn in with just 21 and 34 Ministers respectively. In 1999, when Atal Bihari Vajpayee became Prime Minister, his COM had 74 Ministers. However, the size of COM was becoming unwieldy in some of the larger States. For instance, in 2002 when Mayawati was the Chief Minister of Uttar Pradesh, she had 79 Ministers.

Number game: Prime Minister Narendra Modi, left, with his Council of Ministers at the Rashtrapati Bhavan in New Delhi on June 9.AFP

The National Commission to review the working of the Constitution under the Chairmanship of Justice Venkatachaliah set up in February 2000, had suggested a ceiling of 10% of the total strength of Lok Sabha/Legislative Assembly for the number of Ministers at the Centre/State level. Finally, through the 91st Constitutional Amendment in 2003, the total number of Ministers including PM/CM in the COM was limited to 15% of the total strength of the Lok Sabha/State Legislative Assembly. There is no minimum requirement at the Central level whereas even the smaller States should have a minimum of 12 Ministers. For Union Territories of NCT of Delhi and Jammu & Kashmir (J&K), the maximum limit is 10% of the total strength of its Assembly.

What are the issues?

A thorny issue even after the limit on the number of Ministers is the appointment of Parliamentary Secretaries in various States. The office of Parliamentary Secretary (PS) also has its origin in the British system. In India, the post of PS was first created in 1951. They have not been a regular feature in the Central governments thereafter and the last PS at the Centre was appointed in 1990. However, various States have continued with their appointment to circumvent the limit on COM placed by the 91st Amendment. High Courts of Punjab & Haryana, Rajasthan, Bombay, Calcutta, Telangana, Karnataka etc. have quashed or questioned the appointment of PS in the States under their jurisdiction for indirectly violating the maximum limit on COM. The Supreme Court in July 2017 had also declared a law passed by Assam in 2004 for the appointment of PS as unconstitutional. The most recent instance is the order of the Himachal Pradesh High Court in January 2024 that restrained six PS appointed in the State from functioning as Ministers or availing facilities provided to Ministers. Appointing MLAs to the position of Ministers under the guise of PS to circumvent constitutional limits should be strictly prohibited and discontinued.

It is also pertinent to note that States like Sikkim, Goa and smaller States in the northeastern region with a current estimated population ranging from seven to forty lakhs have a minimum of twelve Ministers. However, Union Territories of Delhi and J&K with estimated population of over 2 crore and 1.5 crore, can have only a maximum of seven and nine Ministers respectively. The administration of public order, police and land in Delhi is not with the Delhi government. Similarly, public order and the police of Jammu and Kashmir will not be with its government. Nevertheless, considering the population of these Union Territories, the 10% limit for their COM may be reconsidered.

Rangarajan R is a former IAS officer. He currently trains civil-service aspirants. Views expressed are personal.

THE GIST

- The present Council of Ministers consists of the Prime Minister, 30 Cabinet Ministers, 5 Ministers of State (MoS) with independent charge and 36 MoS
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- A thorny issue even after the limit on number of ministers is the appointment of Parliamentary Secretaries in various States. Courts have stepped in multiple times to restrain States from appointing PS to circumvent the constitutional limit set for the number of Ministers

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- **A similar setup prevails in States with a COM headed by the Chief Minister (CM).**
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- The administration of public order, police and land in Delhi is not with the Delhi government. Similarly, public order and the police of Jammu and Kashmir will not be with its government.
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Saurabh pandey upsc performance - UPSC PRELIMS 2024 (Detailed pdf to be shared)

11:24 4G

22nd october 2...

Periodical cicada emergence disrupts food webs

The periodical mass emergence of cicadas in eastern North American forests can "rewire" forest food webs and initiate a cascade of impacts that propagates throughout the food chain, as per a study that quantified effects of the 2021 Brood X cicada emergence. The study found that when insect-eating birds have prey in the form of cicadas and thus shift their focus away from their usual repast – leaf-eating caterpillars – the caterpillars feast more heavily upon the leaves of oak saplings, doubling insect leaf damage.

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The cicadas are a superfamily, the Cicadoidea, of insects in the order Hemiptera.

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1:23

10th october 2...

States as per Article 244(2).

What are Scheduled Areas?

- Scheduled Areas cover 11.3% of India's land area, and have been notified in 10 States: Andhra Pradesh, Telangana, Odisha, Jharkhand, Chhattisgarh, Madhya Pradesh, Rajasthan, Gujarat, Maharashtra, and Himachal Pradesh

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How are Scheduled Areas governed?

- The President of India notifies India's Scheduled Areas. States with Scheduled Areas need to constitute a Tribal Advisory Council with up to 20 ST members.
- They will advise the Governor on matters referred to them regarding ST welfare.
- The Governor will then submit a report every year to the President regarding the administration of Scheduled Areas.

- The national government can give directions to the State regarding the administration of Scheduled Areas.
- The Governor can repeal or amend any law enacted by Parliament and the State Legislative Assembly in its application to the Scheduled Area of that State.

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1:33 4G

7TH DECEMBE...

Garba dance of Gujarat makes it to UNESCO list

Sreeparna Chakrabarty
NEW DELHI

Gujarat's traditional dance form 'Garba' was on Wednesday included in the list of Intangible Cultural Heritage by the United Nations Educational, Scientific and Cultural Organization (UNESCO).

The popular dance form is the 15th cultural item from India to make it to the UNESCO list. Kolkata's Durga Puja was the last one added two years ago.

The inclusion has been made under the provisions of the 2003 Convention for the Safeguarding of Intangible Cultural Heritage.

The international cultural body described the 'Garba' as a ritualistic and devotional dance performed India.

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Climate change is making the world sick

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Que-3 With reference to exercise 'Mitra Shakti', consider the following statements

1- Between India and Nepal.

2- The aim of the exercise is to jointly rehearse sub-conventional operations under Chapter VII of the United Nations Charter, which authorises the Security Council to take enforcement measures, including the use of military force, to address threats to international peace and security.

3- "Exercise MITRA SHAKTI-2023" recently commenced in Goa.

How many of the above statements are correct?

a) Only one b) Only two

c) All three d) None

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Ans 3- (a)

- "Exercise MITRA SHAKTI-2023" recently commenced in Aundh (Pune).
- Between India and Sri Lanka.

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Ministry of Defence

1:17

PRELIMS 18th N...

- The Constituent Assembly debated whether fundamental rights including this one could be suspended or limited during an Emergency. The Article cannot be suspended except during the period of Emergency.

Can High Courts be approached in cases of violation of fundamental rights?

- Both the High Courts and the Supreme Court can be approached for violation or enactment of fundamental rights through five kinds of writs:
- Habeas corpus (related to personal liberty in cases of illegal detentions and wrongful arrests)
- Mandamus — directing public officials, governments, courts to perform a statutory duty;
- Quo warranto — to show by what warrant is a person holding public office;

- Prohibition — directing judicial or quasi-judicial authorities to stop proceedings which it has no jurisdiction for; and
- Certiorari — re-examination of an order given by judicial, quasi-judicial or administrative authorities.
- In civil or criminal matters, the first remedy available to an aggrieved person is that of trial courts, followed by an appeal in the High Court and then the Supreme Court.
- When it comes to violation of fundamental rights, an individual can approach the High Court under Article 226 or the Supreme Court directly under Article 32.
- Article 226, however, is not a fundamental right like Article 32.

IE

- 12th BRICS sum

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1:19

28th october 2...

US Pakistan South Asia UK Europe China Middle East Mad, Mad World Photos Vide

7023 Nobel Prize In Economic Sciences Awarded To Claudia Gold...

Imran Cipher Case He Jinbi Missing Israel Hamas War

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Que-2 Consider the following statements

1- Article 244, pertaining to the administration of Scheduled and Tribal Areas, is the single most important constitutional provision for STs.

2- Articles 244(1) provides for the application of Fifth Schedule provisions to Scheduled Areas notified in any State other than Assam, Meghalaya, Tripura, and Mizoram, the Sixth Schedule applies to these states as per Article 244(2).

3- The Prime Minister of India notifies India's Scheduled Areas.

How many of the above statements are correct?

a) Only one b) Only two

c) All three d) None

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Ans 2- (b)

- The President of India notifies India's Scheduled Areas.
- Scheduled Areas cover 11.3% of India's land area, and have been notified in 10 States: Andhra Pradesh, Telangana, Odisha, Jharkhand, Chhattisgarh, Madhya Pradesh, Rajasthan, Gujarat, Maharashtra and Himachal Pradesh. In 2015, Kerala proposed to notify 2,133 habitations, five gram panchayats and two wards in five districts. It awaits the Indian government's approval.
- The President of India notifies India's Scheduled Areas. States with Scheduled Areas need to constitute a Tribal Advisory Council with up to 20 ST members. They will advise the Governor on matters referred to them regarding ST welfare. The Governor will then submit a report every year to the President regarding the administration of Scheduled Areas.
- The national government can give directions to the State regarding the administration of Scheduled Areas. The Governor can repeal or amend any law enacted by Parliament and the State Legislative Assembly in its application to the Scheduled Area of that State. The Governor can also make regulations for a Scheduled Area, especially to prohibit or restrict the transfer of tribal land by or among members of the STs, and regulate the allotment of land to STs and money-lending to STs.

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India World Opinion Sports e-Paper

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12:40

polity 11th augu...

Ethics vs privilege committee

- Objective: It oversees the moral and ethical conduct of members and examines cases of misconduct referred to it.
- Appointment of members in Lok Sabha: The members of the Ethics Committee are appointed by the Speaker for a period of one year.

Procedure for complaints

- Any person can complain against a Member through another Lok Sabha MP, along with evidence of the alleged misconduct, and an affidavit stating that the complaint is not "false, frivolous, or vexatious".
- If the Member himself complains, the affidavit is not needed.
- The Speaker can refer to the Committee any complaint against an MP.
- The Committee does not entertain complaints based only on media reports or on matters that are sub-judice.
- The Committee makes a prima facie inquiry before deciding to examine a complaint. It makes its recommendations after evaluating the complaint.

- The Rules (for example, the Rules of Procedure and Conduct of Business in the Lok Sabha) applicable to the Committee of Privileges also apply to the ethics panel.
- An allegation of corruption against an MP can be sent to either body, but usually more serious accusations go to the Privileges Committee.
- The mandate of the Privileges Committee is to safeguard the "freedom, authority, and dignity of Parliament".
- These privileges are enjoyed by individual Members as well as the

House as a whole.

- An MP can be examined for breach of privilege; a non-MP too can be accused of breach of privilege for actions that attack the authority and

12:55

18th Septembe...

Santiniketan finds its place on UNESCO's World Heritage List

World body makes announcement on Sunday. Mamata says town, nurtured by Tagore, has been supported by Bengal; Culture Ministry says it exhibits important interchange in human values

Santiniketan, a town established by Nobel laureate Rabindra nath Tagore, made it to the UNESCO's World Heritage List on Sunday.

Located in West Bengal's Birbhum dis trict, Santiniketan, which means "abode of peace", started taking shape in 1901 and is the place where Tagore laid the founda tions of VisvaBharati University

EU chief promises a plan of action as migrants flock to Italian island

Ursula von der Leyen, along with Italian PM Giorgia Meloni, visits Lampedusa where more than 7,000 people have arrived this week; 1.26 lakh migrants have arrived in Italy this year, almost double the figure by the corresponding period in 2022

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ceramics and glasses, greases, metallurgical powders, polymers and other uses.

How many of the above statements are correct?

a) Only one b) Only two

c) All three d) None

Que-2 With reference to Parliaments special sessions, consider the following statements

1- There is specific provision in the Constitution that deals with special sessions.

2- Article 352, which deals with the proclamation of Emergency, refers to a 'special sitting' of the House, this clause was added through the 44th Amendment Act in 1978, which included safeguards against the Emergency.

3- The Question Hour was suspended during the session.

How many of the above statements are correct?

a) Only one b) Only two

c) All three d) None

Que-3 Consider the following statements about Sacred Ensembles of the Hoysala

1- This includes five temples in Karnataka, has been recently inscribed on the UNESCO's World Heritage List.

2- The Hoysala Temples, built in the 12th and 13 centuries by the Hoysala kings, are dedicated to Shiva and Vishnu.

3- The temples became targets of plundered and destruction by the Delhi Sultanate army of Alauddin Khalji in the early 14th century and another Delhi Sultanate army of Sultan Muhammad bin Tughluq in 1326 AD.

How many of the above statements are correct?

a) Only one b) Only two

c) All three d) None

Que-4 Consider the following statements about SHREYAS scheme

1- It comprises 4 central sector sub-schemes.

2- The objective of the Scheme is to provide coaching of good quality for economically disadvantaged Scheduled Castes (SCs) and Other Backward Classes (OBCs) candidates to enable them appear in competitive and entrance examinations.

3- The ceiling of the total family income under the scheme is 2 lakhs per annum and 3500 slots are allotted per annum.

How many of the above statements are correct?

a) Only one b) Only two

c) All three d) None

Que-5 Consider the following statements about Women's Reservation Bill

1- The Constitution (One Hundred and Twenty-Eighth Amendment) Bill, 2023, seeking to reserve 33% of seats in Lok Sabha and state Assemblies for women.

SAURABH PANDEY CSE
FROM BASICS TO UPSC BRILLIANCE

12:03

prelims pointer...

Que-5 With reference to Shumang Leela, consider the following statements

1- Shumang Leela is a traditional form of theatre in Tripura.

2- In this the roles of women are all played by men, called Nupi Shabis.

3- It is performed in an open courtyard surrounded by spectators on all four sides.

Which of the following given above is/are correct

a) 1 and 2 only b) 1 only

c) 1, 2 and 3 d) 2 and 3 only

Ans- (d)

- Shumang Leela is a traditional form of theatre in Manipur.
- In the case of women's theatre groups, the roles of men are played by women.
- Shumang Leela translates to "courtyard performance".
- Today, Shumang Leela is of two types: Nupa Shumang Leela, performed only by men, and Nupi Shumang Leela, performed only by women.

Que-6 Consider the following statements about Red Sanders also called Red Sandalwood

1- It is a species found in the southern tropical dry deciduous forest of Telangana.

2- The tree reaches an average height of 10 to 15 metres.

3- The species is listed as 'Endangered' in the International Union for Conservation of Nature and falls in Appendix II of CITES.

Which of the following given above is/are correct

a) 1 only b) 1 and 3 only

c) 1, 2 and 3 d) 2 and 3 only

Ans- (d)

- It is a species found in the southern tropical dry deciduous forest of Andhra Pradesh (AP).
- CITES (shorter name for the Convention on International Trade in Endangered Species of Wild Fauna and Flora, also known as the Washington Convention).
- In India, it has been enlisted under Schedule IV of the Wildlife (Protection) Act, 1972.
- The heartwood of Red Sanders is in demand in the domestic and international markets for making

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CURRENT AFFAIRS FEB 2nd by SAURABH PANDEY SIR

furniture, handicrafts and musical instruments in China and Japan. The red dye obtained from the wood is used as a colouring agent in the textiles, medicine and food industries.

Que-7 Consider the following statements about Compressed biogas (CBG) and compressed natural gas (CNG)

1- Chemically, CBG is the same as CNG — both are compressed methane — and has the same calorific value.

2- CNG is a by-product of petroleum, CBG can be produced from any biomass, be it crop residue, cattle dung, sugarcane press mud, municipal wet waste or effluents from a sewage treatment plant.

3- CBG cannot be transported through cylinders or pipelines to retail outlets.

Which of the following given above is/are correct

a) 1 and 2 only b) 3 only

Que-8 Finance Minister announced 500 new 'waste to wealth' plants under Galvanizing Organic Bio-Agro Resources Dhan scheme (GOBARdhan) in the Union Budget 2023. Consider the following statements about this

1- The new GOBARdhan scheme is an upgrade and an expansion of the old one of the same name, launched in 2018 by the Department of Drinking Water and Sanitation.

2- This scheme limited itself to cluster or community-level biogas plants, for instance, for Anganwadis or farms.

3- Compressed biogas (CBG) was never a part of the initial scheme launched in 2018 because it is very different from biogas in terms of utilisation and constituents.

Which of the following given above is/are correct

a) 2 only b) 1 and 3 only

c) 1, 2 and 3 d) 2 and 3 only

12:05

prelims pointer...

CURRENT AFFAIRS FEB 4th by SAURABH PANDEY SIR

c) 1, 2 and 3 d) 3 only

Ans- (b)

- In the union budget of FY 2023-24, it is announced to launch a mission to eliminate sickle cell anemia by 2047.

Que-7 Lamu Archipelago, recently in News, belongs to which country

a) Somalia

b) Malaysia

c) Indonesia

d) Kenya

Ans- (d)

- The Lamu Archipelago is located in the Indian Ocean close to the northern coast of Kenya, to which it belongs. The islands lie between the towns of Lamu and Kiunga, near the Coast Province. It is a part of Lamu District.

Que-8 Consider the following statements about "Operation Sadbhavana", recently in News

1- Launched by an Indian Army.

2- For development of Jammu and Kashmir.

3- Some of the objectives achieved through Operation Sadbhavana are national integration tours, women's empowerment, employment generation, education, and development activities geared towards nation-building.

Which of the following given above is/are correct

a) 1 and 2 only b) 1 and 3 only

c) 1, 2 and 3 d) 2 only

Ans- (b)

- For development of Ladakh.
- The Indian Army is organising multiple welfare activities, such as running schools and infrastructure development projects, as part of "Operation Sadbhavana" in the Union Territory of Ladakh.

http://www.gesreporter.com/ © GES Reporter

CURRENT AFFAIRS FEB 6th by SAURABH PANDEY SIR

Que-1 Consider the following statements

1- A spy balloon is literally a gas-filled balloon that is flying quite high in the sky, more or less where we fly commercial airplanes.

2- Disadvantage that low Earth orbit satellites have is that they are continually moving around the Earth.

3- Geosynchronous orbit satellite has the disadvantage that it's harder to see things clearly when you're very, very far away.

Which of the following given above is/are correct

a) 1 and 2 only b) 1 and 3 only

c) 1, 2 and 3 d) 3 only

Ans- (c)

- The disadvantage these low Earth orbit satellites have is that they are continually moving around the Earth.

of what we call persistence, allowing satellites to capture images continuously.

Que-2 With reference to Paris Club, consider the following statements

1- The Paris Club is a group of mostly western creditor countries.

2- It grew from a 1956 meeting in which Brazil agreed to meet its public creditors in Paris.

3- Their objective is to find sustainable debt-relief solutions for countries that are unable to repay their bilateral loans.

Which of the following given above is/are correct

a) 2 only b) 1 and 3 only

c) 1, 2 and 3 d) 2 and 3 only

Ans- (b)

- It grew from a 1956 meeting in which

12:35

may 2024 impo...

Exchange traded fund

- An exchange-traded fund (ETF) is a pooled investment security that can be bought and sold like an individual stock.
- ETFs can be structured to track anything from the price of a commodity to a large and diverse collection of securities.
- ETFs can even be designed to track specific investment strategies.
-

- ETF share prices fluctuate all day as the ETF is bought and sold; this is different from mutual funds, which only trade once a day after the market closes.
- ETFs offer low expense ratios and fewer broker commissions than buying the stocks individually.
- An ETF must be registered with the Securities and Exchange Commission.

11:29 4G

12th august 2023

DELIMITATION COMMISSION

- Delimitation literally means the act or process of fixing limits or boundaries of territorial constituencies in a country or a province having a legislative body. The job of delimitation is assigned to a high power body. Such a body is known as Delimitation Commission or a Boundary Commission
- In India, such Delimitation Commissions have been constituted 4 times – in 1952 under the Delimitation Commission Act, 1952, in 1963 under Delimitation Commission Act, 1962, in 1973 under Delimitation Act, 1972 and in 2002 under Delimitation Act, 2002.

- The Delimitation Commission in India is a high power body whose orders have the force of law and cannot be called in question before any court. These orders come into force on a date to be specified by the President of India in this behalf.
- The copies of its orders are laid before the House of the People and the State Legislative Assembly concerned, but no modifications are permissible therein by them.

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11:37

Mock Series 17t...

productivity, uphold good health and prevent poverty.
- The second set consists of policies to reduce inequality and promote economic security at older ages in a fiscally sustainable manner, considering pensions and health care.
- While many older persons are in excellent health or economically active stages, others live with ailments or are in poverty. Public spending in most countries has not been sufficient to cover the growing demand for long-term care, the analysis pointed out.

CURRENT AFFAIRS BY SAURABH PANDEY SIR

Question 5 With reference to Doppler radar network, consider the following statements

1 It is named after Christian Doppler, the physicist who first proposed the concept of the Doppler effect.

2 It is a system of multiple radar stations that work together to provide comprehensive coverage of a specific area.

3 The entire stretch of India will be covered under the Doppler Weather Radar Network to better predict extreme weather events more accurately.

Which of the following given above is/are correct

a) 1 and 2 only b) 1 only

c) 1, 2 and 3 d) 2 and 3 only

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5- (c)
- It is named after Christian Doppler, the physicist who first proposed the concept of the Doppler effect. The Doppler effect is the change in frequency or wavelength of a wave (such as sound or light) as it approaches or moves away from an observer.

What is a Doppler radar network?
- A Doppler radar network is a system of multiple radar stations that work together to provide comprehensive coverage of a specific area. The system uses the Doppler effect to detect and track moving objects, such as weather systems, aircraft, and vehicles.

How does a Doppler radar network work?
- Each station in the network includes a radar transmitter, which sends out a microwave signal, and a radar receiver, which detects the reflected signal. The transmitter and receiver are typically located at the same site, but they can also be separated by a significant distance. The radar signal reflects off any moving objects in its path and the change in frequency of the signal due to the Doppler effect is used to determine the speed and direction of the moving object.

What are the uses of a Doppler radar network?
- Doppler radar networks are widely used for weather forecasting and severe weather warning, tracking of aircraft and vehicles, and also used in meteorology and atmospheric sciences. These radar networks provide detailed information about storm systems, including the location, size, and movement of thunderstorms, tornadoes, and other severe weather events.

CURRENT AFFAIRS BY SAURABH PANDEY SIR

Question 6 Consider the following statements about Army Day

1 India celebrates Army Day on January 15 every year.

2 The Army Day is celebrated every year to honour Cariappa and the defence forces.

3 75th Army Day was held in Hyderabad this year.

Which of the following given above is/are correct

a) 1 and 2 only b) 1 and 3 only

c) 1, 2 and 3 d) 2 and 3 only

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5- (d)
- In 1997 Bangkok Declaration launched a modest grouping (of Bangladesh, India, Sri Lanka and Thailand), with the acronym, BIST-EC.
- Originally formed as BIST-EC (Bangladesh, India, Sri Lanka and Thailand Economic Cooperation) in 1997, it became BIMST-EC after Myanmar joined, and BIMSTEC in 2004 with the inclusion of Nepal and Bhutan. This unique set of five countries from South Asia and two from Southeast Asia are parents to an institution with an unwieldy name but lofty ambitions.

6- (a)
- The portal ensures end-to-end coverage of all the linked schemes.
- Anyone can apply for a loan.

7- (b)
- Any serving or retired three-star officer from either of the three services, below 62 years on the date of projected appointment, would be eligible to be elevated as the CDS and will superannuate at the age of 65. Earlier, the post was only open for four-star generals.

8- (c)
- The Chief of Defence Staff is principally responsible for getting the armed forces better integ... rather than operating in silos as has been the case for decades.
- The job includes the creation of new military commands which integrate the Army, Air Force, an... Navy to fight together.
- According to the government, the CDS acts as the Principal Military Adviser to the Defence Ministe... only on tri-services matters. The three service chiefs will continue to advise the Defence Ministe... exclusively on the matters concerning their respective services.
- The CDS will not hold any military command, including over the three service chiefs.
- As the Permanent Chairman of the Chief of Staff Committee, the CDS brings about jointness i... operation, logistics, transport, training, support services, communications, repairs and maintenanc... of the three services.

SAURABH PANDEY CSE

What is SWM cess and why is it levied on waste generators?

How has the SWM cess fared so far and why has it hit the headlines suddenly? How has Bengaluru been handling its solid waste management and what is about to change going forward?

Pushkara S.V.

The story so far:

The Bruhat Bengaluru Mahangara Palike (BBMP) has proposed a Solid Waste Management (SWM) Cess of ₹100 per month for each household. While the proposal has sparked debate and criticism among residents and stakeholders, it is important to understand the rationale behind SWM cess, its intended use, and the broader context of solid waste management challenges faced by Urban Local Bodies (ULBs) in India.

Urban Local Bodies (ULBs) levy user fees or SWM cess as per the provisions of Solid Waste Management Rules, 2016. According to these guidelines, ULBs must collect user fees/cess for SWM services provisions provided. ULBs typically charge about ₹30-50 per month as SWM cess, which is collected along with property tax. ULBs are now considering revising these rates and imposing higher charges on bulk waste generators to meet a portion of the costs incurred in providing SWM services.

What are the costs?

Offering SWM services is complex and resource-intensive. ULBs typically deploy about 80% of their manpower and up to 50% of their annual budgets to provide SWM services to city residents.

In a city like Bangalore, an urban resident generates about 0.6 kg of waste per day, totalling 0.2 tonnes per person per year. Overall, Bangalore generates about 5,000 tonnes of solid waste per day. Managing this volume of waste requires around 5,000 door-to-door waste collection vehicles, 600 compactors, and about 20,000 Paurakarmikas.

SWM services comprise four components: collection, transportation, processing and disposal. ULBs package collection and transportation together, and processing and disposal together. Collection and transportation are resource and labour-intensive and come up to 85-90% of the SWM budget, whereas only about 10-15% is spent on processing and disposal of waste.

What are the challenges?

Solid waste generated in Indian cities consists of about 55-60% wet biodegradable material and 40-45% non-biodegradable material. The portion of recyclable material in the dry waste is minimal, only about 1-2%, with the rest being mostly non-recyclable and non-biodegradable waste. Although 55% of the wet waste can be converted into organic compost or biogas, the yield is as low as 10-12%, making both composting and biogas generation from solid waste financially unviable. Typically, operational revenue from waste processing facilities covers only about 35-40% of operational expenses, with the rest subsidised by the ULB.

Apart from financial challenges, ULBs face other challenges associated with SWM services, such as extra work of clearing open points and drains, preventing open littering, seasonal changes in waste generation, and sweeping operations. Additionally, the disposal of non-compostable and non-recyclable dry waste, such as single-use plastic, textile waste and inert materials, is expensive since the material needs to be shipped to cement factories or waste-to-energy projects located about 400-500 km from cities.

Large cities like Bangalore spend about 15% of their budget—about ₹1,643 crore out of ₹11,163 crore – whereas the revenue from SWM services is almost negligible at ₹20 lakh per year. Smaller cities tend to spend up to 50% of their budget but also end up with almost negligible revenue. Hence, ULBs charge SWM cess to cover a portion of the costs.

What is the solution?

Although collection and transportation of waste generate no revenue, several strategies can reduce overall expenditure on SWM and lower user charges. These are segregation of waste at source, reducing single-use plastic, decentralised composting initiatives, Information, Education and Awareness (IEC) to prevent open littering, and asking bulk waste generators to process their own waste.

A balanced approach, combining marginal user charges with efficient operations, could help make our cities cleaner.

Pushkara S.V. works with the Indian Institute for Human Settlements, Bengaluru.

THE GIST

- The Bruhat Bengaluru Mahangara Palike's decision to levy a Solid Waste Management cess of ₹100 per household has sparked debate and criticism among residents and stakeholders.
- Offering SWM services is complex and resource intensive. The yield from waste conversion is low and typically, operational revenue from waste processing facilities covers only about 35-40% of operational expenses, with the rest subsidised by the Urban Local Bodies.
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SWM CESS

- **The Bruhat Bengaluru Mahangara Palike's decision to levy a Solid Waste Management cess of ₹100 per household has sparked debate and criticism among residents and stakeholders.**
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- **The yield from waste conversion is low and typically, operational revenue from waste processing facilities covers only about 35-40% of operational expenses, with the rest subsidised by the Urban Local Bodies.**

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- **The portion of recyclable material in the dry waste is minimal, only about 1-2%, with the rest being mostly non-recyclable and non-biodegradable waste.**
- **Although 55% of the wet waste can be converted into organic compost or biogas, the yield is as low as 10-12%, making both composting and biogas generation from solid waste financially unviable.**

Orchid blossoms with new drug to treat anti-microbial resistance

The pharmaceutical company's India-discovered drug Enmetazobactum, the first to receive U.S. FDA approval, will help it flower with strength; for 2023-24, Orchid achieved a turnover of ₹819 crore, net of ₹94 crore; following a ₹400-crore QIP last year, its debt has come down to ₹120 crore

NEWS ANALYSIS

M. Ramesh
CHENNAI

On June 6, Orchid Pharma made a significant announcement in the stock exchanges that went largely unnoticed in the post-election din.

The company said it had received approval from the Drugs Controller General of India to make and sell Enmetozobactum. Normally, a pharma firm getting approval to make a drug should not be an occasion for any excitement but this was different.

Enmetozobactum is not only among the few drugs discovered in India by an Indian company – there are less than 20 of them – but it is the first India-discovered drug to get U.S. FDA approval. And there is more. Disease-causing bacteria are getting cleverer by the day, developing resistance to many antibiotics doctors prescribe.

Anti-microbial resistance (AMR) is estimated to kill about five million people every year (the same as the population of Norway or Denmark). Any drug that overpowers these superbugs is a godsend. Enmetazobactum is an AMR drug. It will be given to patients together with Cefepime, a medicine that falls under the Cephalosporin category of antibiotics.

Huge potential: Dhanuka sees companies shifting base to India. SPECIAL ARRANGEMENT

This development, along with a few others – such as the firm's backward integration moves and getting into a new drug under a licence – underscores the growth phase of Orchid Pharma that has only recently stabilised after a financial wobble.

> Orchid's share price has had a remarkable journey – increasing from ₹18 in November 2020 to about ₹2,500 in April 2021

Orchid's origins

Orchid Pharma was established in 1992 by Kailasam Raghavendra Rao, an IIM-A alumnus, with the money he had earned working in West Asia, to manufacture the Cephalosporin class of drugs, as and when they came out of the patent-protected period. For some years it was successful but fell into a financial distress, due largely to overseas acquisitions. EBIDTA fell from ₹320 crore in the 18-month year 2013-15 (margin 18%) to ₹14 crore (2%) in 2017-18, as stressed working capital delayed order execution leading to cancellations.

In 2019, Lakshmi Vilas Bank, a financial creditor, hauled Orchid to the National Company Law Tribunal. In March 2020, Dhanuka Laboratories stepped in with an offer of ₹1,116 crore against the ₹3,200 crore debt the company had and the liquidation value of ₹1,300 crore. Orchid Pharma came to Dhanuka after the Supreme Court ruled the offer did not have to be equal to or more than the liquidation value.

Things stabilised under the Dhanuka management. For 2023-24, Orchid achieved a turnover of ₹819 crore and made a net profit of ₹94 crore. Its share price has had a remarkable journey – rising from ₹18 in November 2020 to about ₹2,500 in April 2021. On June 14, it was quoting around ₹1,050.

Enmetazobactum was discovered by Orchid in 2008, but financial difficulties forced the company to license the molecule to Allecra of Germany, which would have the right to manufacture and sell the drug anywhere in the world except India, paying (6-9%) royalty to Orchid. Indeed, it is Allecra's application that has been approved by the U.S. FDA.

"Enmetazobactum would be another weapon in a clinician's arsenal," says Mridul Dhanuka, Director, Orchid Pharma. In a conversation with *businessline*, Mr. Dhanuka said in clinical trials, the drug had recorded an efficacy of 79% compared with 59% of a comparable drug, Piperacillin Tazobactum. The latter commands a market revenue of about ₹1,000 crore, but Mr. Dhanuka stressed Enmetazobactum cannot just replace Piperacillin Tazobactum in the market, as considerations such as costs and doctors' cautious approach to new drugs come into play.

The firm recently said Enmetazobactum could be worth ₹75-100 crore a year, but Mr. Dhanuka said the level would be reached after about 2-3 years.

Backward integration

Even as Orchid Pharma is making plans for manufacturing the drug at its Chennai plant, it is busy buying land in Jammu. Its wholly-owned subsidiary, Orchid Bio Pharma, is on to a ₹750-crore project to make 7ACA, a drug intermediate not produced in India, with PLI assistance from the Government of India. When completed, the project is expected to be beneficial to Orchid, as 7ACA "is the raw material for 75% of Orchid's products."

While the production of 7ACA is a backward integration for Orchid Pharma, it also means entry into 'fermentation'. China is the 'big daddy' in fermentation, but Mr. Dhanuka expects due to certain recent regulations in the U.S., Chinese companies could shift base to India. Orchid wants to get into fermentation.

And then, the company is preparing for the manufacture of Cefiderocol, another Cephalosporin discovered by Shionogi of Japan. The licencee Global Antibiotic Research and Development Partnership (GARDP) has sub-licenced the drug to Orchid under a 'fixed margin, no royalty' deal, meant to make low-cost drugs available to everyone. Cefiderocol is a "reserve category" drug that will be used if the first two lines of treatment fail.

Financially, Orchid appears to have put itself on an even keel. Thanks to a ₹400-crore QIP last year, its debt has come down to ₹120 crore, while its current liabilities are easy against its current assets – ₹260 crore versus ₹790 crore. The promoter, the ₹500-crore Dhanuka Laboratories, is to be merged with Orchid, which should make the balance sheet look prettier. The merger is pending NCLT approval.

(The writer is with The Hindu businessline)

Enmetozobactum

- Orchid blossoms with new drug to treat anti-microbial resistance.
- Enmetozobactum is not only among the few drugs discovered in India by an Indian company — there are less than 20 of them — but it is the rst India-discovered drug to get U.S. FDA approval.
- And there is more. Disease-causing bacteria are getting cleverer by the day, developing resistance to many antibiotics doctors prescribe

Life at risk

Activists from the environmental organisation Greenpeace drawing a message in the sand to raise awareness of caring for turtles and the oceans as part of a campaign called 'Oceans without Plastics' at Pie de la Cuesta beach in Acapulco, Guerrero State, Mexico. AFP

More Miles Less Plastic

- ***More Miles Less Plastic*** **is an environmental initiative that One Ocean Foundation has developed and implemented for the nautical world and more specifically for sailing events.**
- **The two main objectives of this project consist in creating awareness on ocean issues while at the same time having a concrete impact through the collection of plastic waste from marine and coastal areas.**
- **The initiative is part of the project *No Plastic in the Ocean that* aims to fight marine pollution from plastics and microplastics.**

New fabric found to make urban 'heat islands' more bearable

The Hindu Bureau

As global temperatures and urban populations rise, the world's cities have become "urban heat islands," with tight-packed conditions and thermal radiation emitting from pavement and skyscrapers trapping and magnifying these temperatures. With 68% of all people predicted to live in cities by 2050, this is a growing, deadly problem.

In a paper published in *Science*, researchers from the University of Chicago detail a new wearable fabric that can help urban residents survive the worst impacts of massive heat caused by global climate change, with applications in clothing, building and car design, and food storage.

Test results

In tests under the Arizona sun, the material kept 2.3 degrees Celsius cooler than the broadband emitter fabric used for outdoor endurance sports and 8.9 degrees Celsius cooler than the commercialised silk commonly used for shirts, dresses and other summer clothing. This, the team hopes, will help many avoid the heat-related hospitalisations and deaths seen in global population centres this year alone.

Existing cooling fabric for outdoor sports works by reflecting the sun's light in a diffuse pattern so it does not blind onlookers. But in an urban heat island, the sun is only one source of heat. While the sun bakes from above, thermal radiation emitted from buildings and pavement blast city-dwellers with blistering heat from the sides and below. About 97% of the clothes are being heated by the thermal radiation coming at them from the sides and below, which broadband emitter fabric does not fight. This means many materials that perform well in lab tests will not help city-dwellers in Arizona,Southeast Asia and China when massive heat waves hit them.

The University of Chicago team's new textile, which has received a provisional patent, can help provide a passive cooling system that can supplement and reduce the need for energy- and cost-intensive systems.

The applications go far beyond clothing. A thicker version of the fabric protected by an invisible layer of polyethylene could be used on the sides of buildings or cars, lowering internal temperatures and reducing the cost and carbon impact of air conditioning. Similarly, the material could be used to transport and store milk and other foods that would otherwise spoil in the heat, cutting refrigeration's impact.

Wearable fabric

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Gene therapy offers hope for patients with hearing loss

It is widely estimated that approximately 50-60% of congenital hearing loss cases are attributed to genetic causes; among the various populations, genetic variants play a significant role

Vinod Scaria
Rahul Bhoyar

Hearing loss is one of the most prevalent disorders and it is estimated that over one billion people suffer from hearing loss and approximately one-two children in every 1,000 births are born with congenital hearing loss.

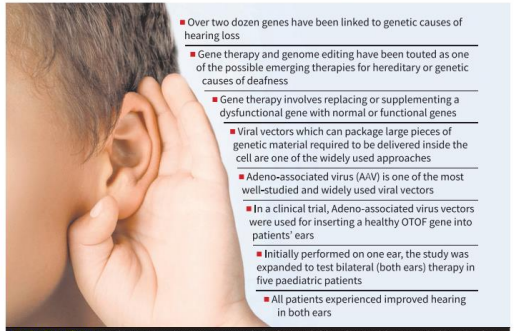
Hearing loss is a complex condition that can result from a variety of environmental and genetic factors including ear infections. Often, hearing loss serves as symptoms indicating defects or pathologies in the ear's process that converts sound into electrical signals sent to the brain.

It is widely estimated that a significant majority, amounting to approximately 50-60% of congenital hearing loss cases, are attributed to genetic causes. Among the various populations, genetic variants play a significant role. For example, mutations in the GJB2 gene are the most common genetic cause of hearing loss in Caucasian, Asian and Hispanic populations. In Africa, the MYO15A and ATP6V1B1 genes are more frequently implicated.

In total, over two dozen genes have been linked to genetic causes of hearing loss. Besides genomic mutations, mitochondrial genetic defects can also lead to hearing impairment. Genetic variants could also play a role in the complex interplay with other factors, like medications. For instance, a prevalent genetic defect in the mitochondrial MTRNR1 gene can predispose individuals to hearing loss when administered with the aminoglycoside antibiotics, widely used in treatment of TB.

Hope for children with congenital hearing loss

Genetic causes are responsible for about 50-60% of congenital hearing loss



- Over two dozen genes have been linked to genetic causes of hearing loss
- Gene therapy and genome editing have been touted as one of the possible emerging therapies for hereditary or genetic causes of deafness
- Gene therapy involves replacing or supplementing a dysfunctional gene with normal or functional genes
- Viral vectors which can package large pieces of genetic material required to be delivered inside the cell are one of the widely used approaches
- Adeno-associated virus (AAV) is one of the most well-studied and widely used viral vectors
- In a clinical trial, Adeno-associated virus vectors were used for inserting a healthy OTOF gene into patients' ears
- Initially performed on one ear, the study was expanded to test bilateral (both ears) therapy in five paediatric patients
- All patients experienced improved hearing in both ears

Early detection: : Newborn screening programmes help detect children born with congenital hearing loss

Emerging therapies

Correction of the gene defect underlies the genetic cause of hearing loss, and therefore gene therapy and genome editing have been touted as one of the possible emerging therapies for hereditary or genetic causes of hearing disability. Gene therapy typically involves replacing or supplementing a dysfunctional gene with normal or functional genes. There are a number of molecular approaches that have been widely used for such replacement or supplementation.

Adeno-associated virus (AAV) is one of the most well-studied and widely used vectors for this purpose. AAV offers several advantages: it is a safe vector, as it does not cause human diseases, and it can infect both dividing and non-dividing cells, thus having a broad spectrum of cells it can target for genetic editing.

In a recent report published in *Nature Medicine*, Chinese researchers provide early promise towards using gene therapy for at least one genetic hearing loss. Researchers at the Fudan University, in collaboration with a number of research and clinical centres in China, proposed that gene therapy could effectively treat a form of genetic deafness involving the OTOF gene, known as hereditary deafness 9. Mutations in the OTOF gene account for approximately 2-8% of all genetic hearing loss cases. In this clinical trial, researchers employed Adeno-associated virus vectors with the intention of inserting a healthy OTOF gene into patients' ears using a harmless virus. All patients experienced improved hearing in both ears. Initially performed on one ear, the study was expanded to test bilateral (both ears) therapy in five paediatric patients.

The researchers in the report suggest that no severe side effects were observed, while among the recorded 36-odd minor side effects, the most common were increased lymphocyte counts and cholesterol levels apart from an increase in lactate dehydrogenase levels, which is a marker for tissue damage in the body. Hearing tests showed significant improvement in all patients reported and all patients regained the ability to understand speech and locate sound sources. The promising results indicate that AAV gene therapy is safe and effective for treating hereditary hearing disability.

Set of caveats

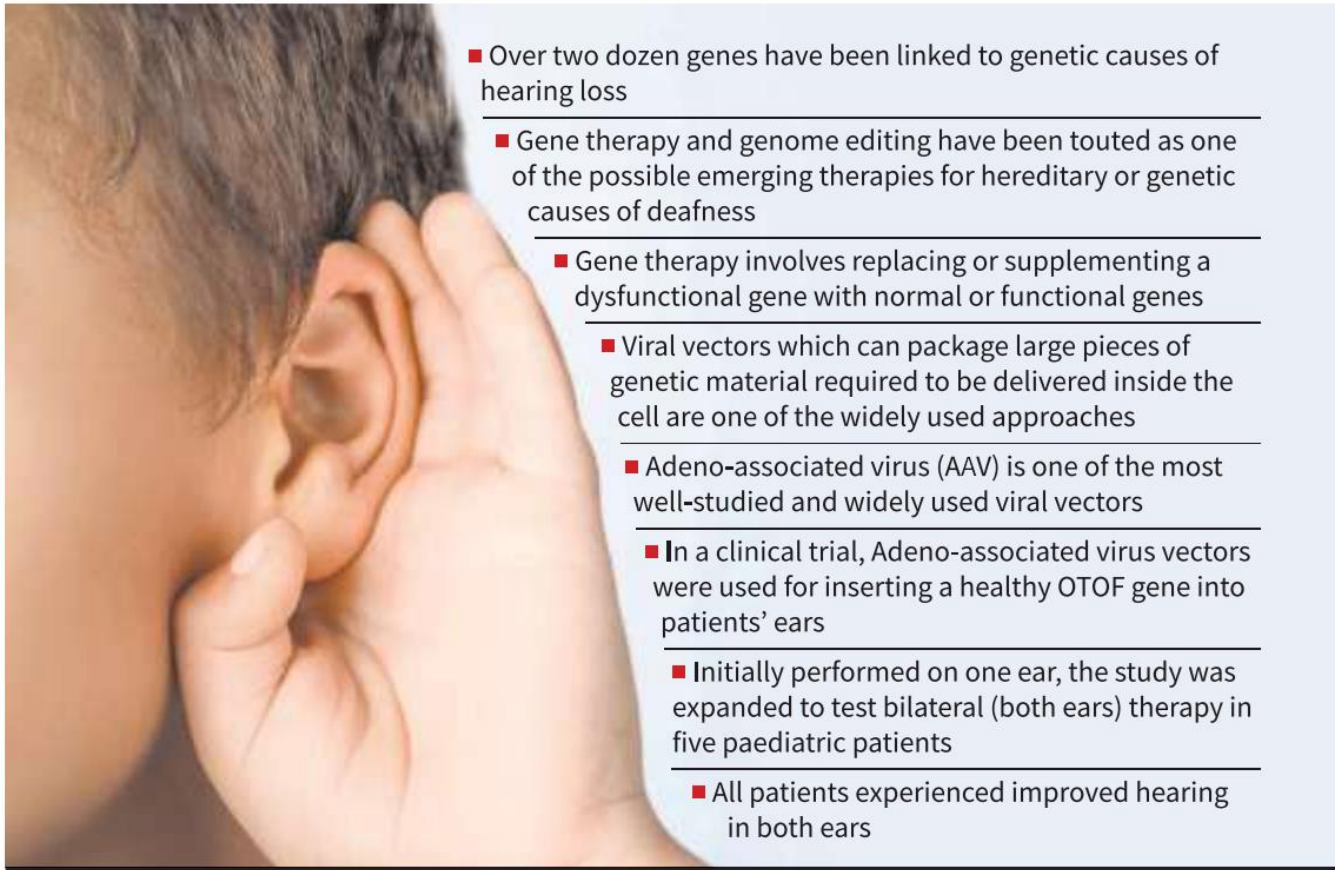
While the initial results are encouraging, Adeno-associated virus vectors come with their own set of caveats. The foremost being that our immune system can recognise and eliminate the virus making it less effective in individuals who are immunised, and also limits the re-administration of the gene therapy vector, since the primary administration would produce antibodies against the virus. Previous studies have suggested that approximately one-fifth to one-third of the patients have neutralising antibodies against AAV.

The present report is limited by the small number of patients studied and reported over a short follow-up period. However, it is encouraging that the clinical trial is ongoing and longer-term follow-up data of the patients would be available soon. While the results are encouraging and provide immense hope, we are not yet on a firm ground to assert that gene therapy for hearing loss is paving the way towards a sound future.

(Vinod Scaria is a consultant at Vishwanath Cancer Care Foundation, and Rahul Bhoyar is a senior scientist at Karkinos Healthcare. Opinions are personal)

Hope for children with congenital hearing loss

Genetic causes are responsible for about 50-60% of congenital hearing loss



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Early detection: : Newborn screening programmes help detect children born with congenital hearing loss

Antimalarials may relieve polycystic ovary syndrome

Plant-derived compounds best known for their antimalarial properties relieve polycystic ovary syndrome, a major public health problem that affects millions of women worldwide. These compounds, called artemisinins, achieve their effect by suppressing ovarian androgen production in multiple rodent models as well as in a small cohort of human patients. Nineteen women taking dihydroartemisinin, a drug used to treat malaria, for 12 weeks substantially reduced key PCOS biomarkers.

Artemisinins

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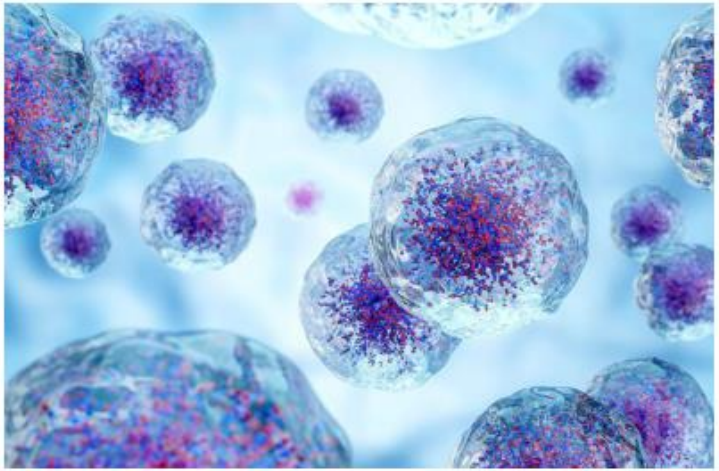

Migraine drug weakens leukemic stem cells in mice

A drug approved for the treatment of migraines can also disrupt energy-producing processes that fuel hardy leukemic stem cells, according to a new study in mice. The findings show that the medication, named lomerizine, could sensitise treatment-resistant leukemia tumors to drugs such as imatinib, suggesting a new potential type of combination therapy. Combining imatinib and lomerizine shrank chronic myeloid leukemia tumors in mice, suppressed leukemic stem cells, and prolonged survival.

lomerizine

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Question Corner

Pigeon proximity

Does seeking social proximity improve flight routes among pigeons?

A new study looked at the social influences on pigeon flight routes. Researchers have found that flight paths are improved as younger birds learn the route from older birds, leading to overall more efficient routes over generations. The researchers compared the pigeon flight data to a computer model that prioritised four main factorsrepresenting what might be involved in choosing a flight path with minimal cognition, including: direction to the goal, representing the bird's internal compass; proximity to the other pigeon; the remembered route; and general consistency, since the birds are unlikely to make erratic turns. The younger agent benefits from the older agent by learning the route. However, it also shows that the older agent benefits from the younger agent. Since younger agents are not following an internal route, they are more oriented to the final destination. The agents' desire for social proximity between the two balances these draws, leading to an overall more efficient route.

Readers may send their questions / answers to questioncorner@thehindu.co.in

Pigeon behaviour

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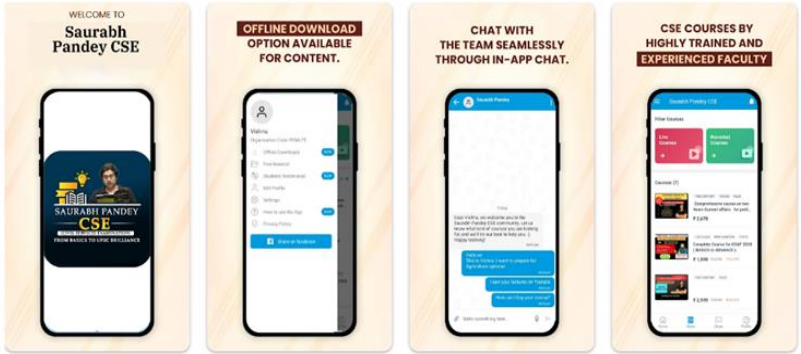

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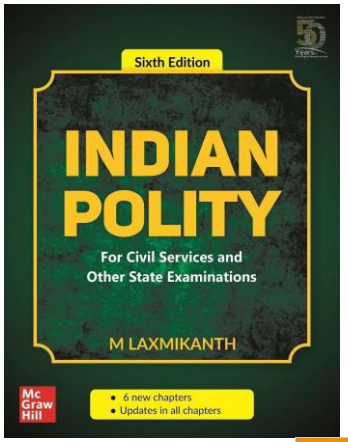

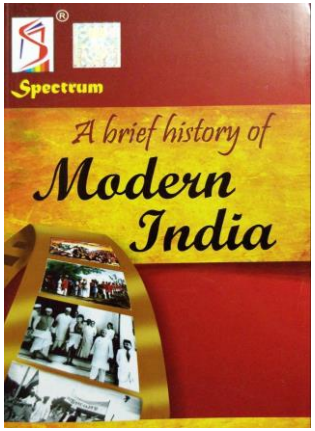

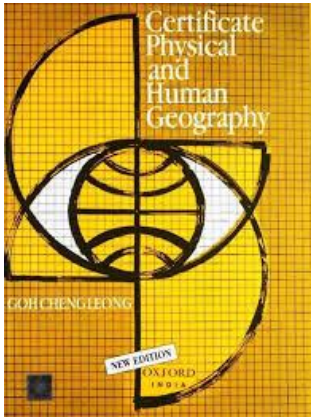

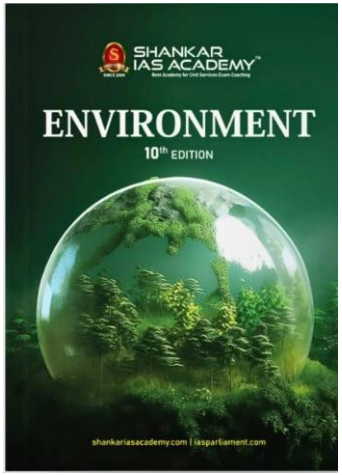

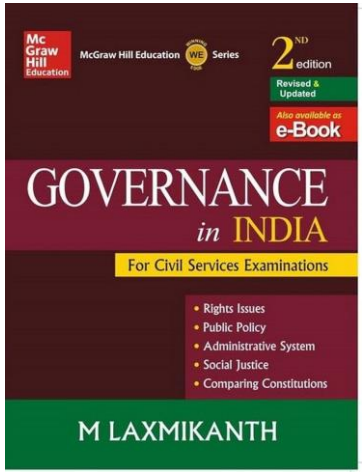

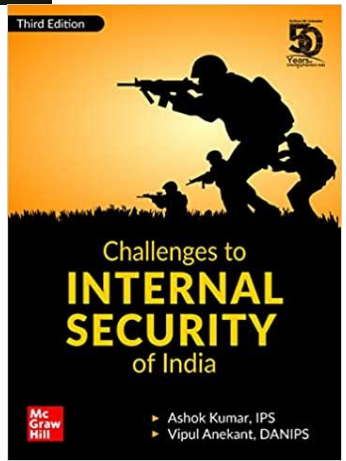

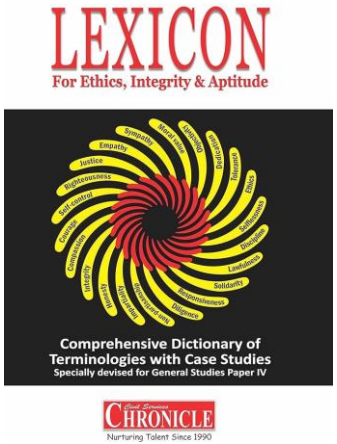

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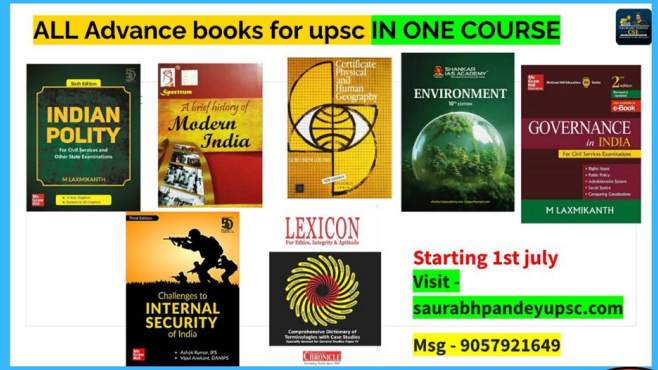

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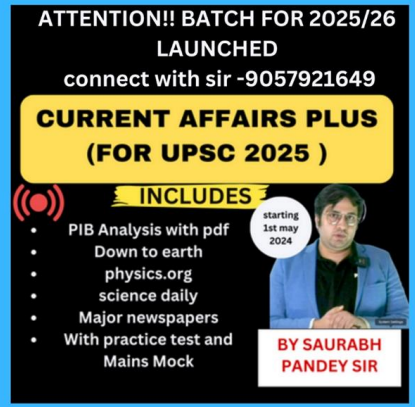

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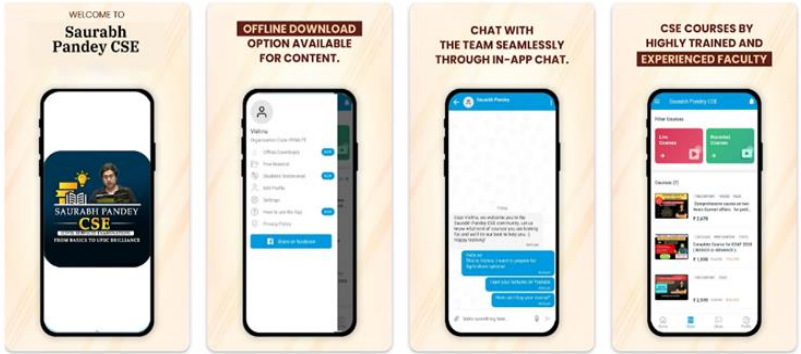

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