Topics

- National Mission for Sustaining the Himalayan Ecosystem
- Lachit Borphukan
- (CAR) T cell therapy
- ISRO’s ‘zero orbital debris’
- Is transparency lacking in candidate disclosure?
- Mains

By saurabh pandey sir

Target Mains 2024/25

Q"Human Habitation in Himalaya region is influenced by both Human centric and non human centric factors. Discuss

Q"हिमालय क्षेत्र में मानव निवास मानव केंद्रित और गैर मानव केंद्रित दोनों कारकों से प्रभावित है। चर्चा करना

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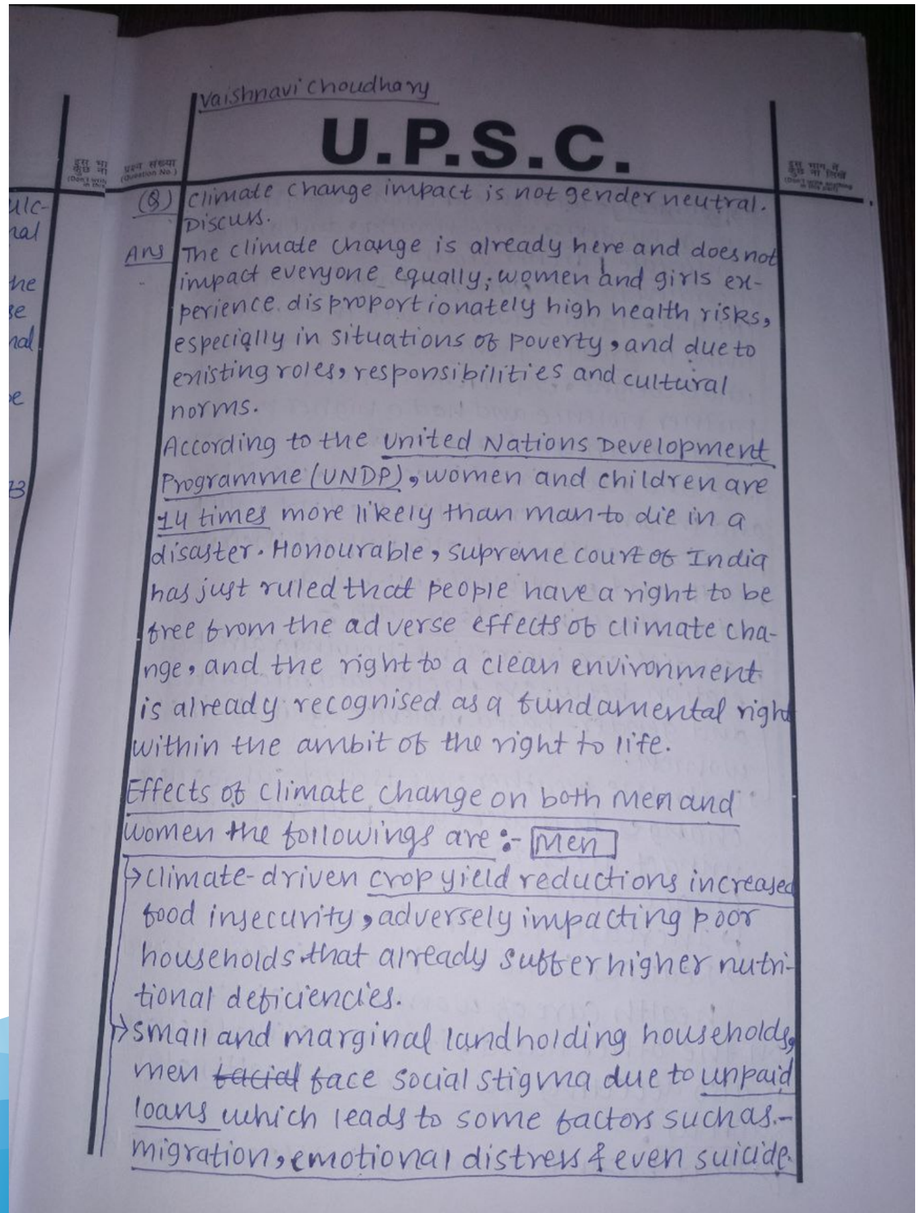
Answer review



Vaishnavi Choudhary

U.P.S.C.

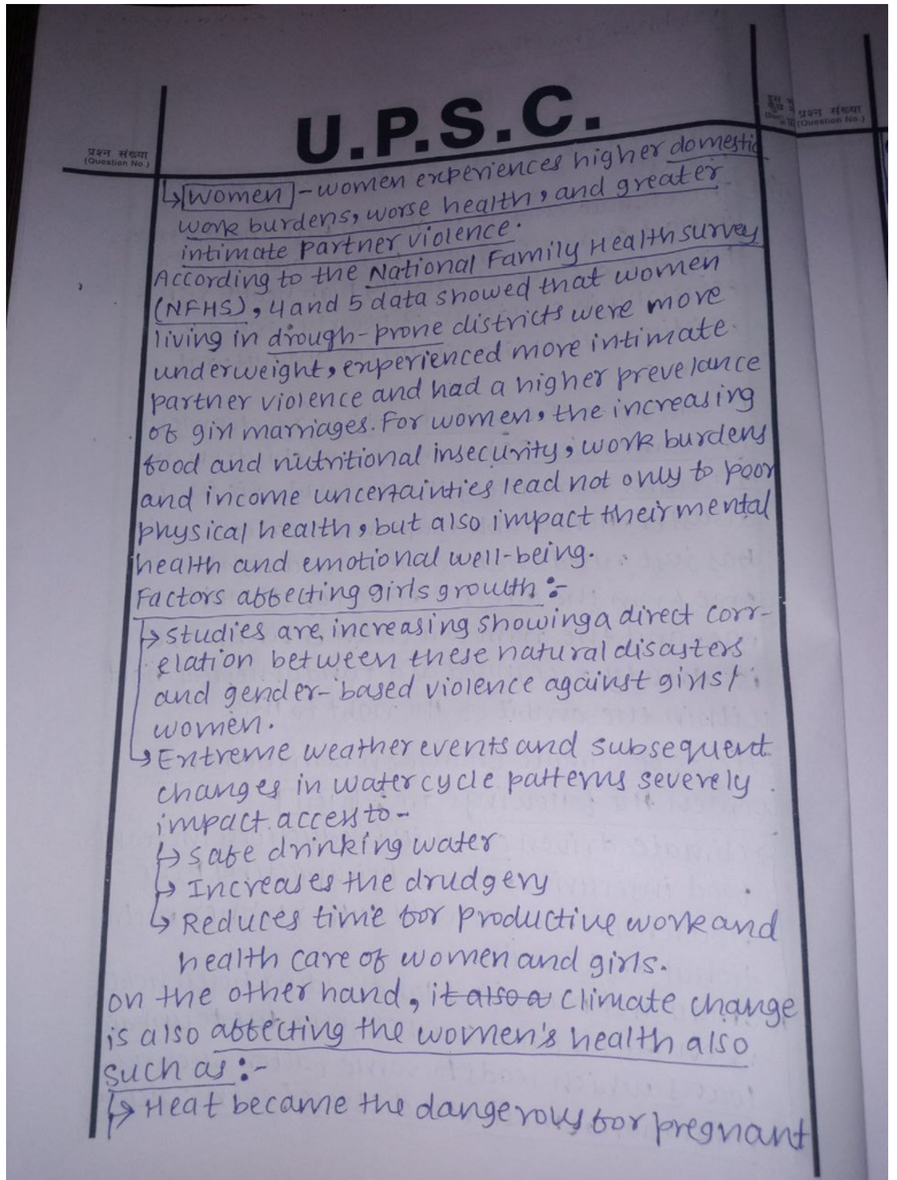
(8) Climate change impact is not gender neutral. Discuss.

Ans The climate change is already here and does not impact everyone equally; women and girls experience disproportionately high health risks, especially in situations of poverty, and due to existing roles, responsibilities and cultural norms.

According to the United Nations Development Programme (UNDP), women and children are 14 times more likely than man to die in a disaster. Honourable, Supreme court of India has just ruled that people have a right to be free from the adverse effects of climate change, and the right to a clean environment is already recognised as a fundamental right within the ambit of the right to life.

Effects of climate change on both men and women the followings are :- Men

- climate-driven crop yield reductions increased food insecurity, adversely impacting poor households that already suffer higher nutritional deficiencies.
- small and marginal landholding households, men ~~facial~~ face social stigma due to unpaid loans which leads to some factors such as:- migration, emotional distress & even suicide.



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- Women - women experiences higher domestic work burdens, worse health, and greater intimate partner violence.

According to the National Family Health survey (NFHS), 4 and 5 data showed that women living in drough-prone districts were more underweight, experienced more intimate partner violence and had a higher prevelance of girl marriages. For women, the increasing food and nutritional insecurity, work burdens and income uncertainties lead not only to poor physical health, but also impact their mental health and emotional well-being.

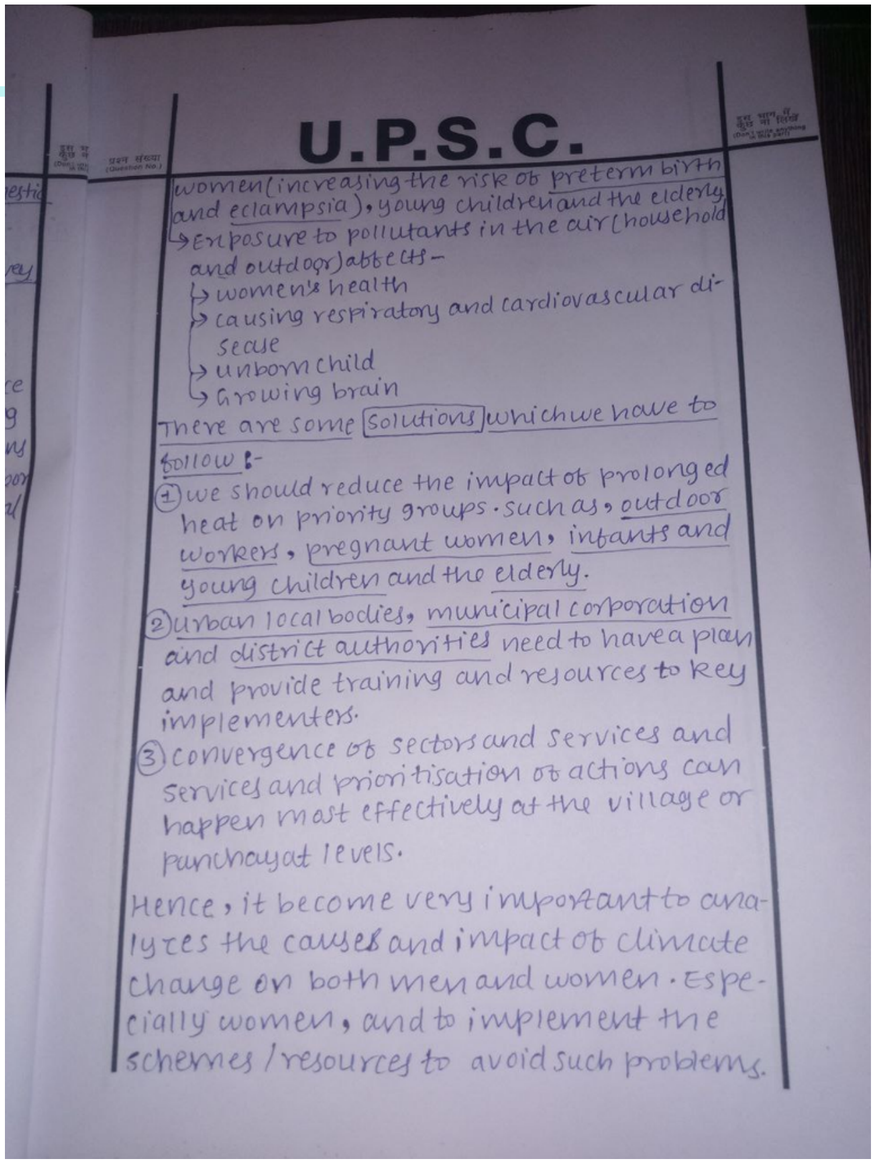
Factors affecting girls growth :-

- studies are increasing showing a direct correlation between these natural disasters and gender-based violence against girls/women.
- Extreme weather events and subsequent changes in water cycle patterns severely impact access to -
  - safe drinking water
  - Increases the drudgery
  - Reduces time for productive work and health care of women and girls.

on the other hand, it ~~also a~~ Climate change is also affecting the women's health also such as :-

- Heat became the dangerous for pregnant

Answer review



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women (increasing the risk of preterm birth and eclampsia), young children and the elderly,
↳ Exposure to pollutants in the air (household and outdoor) affects -
↳ women's health
↳ causing respiratory and cardiovascular disease
↳ unborn child
↳ Growing brain

There are some [solutions] which we have to follow :-

(1) we should reduce the impact of prolonged heat on priority groups · such as, outdoor workers, pregnant women, infants and young children and the elderly.

(2) urban local bodies, municipal corporation and district authorities need to have a plan and provide training and resources to key implementers.

(3) convergence of sectors and services and services and prioritisation of actions can happen most effectively at the village or panchayat levels.

Hence, it become very important to analyses the causes and impact of climate change on both men and women · Especially women, and to implement the schemes / resources to avoid such problems.

A battle to save Ladakh, and all of humanity

When Ramon Magsaysay award winner (2018) and climate activist Sonam Wangchuk addressed a 30,000-strong crowd at Leh, Ladakh on March 6, 2024 to announce his 21-day climate fast, he was not just speaking to the people of Ladakh but also making an appeal to the world.

Tucked away between India's neighbours, Pakistan and China, at a height of 11,500 feet, Ladakh comprises 97% indigenous tribes, many of whom lead simple pastoral lives and depend on farming and animal rearing for a livelihood. Apart from border disputes, the Himalayan region also faces the damaging effects of climate change through floods, drought, landslides, greenhouse gases, and other pollutants.

There are about 15,000 glaciers in the Himalayan region, often referred to as the Third Pole. In spring and summer, these glaciers form an important part of the hydrological process by releasing meltwater to the Indus, the Ganga, and the Brahmaputra. The Himalayan glaciers, like those in the rest of the world, are at risk of melting due to global warming and climate change. This will affect both residents of the mountain region and those living downstream.

Janaki Murali

is a journalist and author

Sonam Wangchuk's climate fast has highlighted the larger issue of the fragility of the Himalayan ecosystem

Infrastructure boom

In 2008, the Centre launched eight Missions under the National Action Plan on Climate Change (NAPCC). One of these was under the Ministry of Science and Technology, i.e., the National Mission for Sustaining the Himalayan Ecosystem (NMSHE). As the Department of Science and Technology (DST) website states, the "main objective of NMSHE is to develop a capacity to scientifically assess the vulnerability of the Himalayan region to climate change and continuously assess the health status of the Himalayan ecosystem".

So, why has NMSHE forgotten its role of protecting the Himalayan region?

Almost as soon as Ladakh became a Union Territory, several mega infrastructure projects were launched at rapid pace. These included the construction of bridges, widening of roads, tunnels, railway lines, mega solar projects, a state-of-the-art airport terminal and wayside amenities to boost tourism. Among these were the 14.15 kilometre Zojila tunnel, the 230 km Kargil-Zanskar National Highway project, and a 10 gigawatt solar energy project covering 20,000 acres in the Changthang region. The Ladakh (UT) Industrial Land Allotment Policy of 2023 aims "to make UT Ladakh one of the preferred destinations for investment".

The Border Roads Organisation (BRO) has been spearheading many of these projects along with the National Highways & Infrastructure Development Corporation Ltd. (NHIDCL). In its annual report of 2021-22, the NHIDCL states as its vision the following: "To fast-pace the construction of National Highways and other Infrastructure in the North Eastern Region, near border and strategic areas like Jammu and Kashmir, Ladakh and also in the state of Uttarakhand and UT of Andaman & Nicobar islands". Incidentally, all these areas are vulnerable to climate change-related disasters.

A region that has seen disasters

What is puzzling is why the various government bodies, sanctioning and executing the projects at such a feverish pace, are not paying heed to the warnings from past disasters in the mountains and learning from them.

Since 2010, there have been several disasters in the Himalayan region, with a loss of lives and livelihoods. In 2013, a cloudburst in the upper reaches of the Himalayas led to flash floods at Kedarnath, claiming 6,000 lives and sweeping away several settlements. In January 2023, disaster struck Joshimath, when water gushed down a lower slope of the mountain, submerging parts of the town. In November 2023, the rescue of 41 trapped workers in the collapsed Silkyara tunnel project in the Himalayas garnered international attention.

Uttarakhand, where all these tragedies occurred, too has seen a slew of infrastructure projects from its formation in 2000. This has continued despite dire warnings from geologists and ecologists. A Supreme Court of India constituted expert committee even suggested that authorities limit the number of pilgrims visiting the Char Dam Himalayan shrines, at Kedarnath, Badrinath, Yamunotri, and Gangotri to carrying capacity. Carrying capacity is the maximum number of people that an ecosystem can support, without eroding it. But, instead, pilgrim numbers have only swelled every year. Some expert committees have even suggested that no hydroelectric projects are set up in the para-glacial zone.

When tragedy strikes, the human cost of environmental destruction is sadly borne by poor migrant workers in ongoing projects and by residents, tourists and pilgrims. Government bodies sanctioning the projects or the developers executing them escape the wrath of the mountains.

Scant review

What has been frustrating climate change activists is their recommendations gathering dust despite approaching the courts and the formation of expert committees. Hardly any due diligence which includes risk assessment, safety measures and geological and seismic analysis, goes into any of the multi-crore mega projects in the mountains.

In the name of development, we cannot afford to upset the fragile balance in the Himalayan ecosystem and its biodiversity. The onus is on all of us to ensure that the Himalayas and the people living under its shadow are protected.

For, Wangchuk's battle is not just about Ladakh and its people. It is a battle for all of humanity and its future generations.

National Mission for Sustaining the Himalayan Ecosystem

- The National Action Plan on Climate Change (NAPCC) has enunciated the launch of a National Mission for Sustaining the Himalayan Ecosystem.
- The mission attempts to address some important issues concerning a) Himalayan Glaciers and the associated hydrological consequences, b) Biodiversity conservation and protection, c) Wild life conservation and protection, d) Traditional knowledge societies and their livelihood and e) Planning for sustaining of the Himalayan Ecosystem.

- Sustaining the Himalayan eco system as a national mission, will focus on the rapid generation of four types of national capacities, They deal with a) Human and knowledge capacities, b) Institutional capacities, c) Capacities for evidence based policy building and governance and d) Continuous self learning for balancing between forces of Nature and actions of mankind.

Jorhat's Statue of Valour watches over battle for Ahom pride

Rahul Karmakar
JORHAT


The statue of Lachit Borphukan was inaugurated by the Prime Minister on March 9.

Pranab Barpatragohain plans to start a restaurant on his plot opposite the entrance gate of an under-construction park sporting Meleng-Hollongapar's newest landmark – the Statue of Valour.

The 125-foot statue depicts Lachit Borphukan, the iconic Ahom general revered for leading the Battle of Saraighat in 1671 to prevent the Mughal army from occupying Assam. The park encompasses the *maidam*, or earthen pyramid, where he was buried after the battle.

"The park and the statue are expected to attract visitors and boost business in the neighbourhood," said Mr. Barpatragohain.

"This statue may change the face of our area, but it should have been inaugurated after completion," said one of his neighbours.

Divided opinion

Opinions about the Statue of Valour, inaugurated by Prime Minister Narendra Modi on March 9, are perhaps as divided as the support for the two top candidates – BJP's Topon Kumar Gogoi, who is eyeing a second successive term; and challenger Gaurav Gogoi of the Congress. The latter had won the 2019 Lok Sabha election from the adjoining Kaliabor seat, which metamorphosed into Kaziranga after the 2023 delimitation exercise.

The nerve centre of the constituency is the elite Jorhat town, said to be Assam's tea capital because of the surrounding plantations, about 300 km east of Guwahati. The park is almost as far from the eastern edge of the town along NH-715 as the Sukhapha Samannay Kshetra is from its western edge.

Dedicated to Swargadeo (or emperor) Sukapha, who came from China's Yunnan to establish the Ahom dynasty that ruled Assam for 600 years until the British takeover in the 1800s, this represents Ahom pride as much as the Lachit statue park. But while the park is perceived to have a BJP stamp, the Kshetra is associated with the Congress. Former CM and Mr. Gaurav's father, the late Tarun Gogoi, laid its foundation in December 2015. The Ahom community, to which the Gogois belong, make up the majority of voters in the Jorhat constituency, and are believed to have a soft corner for Mr. Gaurav.

Lachit Borphukan

- .Lachit Borphukan, the general of the Ahom Kingdom, is best known for fighting off the Mughals, defeating them in the Battle of Saraighat in 1671 on the banks of the Brahmaputra near Guwahati.
- Born on November 24, 1622, Lachit Borphukon is a 17th-century commander of the Ahom forces.

AHOM KINGDOM

The Hindu analysis by saurabh pandey sir

- The Ahom kingdom had been repeatedly attacked by the Turkic and Afghan rulers of the Delhi Sultanate and later by the Mughals.
- The Mughal-Ahom wars had been going on since 1615-16, with the first Mughal attack on Assam with a view to capturing the region.
- The Ahoms had ruled major parts of Assam for nearly 600 years, between 1228 and 1826

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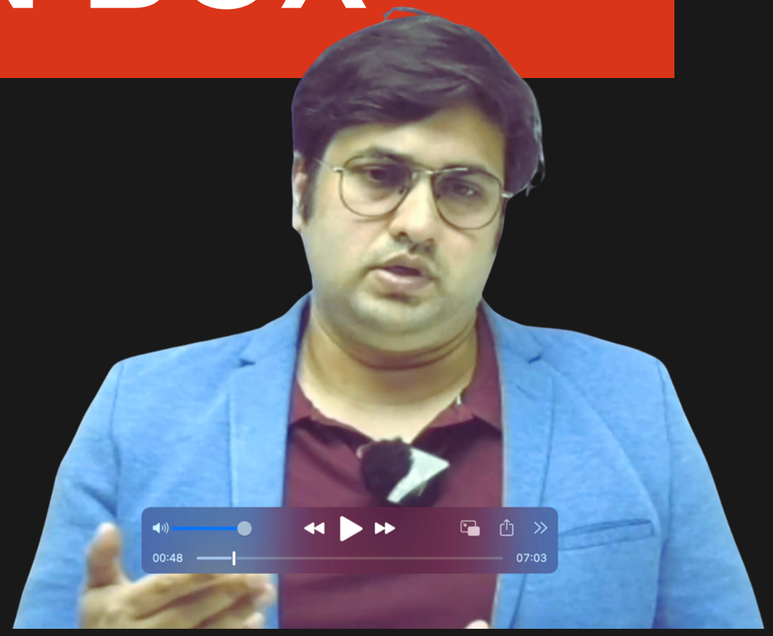

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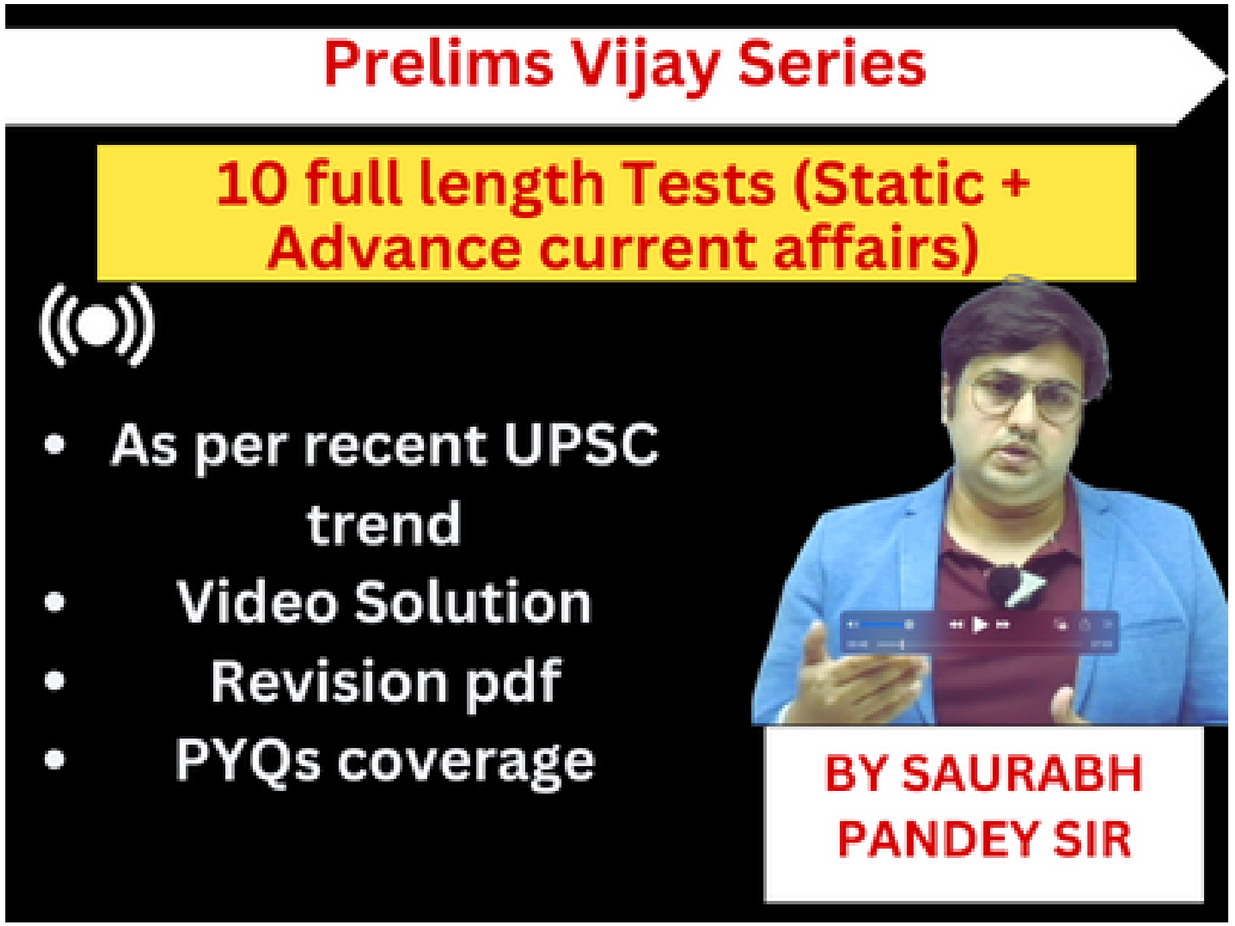

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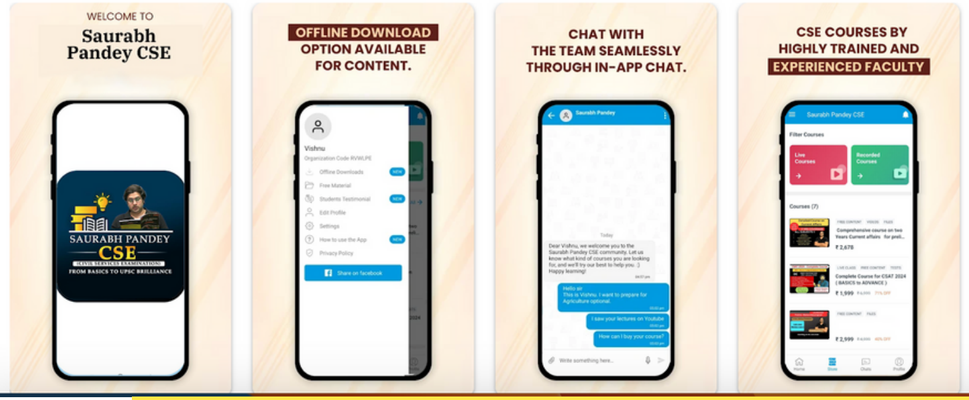

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Crafted at home, NexCAR19 takes India to next level in cancer care

Chimeric Antigen Receptor T cell therapy involves genetically modifying a patient's T cells to fight against malignant tumor cells. T cells are a type of white blood cell developed from the stem cells in the bone marrow and are a vital part of the immune system, defending the body against infections

Soujanya Padikkal

It is 2015. Alka Dwivedi, is striving to develop patient-focused therapy for cancer. This leads her to join Rahul Purwar, a Professor at the Indian Institute of Technology Bombay (IIT-B), who is working on developing affordable CAR-T cell therapy in India.

Chimeric Antigen Receptor (CAR) T cell therapy involves genetically modifying a patient's T cells to fight malignant tumor cells. T cells are a type of white blood cell developed from the stem cells in the bone marrow and are a vital part of the immune system, defending the body against infections.

Dr. Purwar returned to India in 2013 after completing his post-doctoral programme at Harvard Medical School and realised that India lagged behind the West in CAR-T research. The U.S. was already working on it by then, and in 2017, it had approved the first commercial CAR-T cell therapy, which cost anywhere between ₹3 and 4 crore, excluding hospitalisation to treat side effects, rendering it unaffordable to middle and low-income countries, including India.

He was driven by a vision to provide accessible treatment to Indians. It took 10 years to flesh out his vision in research that included his students Alka Dwivedi and Atharva Karulkar. "When I saw what he was doing, I decided to give it my 100% to make it successful," says Dr. Dwivedi, the former doctoral student who now works at the National Cancer Institute (NCI) in Bethesda, Maryland.

He would soon be joined by Gaurav Narula and Hasmukh Jain, haemato-oncologists from Tata Memorial Hospital (TMH), Mumbai, who spearheaded the clinical trial phases of NexCAR19. "We were just getting to know that [CAR-T therapy] is something that is going to potentially change the treatment paradigm," said Dr. Jain.

How are CAR-T cells made?

T-cells (a type of white blood cell) are collected from the patient through a process called leukapheresis. They are then modified in the lab to express proteins called chimeric antigen receptors (CARs) on their surface. The gene responsible for encoding CAR is developed synthetically in the lab, and a vector acts as a vehicle to deliver CAR into the patient's T-cell. Commonly, viral vectors, such as lentiviral vectors, are used, as seen in NexCAR19. The re-engineered T cells are then multiplied by millions in the lab and sent back to the hospital, where they are infused into the patient. The patient usually undergoes chemotherapy before receiving the CAR-T cells.

The CAR comprises several components that enable it to identify cancer cell antigens and stimulate an immune response. Each CAR spans across the cell membrane, with a portion extending outside the cell and a portion inside. The exterior segment is made of fragments of laboratory-generated antibodies selected for their affinity to bind to the targeted antigen. The internal segment of CAR consists of two components responsible for transmitting signalling once the receptor interacts with an antigen.

The National Cancer Institute at the National Institutes of Health in Bethesda, Maryland. AFP

The FDA has approved six CAR-T cell therapies till now, and four of them target CD19, a protein produced on the surface of leukemia and lymphoma cells. NexCAR19 is similar in this aspect. A key difference between the CAR-T cell therapies developed in the U.S. and NexCAR19 lies in the composition of antibody fragments. While those developed in the US originate from murine (mice) sources, NexCAR19 has human proteins added to the mouse antibody, resulting in a 'humanised' CAR. This modification might have contributed to its reduced toxicity.

Collaboration with NCI

The researchers were trying to develop a therapy unexplored in India, and it was not an easy path. "We tried multiple times and had multiple failures and successes," says Dr. Dwivedi. "The process is very lengthy and requires skill. When I was trying, the process was not working." Recognising the need for expertise, the team decided to seek help from the NCI and brought on board Nirali Shah, M.D., who collaborated with Dr. Jain and Dr. Narula on the clinical trial phase of the treatment. "They knew what they wanted to do and how to develop it in India for India," says Dr. Shah.

They visited NCI during a conference at the American Association for Cancer Research (AACR). The team met researchers at NCI who helped them troubleshoot and provided insights on protocol and the challenges they were facing. Upon returning to India, they implemented the suggestions provided, and it worked well. "NCI had a great impact on our development," says Dr. Dwivedi. The visit helped the team design an effective therapy. A smile spreads across her face as she reminisces about the day the CAR construct worked not only in vitro but also in mice.

> In October 2023 CDSCO approved the first CAR-T cell therapy to treat relapsed or refractory B-lymphomas and B-Acute Lymphoblastic Leukemia (B-ALL), where all other lines of treatment had failed

Clinical trial

After successfully developing CAR-T cell therapy, the team had to approach the Central Drugs Standard Control Organization (CDSCO) for clinical trial approval. "I think getting approval to conduct the study was a second critical milestone," says Dr. Shah.

On June 4, 2021, the first patient was treated at Tata Memorial Hospital, and the CAR-T therapy worked. "We were super happy that whatever we saw in the laboratory was working on the patient. It was a huge thing," says Dr. Dwivedi.

In October 2023, based on the data emerging from the clinical trial, CDSCO approved the first CAR-T cell therapy to treat relapsed or refractory B-lymphomas and B-Acute Lymphoblastic Leukemia (B-ALL), where all other lines of treatment had failed. Thus emerged a Made-in-India product, built by a team that persevered despite numerous challenges.

Risks of CAR-T therapy

While CAR-T therapy has shown remarkable progress in cases that looked hopeless, its efficacy varies from person to person, and it remains too early to declare it a complete cure. Moreover, it entails several side effects, the cytokine release syndrome (CRS) being the most common – an inflammatory response triggering immune system hyperactivity. Neurotoxicity is another common side effect but it wasn't observed in any early-stage clinical trial patients, potentially because of the 'humanised' antibody fragments used. Additionally, infections and low blood cell counts are other side effects doctors anticipate.

"We had to keep in mind that complications, which we may not be aware of now, might appear as you go along. That is something we have to be careful about," says Dr. Jain.

Despite the promise of CAR-T therapy, access to primary healthcare remains a challenge in many parts of India, with cancer treatment primarily concentrated in metropolitan areas. Given the therapy's side effects, proximity to a hospital is paramount.

As a clinician and scientist, Dr. Shah points out that her biggest worry with CAR-T cell implementation is managing its side effect profile linked to inflammation, particularly in cases requiring intensive care support, and the possibility of patients being heavily immunocompromised.

"You have to be really mindful when you try to adopt a therapy from one country to the next. You have to also think about the clinical parameters where this therapy is going to be implemented," says Dr. Shah

Relatively costly therapy

The project started with Dr. Purwar's dream of developing an affordable treatment. While NexCAR19 is priced at a fraction of its U.S. counterpart, it remains relatively high for many Indians, ranging from ₹40 to 45 lakh. "It's still one of the most expensive therapies that we have in the entire field of cancer therapy," says Dr. Jain. The manufacture of NexCAR19 involves multiple steps that affect its cost. Labour, logistics, materials, and facility expenses as well as marketing, distribution, and intellectual property development all play a role in pricing according to Shirish Arya, Co-founder and Director-Corporate Strategy and Business Development at ImmunoACT, a startup founded by Dr. Purwar and backed by Laurus Labs.

The good news, though, is the price can be further reduced. "We are working hard to increase access further", says Mr. Arya. "As purchasing power improves, scale up of manufacturing will help reduce cost of production". Also, the low toxicity means a patient doesn't have to bear the cost of hospitalisation.

(The author is a freelance content provider based in Hyderabad. souji_padikkal@yahoo.com)

Chimeric Antigen Receptor (CAR) T cell therapy

- Chimeric Antigen Receptor (CAR) T cell therapy involves genetically modifying a patient’s T cells to fight malignant tumor cells.
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Side Effect

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ISRO's 'zero orbital debris' milestone

How did ISRO ensure practically zero debris left in earth orbit after the PSLV-C58/XPoSat mission? What is the purpose and function of the PSLV Orbital Experimental Module-3 (POEM-3)? How does it contribute to space debris mitigation efforts? What are the risks space debris poses to space assets?

EXPLAINER

Suchitra Karthikeyan

The story so far:

The Indian Space Research Organisation (ISRO) has said its PSLV-C58/XPoSat mission has practically left zero debris in earth orbit. The space agency explained that the last stage of the Polar Satellite Launch vehicle (PSLV) used in the mission was transformed into a kind of orbital station – called the PSLV Orbital Experimental Module-3 (POEM-3) – before it was left to re-enter the earth's atmosphere instead of floating in orbit once its mission was completed. ISRO said that after it completed the primary mission of injecting all satellites into their target orbits, the fourth stage of the PSLV was transformed into the POEM-3. It was subsequently de-orbited from 650 km to 350 km, rendering it more susceptible to being pulled towards the earth and burning up in the atmosphere. ISRO also said it "passivated the stage," meaning dumped its fuel, to avoid an explosion that could have flung small pieces of debris into orbit.

What is POEM?

Developed by the Vikram Sarabhai Space Centre (VSSC) as an inexpensive space platform, POEM uses the spent fourth stage of a PSLV rocket as an orbital platform. Used for the first time in the PSLV-C53 mission in June 2022, ISRO had POEM orbit the earth to perform in-orbit scientific experiments with various payloads onboard.

POEM is powered by solar panels mounted on the fuel tank of the rocket's fourth stage and a lithium-ion battery. It has a navigation, guidance, and control (NGC) system to stabilise its altitude along with helium control thrusters. The NGC system has four Sun sensors, a magnetometer, and gyroscopes, and talks to ISRO's NavIC satellite constellation for navigation. POEM also has a telecommand system to communicate with the ground station.

Orbital threat: With the rise in the number of satellites in orbit around the earth, space debris has become a pressing issue. AFP

ISRO first demonstrated the reuse of the spent fourth stage of its rocket in its PSLV C-44 mission in 2019. After satellites were injected into the target orbits, the fourth stage, carrying a student payload called Kalamsat-V2, was moved to a higher circular orbit of 443 km and stayed there, facilitating the payload's requirements.

What has POEM-3 achieved?

ISRO launched the PSLV C-58 mission from the Satish Dhawan Space Centre in Sriharikota on January 1.

After deploying the XPoSat satellite in its desired orbit of 650 km, the fourth stage, now called POEM-3, was lowered to a 350-km-high circular orbit. The lower a satellite is in orbit around the earth, the more drag it experiences and the more energy it needs to expend to stay in orbit.

POEM-3 featured nine payloads: two each from VSSC and Bellatrix Aerospace Pvt Ltd, one each from the start-ups TakeMe2Space, Inspecity Space Labs Pvt Ltd., Dhruva Space, and from LBS Institute of Technology, KJ Somaiya Institute of Technology, and ISRO's Physics Research Laboratory, Ahmedabad.

It completed 400 orbits around the earth by its 25th day. The payloads were operationalised to perform their experiments at this time. ARKA200, RUDRA, and LEAP-TD completed their respective experiments while the data from WeSAT, RSEM, and DEX were collected after every orbit for further analysis on the ground. Two fuel cells from VSSC demonstrated their ability to generate power. By January 27, 2024, all of POEM-3's payload objectives were completed.

For two months, POEM-3 prepared for its re-entry while ISRO tracked it with its Telemetry, Tracking and Command Network stations in Bengaluru, Lucknow, Mauritius, Sriharikota, Port Blair, Thiruvananthapuram, Brunei, and Biak (Indonesia) and the Multi-Object Tracking Radar (MOTR) at Sriharikota. On March 21, POEM-3 re-entered the earth's atmosphere, meeting its fiery end.

Why is this significant?

With the rise in the number of satellites in orbit around the earth, space debris has become a pressing issue. Space debris in the low earth orbit (LEO) mainly comprises pieces of spacecraft, rockets, and defunct satellites, and the fragments of objects that have deteriorated explosively as a result of anti-satellite missile tests. This debris often flies around at high speeds of up to 27,000 km/hr. Due to their sheer volume and momentum, they pose a risk to several space assets.

The LEO extends from 100 km above the earth's surface up to 2000 km above. It includes satellites tracking intelligence data, encrypted communication, and navigation. According to ISRO's Space Situational Assessment Report 2022, the world placed 2,533 objects in space in 179 launches in 2022.

Debris also exists, but in smaller volumes, in the geosynchronous orbit (GEO) 36,000 km above the earth's surface. Currently, 7,000 operational satellites are orbiting the earth at different altitudes along with millions of pieces of space debris. The U.S. Space Command tracks and catalogues space debris larger than 10 centimetres in LEO and larger than 0.3-1 metres in GEO.

How are agencies dealing with debris?

The latest incident of space debris causing havoc was recorded on March 8 when a discarded battery pallet dropped by the International Space Station ripped through the roof of a house in Florida.

As more communication satellites/constellations are launched and more anti-satellite tests are conducted, more on-orbit breakup and collisions occur, producing smaller fragments in orbit. The number of space objects (debris or functional equipment) greater than 10 cm in size in LEO is expected to be about 60,000 by 2030, per ISRO estimates. Space debris can also create unusable regions of the orbit where too much debris has accumulated, and which can trigger a cascading avalanche of collisions that produce yet more, but smaller pieces of, debris.

Currently, there are no international space laws pertaining to LEO debris. Most spacefaring nations abide by the Space Debris Mitigation Guidelines 2002 specified by the Inter-Agency Space Debris Coordination Committee (IADC), which the U.N. endorsed in 2007.

THE GIST

- ISRO successfully conducted the PSLV-C58/XPoSat mission, deploying the XPoSat satellite into orbit and subsequently transforming the last stage of the PSLV into the PSLV Orbital Experimental Module-3 (POEM-3).
- Developed by the Vikram Sarabhai Space Centre (VSSC), POEM utilises the spent fourth stage of a PSLV rocket as an orbital platform for scientific experiments.
- POEM-3 completed 400 orbits around the earth, operationalising nine payloads to conduct various experiments before re-entering the earth's atmosphere.
- With the increasing number of satellites in orbit, space debris poses a significant risk to space assets.

ISRO’s ‘zero orbital debris’

- T he Indian Space Research Organisation (ISRO) has said its PSLV-C58/XPoSat mission has practically left zero debris in earth orbit.
- The space agency explained that the last stage of the Polar Satellite Launch vehicle (PSLV) used in the mission was transformed into a kind of orbital station — called the PSLV Orbital Experimental Module-3 (POEM-3) — before it was left to re-enter the earth’s atmosphere instead of □oating in orbit once its mission was completed.

- WHAT IS POEM?
- Dubbed PSLV Orbital Experimental Module, Poem is the spent fourth stage of the launch vehicle that would be used as an orbital platform to carry out scientific experiments through non-separating payloads.
- PSLV is a four-stage rocket, and while the first three stages are jettisoned into the ocean after they push the mission to desired orbit, the four-stage remains in orbit and becomes space junk.
- Isro is now repurposing this fourth stage to use an experimental platform
-

HOW DOES POEM WORK?

- The fourth stage or the orbital experimental platform, Poem, is powered by solar panels and is fitted with its own Navigation Guidance and Control (NGC) system, which helps in attitude stabilization.
- The payloads will be switched on, once the primary and the secondary satellites from Singapore are deployed in their orbits. Isro said that the solar panels mounted around the PS4 tank will be deployed after confirmation of the stage achieving stabilization.
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- "The platform will ensure that the deployed solar panel points towards the Sun optimally using appropriate sun pointing mode, which will increase the power generation capability of the platform.

What has POEM-3 achieved?

- ISRO launched the PSLV C-58 mission from the Satish Dhawan Space Centre in Sriharikota on January 1.
- After deploying the XPoSat satellite in its desired orbit of 650 km, the fourth stage, now called POEM-3, was lowered to a 350-km-high circular orbit.
- The lower a satellite is in orbit around the earth, the more drag it experiences and the more energy it needs to expend to stay in orbit

Why is this significant?

- With the rise in the number of satellites in orbit around the earth, space debris has become a pressing issue.
- Space debris in the low earth orbit (LEO) mainly comprises pieces of spacecraft, rockets, and defunct satellites, and the fragments of objects that have deteriorated explosively as a result of anti-satellite missile tests.
- This debris often flies around at high speeds of up to 27,000 km/hr.
-

- Due to their sheer volume and momentum, they pose a risk to several space assets.
- The LEO extends from 100 km above the earth’s surface up to 2000 km above.
- It includes satellites tracking intelligence data, encrypted communication, and navigation
- Currently, there are no international space laws pertaining to LEO debris.
- Most spacefaring nations abide by the Space Debris Mitigation Guidelines 2002 specified by the Inter-Agency Space Debris Coordination Committee (IADC), which the U.N. endorsed in 2007.

Is transparency lacking in candidate disclosure?

How has the Supreme Court addressed concerns about candidates with serious criminal charges contesting elections? What reforms have been proposed by the Law Commission and EC to address these issues?

Rangarajan. R

The story so far:

The Supreme Court recently held that candidates need not disclose every piece of information and possession in their election affidavit unless it is substantial in nature. In another development, the Election Commission of India (EC) has asked the Central Board of Direct Taxes to verify the declaration with respect to yearly income in the affidavit filed by Rajeev Chandrashekar, the BJP candidate from Thiruvananthapuram.

What does the law specify?

Section 33 of the Representation of the People Act, 1951 (RP Act) read with rule 4A of election rules, requires every contesting candidate to file their nomination paper for elections along with an affidavit in a prescribed format. In *Association of Democratic Reforms (ADR) Vs Union of India* (2002), the Supreme Court held that voters have the right to know about the criminal antecedents, income and asset details of the candidate and his/her dependants and educational qualification of contesting candidates. This resulted in Section 33A being added to the RP Act that requires details of criminal antecedents to be part of the election affidavit.

Section 125A of the RP Act further provides that failure to furnish required information; giving false information or concealing any information in the nomination paper or affidavit shall be punishable with imprisonment up to six months or fine or both.

What are the issues?

In a recent case, an independent candidate from Arunachal Pradesh failed to declare three vehicles as assets in his election affidavit while contesting the Assembly election in 2019. His election was set aside by the Gauhati High Court. However, the Supreme Court reversed the decision and held that non-disclosure of information that is not material or substantial cannot be treated as an attempt to unduly influence the voters. In the case of Mr. Chandrashekhar, the complaint is about alleged concealment of his income and substantial assets in his election affidavit that can have a potential impact on the decision of the voters.

An even more significant issue relates to candidates with serious criminal charges contesting elections. Some candidates circumvented the requirement of rule 4A by leaving certain columns blank and filing incomplete affidavits. It once again required an order of the court in Resurgence India Vs EC (2013), to ensure that all columns are filled appropriately. According to a report by ADR, 19% of candidates in the 2019 Lok Sabha election faced charges of rape, murder or kidnapping.

The Law Commission in its 244th report on 'Electoral Disqualifications' (2014) and EC in its memorandum on 'Electoral reforms' submitted in 2016 had provided certain recommendations. First, a conviction for filing a false affidavit should attract a punishment of a minimum of two years imprisonment and be a ground for disqualification. Second, the trials in such cases must be conducted on a day-to-day basis. Finally, persons charged by a competent court with offences punishable by imprisonment of at least five years should be debarred from contesting in the elections provided the case is filed at least 6 months before the election in question.

The Supreme Court in *Public Interest Foundation Vs Union of India* (2018) directed candidates as well as political parties to issue a declaration about criminal antecedents, at least three times before the election, in a newspaper in the locality and electronic media.

What can be the way forward?

Debarring chargesheeted candidates from contesting elections is likely to be misused by various ruling parties. However, the other recommendations with respect to increasing punishment for filing false affidavits and making it a ground for disqualification need to be implemented. The Supreme Court's order to provide wide publicity of criminal records should also be strictly implemented. This would enable a discerning voter to exercise a well-informed choice.

Rangarajan R is a former IAS officer and author of 'Polity Simplified'. Views expressed are personal

THE GIST

- The Supreme Court ruled that candidates are not obligated to disclose every detail in their election affidavits unless the information is substantial in nature.
- Instances of candidates failing to disclose assets and income have raised questions about the transparency and completeness of affidavits.
- While debarring candidates based on chargesheets could be misused, implementing stricter punishment for false affidavits and increasing transparency in disclosing criminal records are crucial steps. Ensuring voter awareness and informed choices through better disclosure mechanisms is essential for electoral integrity.

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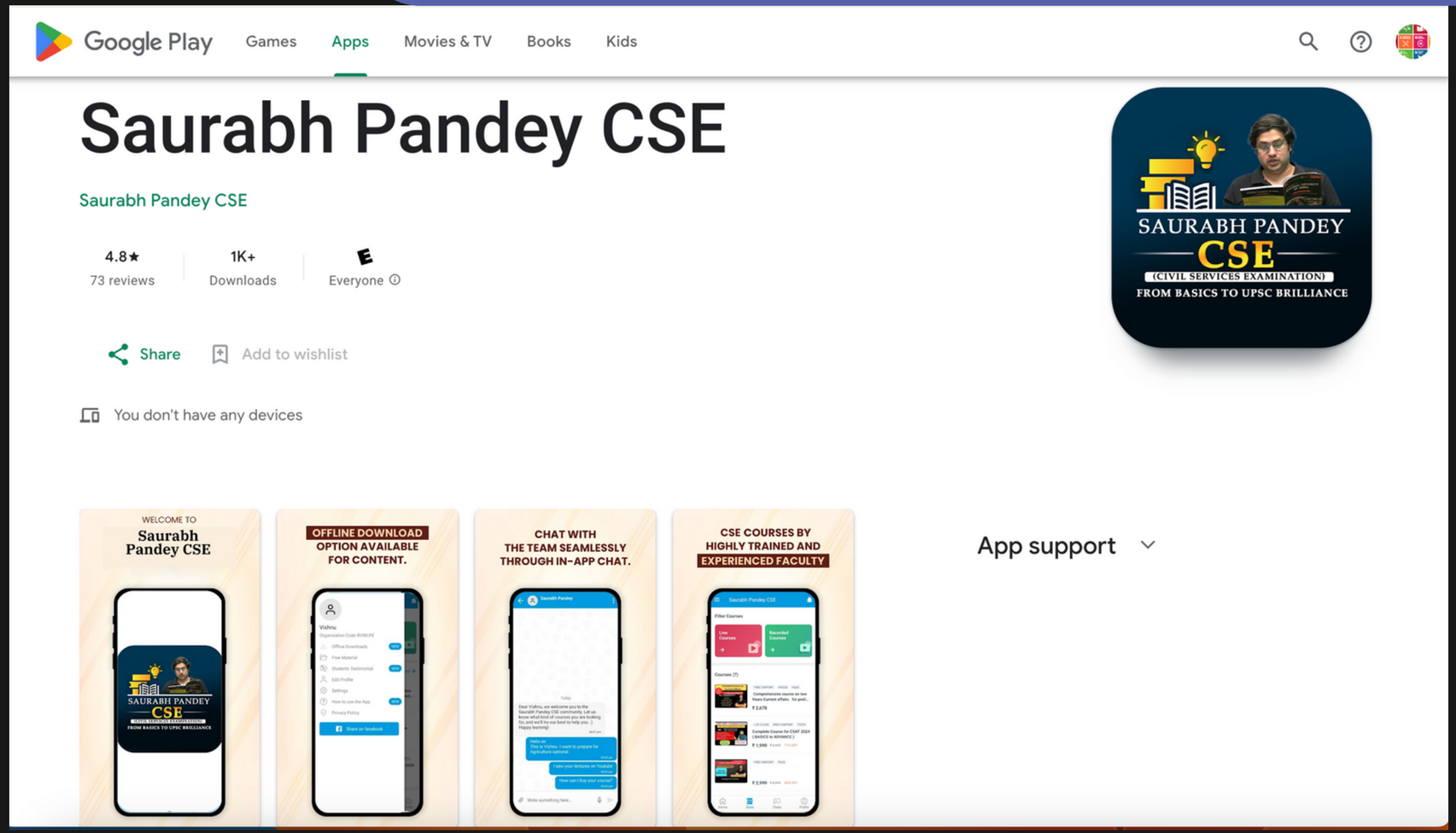

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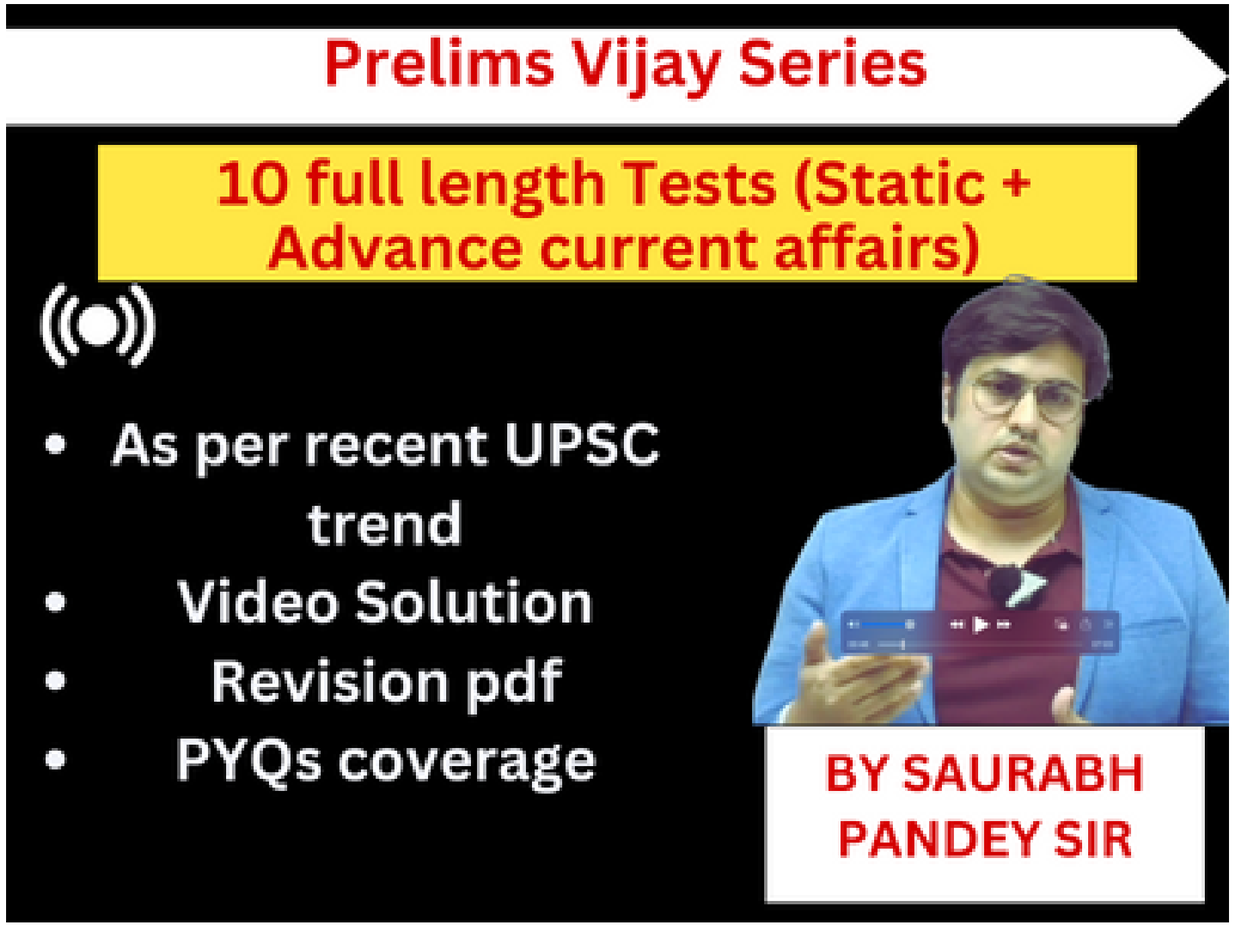

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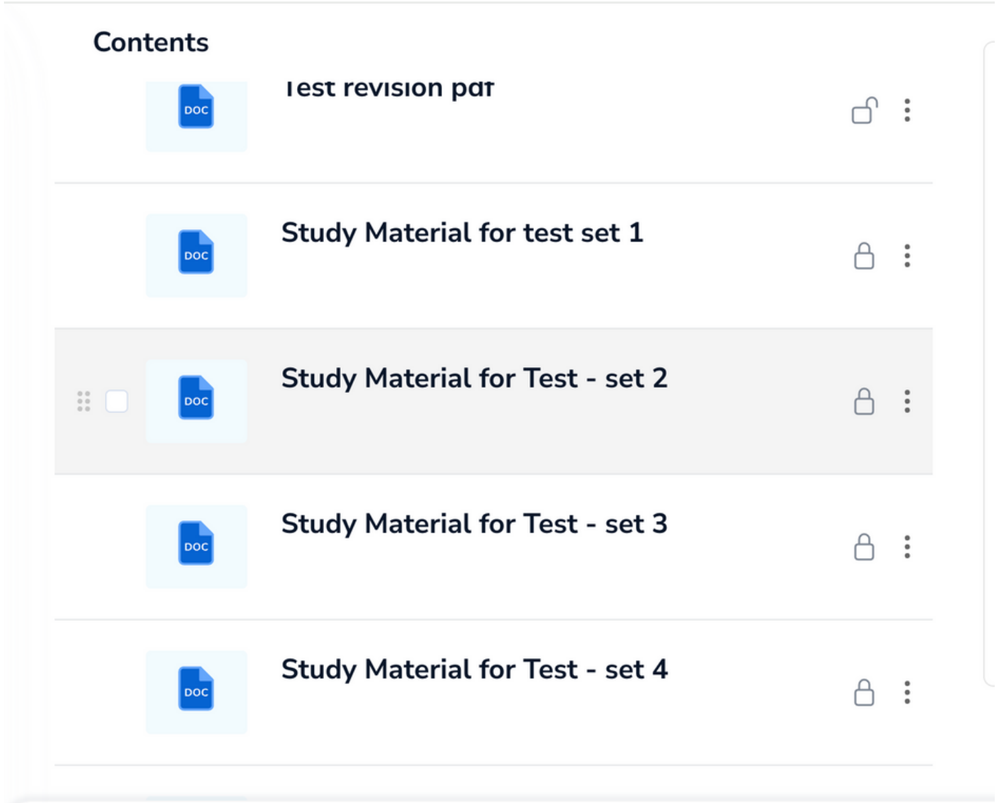

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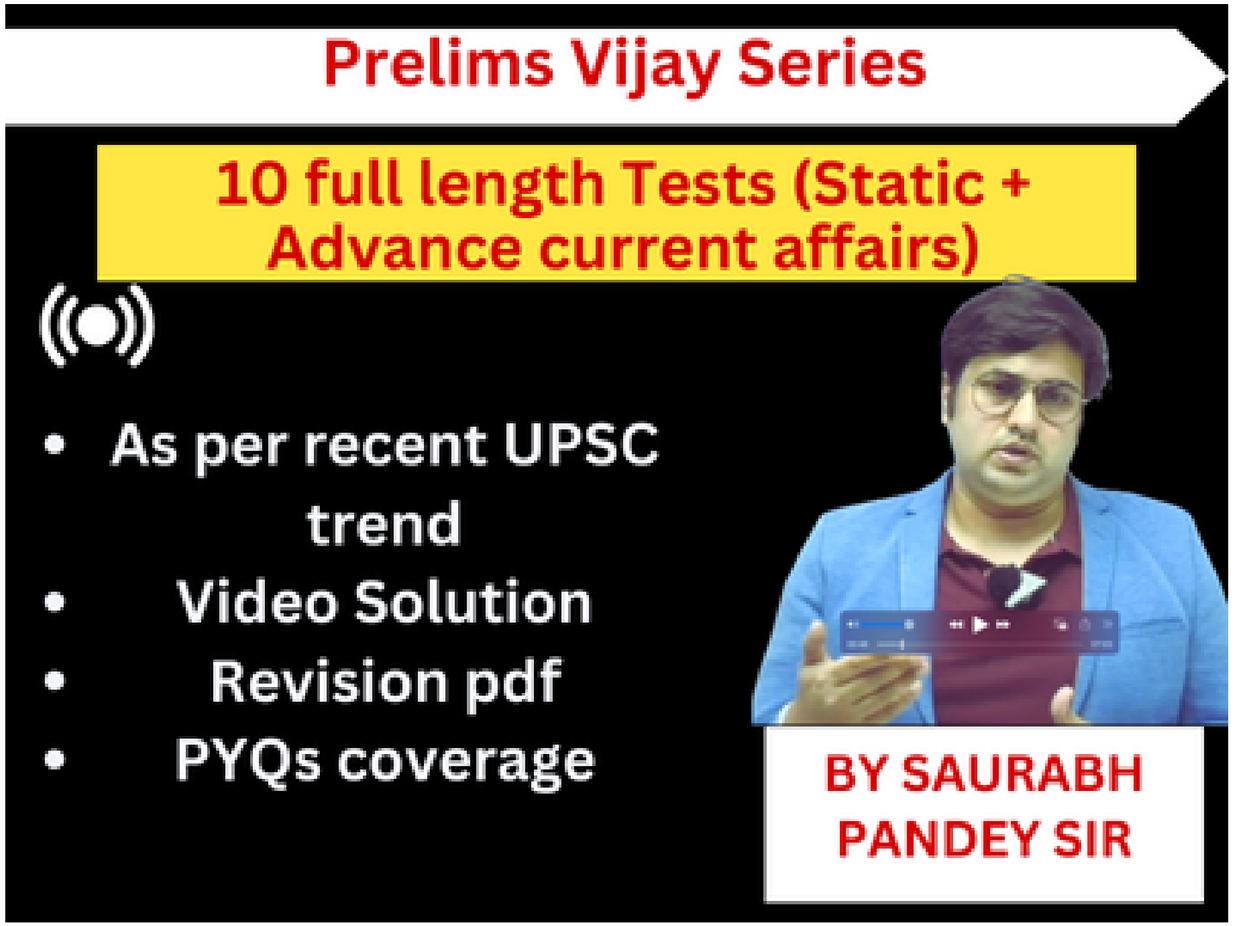

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