GS III & ESSAY

SYLLABUS: INDIGENIZATION OF TECHNOLOGY AND DEVELOPING NEW TECHNOLOGY.

INDIAAI MISSION

THE HINDU, PG.NO:7.

News: "What India's AI Safety Institute could do."

Context: MeitY convened meetings with industry and experts to discuss setting up an AI Safety Institute under the IndiaAI Mission.

About IndiaAI Mission:
- **Funding Allocation:** The Cabinet has approved over *Rs 10,300 crore* for the IndiaAI Mission over the next five years.
- **Objective:** To bolster India's AI ecosystem, Position India as a force shaping the future of AI.
- **Focus Areas:** The funding will support initiatives like:
  - IndiaAI Compute Capacity: To establish a cutting-edge, scalable AI computing infrastructure by *deploying over 10,000 GPUs* through strategic public-private collaborations.
  - IndiaAI Innovation Centre (IAIC): will receive funding to develop and deploy foundational AI models, Eg. *Indigenous Large Multimodal Models (LMMs)* and domain-specific models.
  - IndiaAI FutureSkills program: will expand AI education by increasing graduate and post-graduate AI program accessibility and establishing *Data and AI Labs in major and smaller towns.*
  - Financial Support for AI Startups: providing e*asier access to funding* for AI startups and supporting their growth from product development to commercialization.
  - IndiaAI Datasets Platform: aims to *enhance public sector datasets' accessibility, quality, and utility* for data-driven governance and AI-based innovation.
  - **Other areas like**, IndiaAI Application Development Initiative etc.

Regulatory Bottle Necks:
- **MeitY's AI Advisory in March 2024:** mandated govt. approvals before the public roll-out of experimental AI systems.
- **Global Digital Compact** that identifies multi-stakeholder collaboration, human-centric oversight, and inclusive participation of developing countries as essential pillars of AI governance and safety.
- **Regulatory sanctions** will hinder proactive information sharing among businesses, govts, and the wider ecosystem.
- **Shared expertise** will be essential to keep up with AI's rapid innovation trajectories.
- India should establish an **AI Safety Institute** which integrates into the Bletchley network of safety institutes.
  - **Bletchley Declaration** establishes a shared understanding of AI's opportunities and risks.

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PYQs:

Essay 2019: Rise of Artificial Intelligence: the threat of jobless future or better job opportunities through reskilling and upskilling.

GS III & ESSAY

SYLLABUS: INDIGENIZATION OF TECHNOLOGY AND DEVELOPING NEW TECHNOLOGY.

RESEARCH SECURITY

THE HINDU, PG.NO: 6.

News: "Research security should be a national priority."

Context: India is ramping up investments in strategic technologies, which include space, defence, semiconductors, nuclear technology, cybersecurity, biotechnology, clean energy, artificial intelligence, and quantum technology. So, ensuring strategic research outputs remain protected is critical.

Issues associated with Research Security:
- **Foreign interference:** A Harvard professor and his two Chinese students were arrested for concealing links to Chinese funding while receiving U.S. Department of Defense funding.
- **Cyberattacks & Intellectual property theft:** COVID-19 vaccine research facilities were cyber-attacked in 2020 to steal sensitive data.
- **Unauthorised access** to sensitive information.
- **Insider threat etc.**

Measures in other countries:
- **USA:** US CHIPS and Science Act has several provisions on research security.
- **Canada:** National Security Guidelines for Research
- Partnerships and a Policy on Sensitive Technology Research.
- A dedicated office similar to one at the U.S. National Science Foundation could be created for research security in the newly established *Anusandhan National Research Foundation (ANRF).*

Anusandhan National Research Foundation (ANRF):
- Statutory body established under *Anusandhan National Research Foundation (ANRF) 2023 Act.*
- **Purpose of ANRF:** To seed, grow, and promote research and development (R&D) in India.
- **Role of ANRF:** Apex body, to provide high-level strategic direction of scientific research in India as per National Education Policy 2020.
- **Collaboration of ANRF:** To forge collaborations among industry, academia, and government departments and research institutions.

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PYQs:

Essay 2020: Technology as the silent factor in international relations.

DISEASES

PRE-CONTEXT

HIV-AIDS

THE HINDU, PG.NO: 12.

News: "New HIV infections declined 44% in 2023, AIDS-related deaths down 79%."

"India reduced annual AIDS related deaths by nearly 80% between 2010-2023."

About Human Immunodeficiency Virus (HIV):
- HIV is a *weak virus.* It *'cannot' be transmitted through air or water outside the human body* unlike influenza etc.
- Within human body, HIV is highly effective in replicating.

Process:
- HIV enters bloodstream and *attached to CD4 or Helper T-cells* (a type of white blood cell, responsible for fighting infections).
- Attached HIV cell fuses with CD4.
- Then, *HIV releases its genetic material into CD4 cell-* which combines with cell's DNA.
- This allows the **virus to produce more HIV proteins inside the cell** and released; which **attack other CD4 cells.**
- The average *incubation period is 28 months.*

Mode of transmission:
- **Sexual contact (most common)** with HIV infected transmission.
- *Syringe* used for affected person.
- Blood (containing HIV) transfusion.
- Organ transplantation of the HIV-affected person.
- Artificial insemination.
- **Mother (infected with HIV)** to a new born baby during the process of giving birth, breast-feeding.

About Acquired Immunodeficiency Syndrome:
- AIDS is a disease in which *human immune system* is **severely affected.**
- It is caused by the HIV virus and the *last stage of HIV infection.*
- A person with AIDS **CD4 cell count drops below 200 cubic millimetres of blood** (normal counts are between 500-1600 millimetres of blood) and develops certain opportunistic infections.
- A full-blown (HIV) AIDS patient may die within *three years.*

Current status in India 2024:
- HIV prevalence in adults continued to be high in *Mizoram and Nagaland*, closely followed by *Manipur*. Further, its rising trend in *Punjab* is a cause for concern — **Ministry of Health and Family Welfare data.**

Bio Biomedical Waste (Management and Handling) Rules 1998:
- Marking the *first time* **hospital waste was recognised as** *hazardous and distinct.*
- Issued under *Environment Protection Act 1986.*

- The **Act empowered the Central and State Pollution Control Boards to monitor and regulate waste disposal**, ushering in an era of *accountability*.
- The **rules have undergone four amendments**, with major updates in 2016 and minor revisions in 2020, ensuring that hospital waste is segregated, treated, and disposed of responsibly.

The Syringe Tide of 1987:
- A chilling phenomenon, **saw used syringes and medical waste like blood vials and body tissues appear on beaches along the Atlantic coas**t, particularly in New Jersey and New York City. The *sight of children playing with syringes sparked a national outcry* and a **sense of biological apocalypse** among the American public. Led to the drafting of the 1988 U.S. Medical Waste Tracking Act.

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SYLLABUS: INCLUSIVE GROWTH.

UNEMPLOYMENT (WOMEN)

THE HINDU, PG.NO: 12.

News: "Centre working on national policy document on female labour force participation".

Womens Labour Force Participation Rate:
- Against *world average of 48%* (2022), the WLFPR in *India was 37%* (2023)—**Economic survey 2023-24.**
- **Domestic unpaid work:** which accounts to *3% of GDP*—**Oxfam Report 2022.**

Causes of Low WLPR:
- **Care responsibilities:** childcare, elderly, disabled etc.
- **Disguised Unemployment:** mostly in agriculture.
- **Cultural norms:** patriarchal culture, limited decision making power.
- **Stagnation of labour intensive sectors:** Eg. Manufacturing, construction.
- **Gender based job segregation:** limited to low skilled jobs.
- **Work place safety concerns.**
- **Gander gap:** India ranked 129 in Global Gender Gap report 2024, shows above barriers of women to enter workforce.

Care economy:
- A sector of **economic activities** related to providing care, **both paid and unpaid,** for the present and future populations, **encompasses direct care like feeding a baby and indirect care like cooking, cleaning, healthcare, education, and personal services.**
- *'Palna' scheme,* or the National Programme on Anganwadi-cum-Crèche by *MoW&CD,* which provides daycare facilities for children of working parents.
  - *1,000 Anganwadi creches* have been operationalised as part of this scheme.

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PYQs:

GS III 2023: Distinguish between 'care economy' and 'monetised economy'. How can care economy be brought into monetised economy through women empowerment?

GS III

Syllabus: inclusive growth.

THE OCEANS AND CARBON SEQUESTRATION

THE HINDU, PG.NO: 12.

News: "Conservation, environmental pollution and degradation".

"*The Ocean, the Earth's vast blue lung, has long played a critical but under appreciated role in moderating the planet's climate.*"

Ocean as Carbon Sink:
- It has absorbed *25% of anthropogenic CO2 emissions and more than 90% of the excess heat generated by GHGs,* buying humankind precious time against the worsening effects of climate change.

Ocean Pollution:
- Ocean acidification: disrupted **bio-geochemical-cycles, pollution**, threatens calcifying organisms like coral and shellfish.
- Ocean Warming: **alters ocean circulation and deoxygenates vital marine habitats**, undermining the services they provide Eg. fisheries to carbon sequestration.

Ocean Carbon Sequestration:
- Oceans, seas, rivers, and even lakes offer a different suite of options.
- **Biotic Approach:**
  - **Carbon capture by Deep-water bodies:** rapidly remove excess carbon from the atmosphere by *transporting it to depths* where it mixes and binds with minerals.
  - **Marine carbon capture on land:** *Mangroves and Macroalgae (seaweeds)* carefully manage how much plant material (biomass) is stored in the ocean.
  - This nature-based carbon sequestration potential is **modest**, *typically capped at less than a billion tonnes of carbon dioxide annually,* with **storage durations limited to hundreds or at most thousands of years.**

- **Abiotic approach:**
  - Manipulate physical or chemical properties, such as through *ocean alkalinity enhancement.*
    - Alkaline materials are added to seawater to neutralize its carbon dioxide content, **locking the carbon away for tens of thousands of years** as dissolved inorganic molecules.
    - This method could potentially sequester *one to 15 billion tonnes of carbon dioxide per year.*
  - Ocean Iron Fertilisation, which claims to stimulate phytoplankton blooms to capture carbon dioxide

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EXAMPLES FROM TODAY'S NEWS PAPER

THE HINDU, PG.NO: 12

News: "40 years after Bhopal gas tragedy, UnionCarbide's toxic waste yet to be removed".

Accountability

Cases of lack of Accountability in Governance:
- Bhopal Gas tragedy 1984: 40 years after Bhopal gas tragedy, UnionCarbide's **toxic waste yet to be removed.**
- Ganga River remained among top polluted rivers in the world for **decades**.
- Delhi Air Pollution Crisis: **AQI reaching 1700** in 2024 making city a **gas chamber.**
- Flooding in Urban Areas almost every year: **Mumbai, Chennai, Bengaluru, NCR region.**
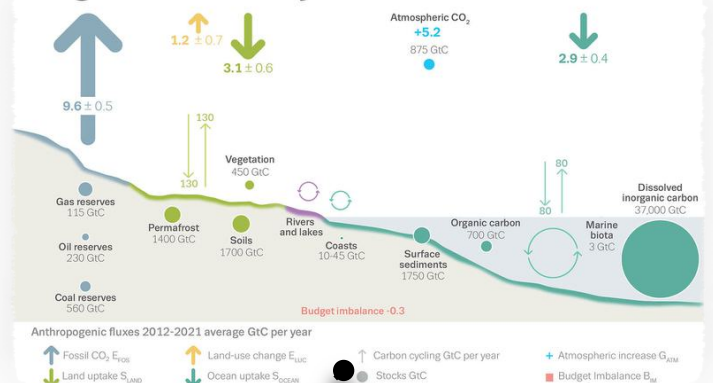
Impacts:
- Loss of **lives & livelihood**, property damage, disruption of city life.
- Led to loss of **aquatic life,** health hazards for communities dependent on the rivers.
- **Decades of irresponsible actions** can *erode public trust* in governance, leading to a sense of hopelessness and *passive acceptance* among the people.

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PYQs:

GS IV 2014: What does 'accountability' mean in the context of public service?

The global carbon cycle

Thank you!