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Daily PIB Summary

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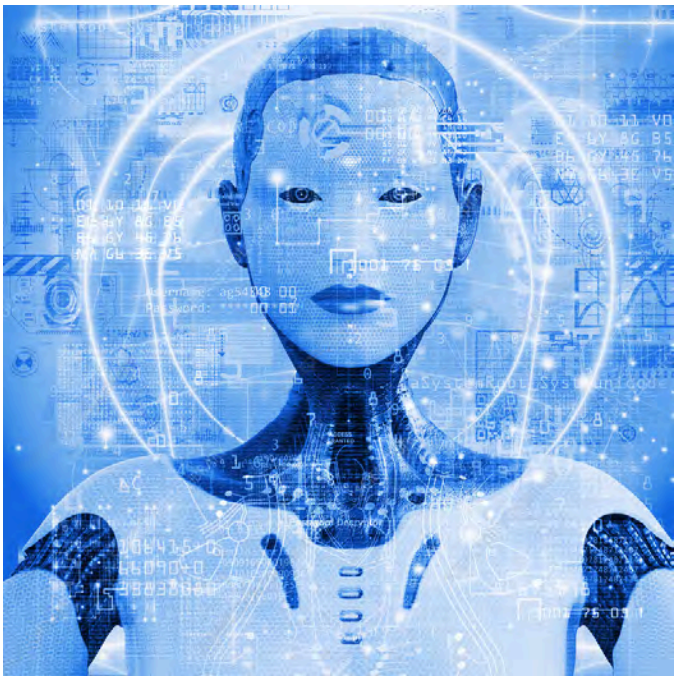
1.INDIA'S EMERGING TECHNOLOGY ECOSYSTEM



Key Highlights

I. India is rapidly emerging as a global technology and innovation hub.
II. Focus areas include:
    A. Artificial Intelligence (AI)
    B. Semiconductors
    C. Quantum Technologies
    D. Biotechnology
    E. Space Technology
    F. Robotics and Advanced Manufacturing
III. Government initiatives such as IndiaAI Mission, National Quantum Mission, and Semicon India Programme are strengthening the innovation ecosystem.
IV. Digital Public Infrastructure (DPI) and the startup ecosystem are acting as major growth enablers.
V. Emerging technologies are expected to drive economic growth, employment generation, strategic autonomy, and national security.

BACKGROUND/CONTEXT

I. The Fourth Industrial Revolution (Industry 4.0) is characterized by the convergence of digital, physical, and biological technologies.
II. Countries across the world are investing heavily in frontier technologies due to their transformative impact on economic competitiveness, industrial growth, military capabilities, and governance.
III. India's rapid digital transformation over the last decade has created a strong foundation for technological innovation through:
    A. Expanding internet connectivity.
    B. Digital governance.
    C. Financial inclusion.
    D. Startup-led innovation.
IV. With increasing geopolitical competition and supply-chain vulnerabilities, technological self-reliance has become a strategic imperative.
V. India's emerging technology ecosystem seeks to position the country as both a developer and exporter of advanced technologies.

ARTIFICIAL INTELLIGENCE (AI)

Artificial Intelligence

Applications

- Healthcare diagnostics and medical research.

- Precision agriculture.
- Education and personalized learning.
- Smart governance.
- Financial technology.
- Defence and security.

Government Initiative

IndiaAI Mission

I. Aims to build:
   A. AI computing infrastructure.
   B. AI datasets.
   C. Innovation ecosystem.
   D. Startup support.
   E. Skilled workforce.

SEMICONDUCTOR ECOSYSTEM

Importance

I. Semiconductors are the foundation of modern electronic devices.
II. Critical for:
   A. Mobile phones.
   B. Computers.
   C. Data centres.
   D. Electric vehicles.
   E. Defence equipment.
   F. AI hardware.

Government Initiative

Semicon India Programme

Objectives

- Develop domestic semiconductor manufacturing capabilities.
- Reduce dependence on imports.
- Strengthen supply-chain resilience.

QUANTUM TECHNOLOGIES

Quantum Technology

Applications

- Quantum computing.
- Quantum communication.
- Advanced cryptography.
- Precision sensing.
- Secure information systems.

National Initiative

National Quantum Mission

- Approved in 2023.
- Seeks to establish indigenous quantum technology capabilities.

SPACE TECHNOLOGY

Indian Space Research Organisation (ISRO)

Emerging Areas

- Satellite communications.
- Earth observation.
- Navigation services.
- Launch vehicles.
- Commercial space applications.

Space Sector Reforms

Indian National Space Promotion and Authorization Center (IN-SPACe)

- Facilitates participation of private players in the space sector.
- Encourages commercialization and innovation.

BIOTECHNOLOGY

Biotechnology

Key Areas

- Vaccines and pharmaceuticals.
- Agricultural biotechnology.
- Bio-manufacturing.
- Healthcare innovation.
- Environmental sustainability.

Importance

- Strengthens healthcare security.
- Supports India's growing bioeconomy.

DEEP-TECH STARTUP ECOSYSTEM

Focus Areas

- Artificial Intelligence.
- Robotics.
- Drones.
- Aerospace.
- Cybersecurity.
- Clean Energy.
- Advanced Manufacturing.

Significance

- Accelerates commercialization of frontier technologies.
- Drives innovation-led economic growth.

DIGITAL PUBLIC INFRASTRUCTURE (DPI): THE FOUNDATION

India's Digital Public Infrastructure includes:

- Aadhaar
- Unified Payments Interface (UPI)
- DigiLocker

Role

- Enables digital service delivery at scale.
- Supports entrepreneurship and innovation.
- Facilitates financial inclusion and digital governance.

SIGNIFICANCE

Economic Growth

- Enhances productivity and innovation-driven development.

Strategic Autonomy

- Reduces dependence on foreign technologies.

Employment Generation

- Creates high-skilled jobs and entrepreneurial opportunities.

National Security

- Strengthens cyber security, defence capabilities, and technological resilience.

Global Competitiveness

- Positions India as a major global innovation hub.

CHALLENGES

- Low expenditure on Research & Development (R&D).
- Dependence on imports for critical technologies.
- Skill shortages in frontier technology domains.
- Cybersecurity and data privacy concerns.
- Need for stronger industry-academia collaboration.

WAY FORWARD

- Increase investment in research and innovation.
- Strengthen indigenous technology development.
- Promote deep-tech startup financing.
- Foster public-private partnerships.
- Enhance skilling in emerging technologies.
- Develop robust ethical and regulatory frameworks for responsible technology deployment.

KEY HIGHLIGHTS

- Emerging technologies are central to India's vision of **Viksit Bharat @ 2047**.
- Major focus sectors include AI, semiconductors, quantum technology, biotechnology, and space technology.
- India's Digital Public Infrastructure and startup ecosystem provide a strong foundation for innovation.
- Technological leadership is increasingly linked to economic growth, national security, and strategic autonomy.

PRELIMS BOOSTER BOX

I. **IndiaAI Mission**
   A. National initiative to develop AI computing infrastructure, datasets, innovation ecosystem, and skilled talent.

II. **National Quantum Mission (2023)**
   A. Implemented by the Department of Science and Technology (DST).
   B. Focuses on quantum computing, communication, sensing, and materials.

III. **Semicon India Programme**
   A. Aims to create a sustainable semiconductor and display manufacturing ecosystem in India.

IV. **Digital Public Infrastructure (DPI)**
   A. Refers to interoperable digital systems such as Aadhaar, UPI, and DigiLocker.

V. **IN-SPACe**
   A. Autonomous agency under the Department of Space.
   B. Facilitates private sector participation in India's space activities.

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PadhAI-GENERATED UPSC MCQ

Consider the following statements:

1. The National Quantum Mission is implemented by the Department of Science and Technology.
2. The Semicon India Programme aims to promote semiconductor and display manufacturing in India.
3. Aadhaar, UPI, and DigiLocker are components of India's Digital Public Infrastructure.

Which of the statements given above is/are correct?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

Answer: (d)

2.RESILIENT SUPPLY CHAINS: FOUR FERTILIZER SHIPS SUCCESSFULLY CROSS STRAIT OF HORMUZ TO BOLSTER INDIAN AGRI-STOCKS

Key Highlights

I. Four fertilizer ships carrying critical agricultural inputs safely transited through the Strait of Hormuz.
II. The shipments are expected to strengthen fertilizer availability for Indian farmers.
III. The successful transit highlights:
    A. Supply-chain resilience.
    B. Strategic inventory management.
    C. Diversified sourcing mechanisms.
IV. The development assumes significance amid concerns regarding disruptions in global maritime trade routes due to regional tensions.

BACKGROUND/CONTEXT

I. The Strait of Hormuz is one of the world's most important maritime chokepoints connecting the Persian Gulf with the Gulf of Oman and the Arabian Sea.
II. A significant share of global crude oil, LNG, petrochemicals, and fertilizer-related raw materials passes through this route.
III. India imports a substantial portion of its fertilizer requirements and fertilizer feedstocks from countries in West Asia and other global suppliers.
IV. Any disruption in this maritime corridor can affect:
    A. Fertilizer availability.
    B. Energy security.
    C. Global commodity prices.
    D. Food security.
V. Therefore, ensuring uninterrupted shipping through strategic sea lanes is critical for India's agricultural and economic stability.

IMPORTANCE OF FERTILIZERS IN INDIAN AGRICULTURE

Major Fertilizers Used

- Urea (Nitrogenous fertilizer).
- DAP (Di-Ammonium Phosphate).
- MOP (Muriate of Potash).
- NPK Complex Fertilizers.

Role in Agriculture

- Improve soil nutrient availability.
- Enhance crop productivity.
- Support food security.
- Sustain agricultural growth.

Dependence on Imports

I. India is largely self-sufficient in urea production but remains dependent on imports for:
    A. Phosphatic fertilizers.
    B. Potassic fertilizers.
    C. Fertilizer raw materials.

STRAIT OF HORMUZ: A STRATEGIC MARITIME CHOKEPOINT

Strait of Hormuz

Location

I. Connects the Persian Gulf to the Gulf of Oman and the Arabian Sea.
II. Lies between:
    A. Iran (north).
    B. Oman and the UAE (south).

Strategic Importance

I. One of the busiest energy trade routes globally.
II. Critical for transportation of:
    A. Crude oil.
    B. Natural gas.
    C. Petrochemicals.
    D. Fertilizer inputs.

Significance for India

- Vital for energy imports.
- Important for fertilizer and commodity supply chains.

- Supports maritime trade with West Asian countries.

INDIA'S FERTILIZER SECURITY STRATEGY

Diversification of Sources

- Expanding fertilizer sourcing from multiple countries.
- Reducing overdependence on any single supplier.

Strategic Stock Management

- Maintaining adequate fertilizer inventories.
- Ensuring timely availability during Kharif and Rabi seasons.

Domestic Production Enhancement

- Revival of urea plants.
- Promotion of nano-fertilizers.
- Encouragement of balanced nutrient use.

International Cooperation

- Long-term fertilizer supply agreements.
- Strengthening partnerships with resource-rich countries.

SIGNIFICANCE

Food Security

- Ensures uninterrupted agricultural production.

Supply Chain Resilience

- Demonstrates India's ability to manage external disruptions.

Farmer Welfare

- Supports timely fertilizer availability during crop seasons.

Economic Stability

- Minimizes risks of price volatility and shortages.

Strategic Preparedness

- Strengthens resilience against geopolitical uncertainties.

CHALLENGES

- Dependence on imported fertilizer inputs.
- Geopolitical instability in critical supply regions.
- Volatility in global fertilizer prices.
- Maritime security risks in key shipping corridors.
- Rising logistics and transportation costs.

WAY FORWARD

- Strengthen domestic fertilizer production capacity.
- Diversify import sources and logistics routes.
- Promote nano-fertilizers and alternative nutrient solutions.
- Enhance strategic reserves of critical agricultural inputs.

- Strengthen maritime security cooperation and supply-chain monitoring mechanisms.

KEY HIGHLIGHTS

- Four fertilizer vessels successfully crossed the Strait of Hormuz.
- Supports fertilizer availability for India's agricultural sector.
- Highlights resilience of India's supply-chain management.
- Strait of Hormuz remains a critical global maritime chokepoint.
- Fertilizer security is closely linked with food security and farmer welfare.

PRELIMS BOOSTER BOX

I. **Strait of Hormuz**
   A. Connects the Persian Gulf with the Gulf of Oman and Arabian Sea.
   B. Lies between Iran and Oman.
   C. One of the world's most important maritime chokepoints.

II. **Di-Ammonium Phosphate (DAP)**
   A. Major phosphatic fertilizer.
   B. Contains both nitrogen and phosphorus.

III. **Muriate of Potash (MOP)**
   A. Major source of potassium for crops.
   B. India imports most of its potash requirements.

IV. **Nano Urea**
   A. Developed by **Indian Farmers Fertiliser Cooperative Limited**.
   B. Intended to improve nutrient-use efficiency and reduce conventional urea consumption.

PadhAI-GENERATED UPSC MCQ

Consider the following statements:

1. The Strait of Hormuz connects the Persian Gulf with the Gulf of Oman.
2. India is fully self-sufficient in the production of phosphatic and potassic fertilizers.
3. Disruptions in the Strait of Hormuz can affect both India's energy security and fertilizer supply chains.

Which of the statements given above is/are correct?

(a) 1 and 3 only

(b) 1 only

(c) 2 and 3 only

(d) 1, 2 and 3

Answer: (a)

3.HUMAN SKELETAL REMAINS FROM RAKHIGARHI TRANSFERRED TO ANTHROPOLOGICAL SURVEY OF INDIA FOR ADVANCED SCIENTIFIC RESEARCH

Key Highlights

I. Human skeletal remains recovered from Rakhigarhi will undergo advanced anthropological and scientific examination.
II. Research will focus on:
    A. Ancient population studies.
    B. Biological anthropology.
    C. Health and disease patterns.
    D. Dietary habits.
    E. Migration and ancestry.
III. The initiative is expected to contribute significantly to understanding the origins and evolution of ancient South Asian populations.

BACKGROUND/CONTEXT

I. Rakhigarhi is one of the largest known urban settlements of the Indus Valley Civilization (IVC), also known as the Harappan Civilization.
II. Archaeological excavations have revealed:
    A. Urban planning.
    B. Drainage systems.
    C. Burial sites.
    D. Craft production centres.
    E. Residential complexes.
III. Human skeletal remains discovered from burial sites provide valuable evidence about the lifestyle, health, genetics, and social organization of ancient communities.
IV. Modern scientific techniques such as DNA analysis, isotope studies, and osteological examination have become important tools for reconstructing human history.

RAKHIGARHI: AN IMPORTANT HARAPPAN SITE

Rakhigarhi

Location

- Situated in Haryana's Hisar district.
- Located in the Ghaggar-Hakra river basin region.

Significance

I. One of the largest sites of the Indus Valley Civilization.
II. Larger than many other well-known Harappan sites.
III. Provides crucial evidence regarding:
    A. Urbanization.
    B. Trade.
    C. Craft specialization.
    D. Social organization.

Archaeological Findings

- Planned settlements.

- Drainage systems.
- Pottery and ornaments.
- Burial grounds.
- Evidence of agriculture and animal husbandry.

ANTHROPOLOGICAL SURVEY OF INDIA (AnSI)

Anthropological Survey of India

Establishment

- Founded in **1945**.

Ministry

- Functions under the **Ministry of Culture**.

Objectives

- Study human diversity in India.
- Conduct anthropological and ethnographic research.
- Preserve and document biological and cultural heritage.
- Support archaeological and population studies.

SCIENTIFIC ANALYSIS OF HUMAN SKELETAL REMAINS

Osteological Studies

I. Examination of bones and teeth.
II. Provides information regarding:
    A. Age.
    B. Sex.
    C. Health status.
    D. Disease patterns.

Ancient DNA (aDNA) Analysis

I. Helps understand:
    A. Genetic ancestry.
    B. Population movements.
    C. Evolutionary relationships.

Isotope Analysis

I. Reveals:
    A. Dietary patterns.
    B. Migration history.
    C. Environmental conditions.

Palaeopathology

- Study of diseases in ancient populations.
- Helps reconstruct health conditions and lifestyle.

INDUS VALLEY CIVILIZATION (IVC)

Indus Valley Civilization

Time Period

- Approximately **2500 BCE – 1900 BCE** (Mature Harappan Phase).

Major Features

- Planned urban settlements.
- Advanced drainage systems.
- Standardized weights and measures.
- Extensive trade networks.
- Craft specialization.

Important Sites

- Harappa

- Mohenjo-daro
- Dholavira
- Lothal
- Kalibangan
- Rakhigarhi

SIGNIFICANCE

Understanding Ancient Populations

- Provides insights into the biological history of South Asia.

Reconstructing Human Migration

- Helps trace population movements and genetic linkages.

Knowledge of Ancient Health Systems

- Reveals disease patterns, nutrition, and lifestyle.

Strengthening Archaeological Research

- Combines archaeology with modern scientific methods.

Cultural Heritage Preservation

- Enhances understanding of India's ancient civilizational legacy.

CHALLENGES

- Preservation of ancient biological material.
- Risk of contamination during sampling.
- Limited availability of well-preserved DNA.
- Need for interdisciplinary collaboration.
- Ethical considerations in handling human remains.

WAY FORWARD

- Strengthen archaeological-scientific collaboration.
- Expand ancient DNA and bioarchaeological research facilities.
- Promote multidisciplinary studies involving archaeology, genetics, and anthropology.
- Enhance conservation standards for archaeological remains.
- Develop comprehensive databases of archaeological and anthropological findings.

KEY HIGHLIGHTS

- Human skeletal remains from Rakhigarhi have been transferred to the Anthropological Survey of India.
- Research will focus on ancestry, health, diet, and migration patterns.
- Rakhigarhi is among the largest sites of the Indus Valley Civilization.
- Advanced scientific methods will help reconstruct ancient population history.
- The initiative strengthens evidence-based understanding of India's ancient past.

PRELIMS BOOSTER BOX

I. **Rakhigarhi**
   A. Located in Hisar district, Haryana.
   B. One of the largest known settlements of the Indus Valley Civilization.

II. **Anthropological Survey of India (AnSI)**
   A. Established in 1945.
   B. Functions under the Ministry of Culture.

III. **Ancient DNA (aDNA)**
   A. Genetic material recovered from ancient human, animal, or plant remains.
   B. Used to study ancestry and population history.

IV. **Dholavira**
   A. UNESCO World Heritage Site (2021).
   B. Located in Gujarat's Kutch district.

V. **Lothal**
   A. Known for its dockyard and maritime trade connections.

PadhAI-GENERATED UPSC MCQ

Consider the following statements:

1. Rakhigarhi is one of the largest known sites of the Indus Valley Civilization.
2. The Anthropological Survey of India functions under the Ministry of Culture.
3. Ancient DNA analysis can help reconstruct population history and migration patterns.

Which of the statements given above is/are correct?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

Answer: (d)

4.INDIA ACHIEVES LANDMARK MILESTONE OF 5 LAKH ORGAN DONATION PLEDGES

Key Highlights

- India has crossed **5 lakh organ donation pledges**.
- The milestone highlights increasing public awareness regarding organ and tissue donation.
- Organ donation can save multiple lives by facilitating transplantation of vital organs and tissues.

- Government initiatives and awareness campaigns have played a crucial role in promoting organ donation.
- The achievement supports efforts to strengthen India's organ transplantation ecosystem.

BACKGROUND/CONTEXT

- Organ transplantation is often the only life-saving treatment for patients suffering from end-stage organ failure.
- India faces a significant shortage of donated organs despite a large number of patients requiring transplants every year.
- Low awareness, social misconceptions, and procedural challenges have historically limited organ donation rates.
- To address these issues, the Government has undertaken various reforms and awareness campaigns aimed at promoting voluntary organ donation and improving transplant infrastructure.
- The milestone of 5 lakh pledges reflects increasing societal acceptance and awareness regarding the importance of organ donation.

ORGAN DONATION: AN OVERVIEW

Definition

- Organ donation refers to the voluntary donation of organs and tissues for transplantation after death or, in certain cases, during life.

Types of Organ Donation

Living Donation

I. Donation by a living person.
II. Commonly includes:
    A. Kidney.
    B. Part of the liver.
    C. Bone marrow.

Deceased Donation

- Donation after brain-stem death or cardiac death.
- Multiple organs can be retrieved and transplanted.

ORGANS AND TISSUES THAT CAN BE DONATED

Organs

- Heart.
- Liver.
- Kidneys.
- Lungs.
- Pancreas.
- Intestine.

Tissues

- Cornea.
- Skin.
- Bone.
- Tendons.
- Heart valves.

NATIONAL ORGAN TRANSPLANT FRAMEWORK IN INDIA

National Organ and Tissue Transplant Organization (NOTTO)

National Organ and Tissue Transplant Organization

Functions

- National apex body for organ procurement and transplantation.
- Maintains national waiting lists.
- Coordinates organ allocation.
- Promotes awareness and capacity building.

Administrative Ministry

- Ministry of Health and Family Welfare

LEGAL FRAMEWORK

Transplantation of Human Organs and Tissues Act, 1994 (THOTA)

Transplantation of Human Organs and Tissues Act, 1994

Objectives

- Regulate organ transplantation.
- Prevent commercial trading of human organs.
- Define legal provisions relating to organ donation and brain-stem death.

Key Features

- Recognition of brain-stem death.
- Authorization committees for transplantation.
- Regulation of organ retrieval and transplantation procedures.

GOVERNMENT INITIATIVES

Organ Donation Awareness Campaigns

- Promotion of voluntary organ donation through nationwide awareness programmes.

Simplification of Procedures

- Removal of domicile requirements in certain transplant registrations.
- Streamlining transplant processes.

Digital Platforms

- Strengthening organ allocation and registration systems through digital infrastructure.

SIGNIFICANCE

Saving Lives

- One donor can save multiple lives through organ transplantation.

Improved Healthcare Outcomes

- Enhances treatment options for patients with organ failure.

Public Participation

- Encourages citizen involvement in healthcare and social responsibility.

Strengthening Health Infrastructure

- Supports development of transplant centres and medical expertise.

CHALLENGES

- Low deceased organ donation rates.
- Lack of awareness in certain regions.
- Social and cultural misconceptions.
- Shortage of trained transplant coordinators.
- Infrastructure gaps in smaller healthcare facilities.

WAY FORWARD

- Intensify public awareness campaigns.
- Strengthen transplant infrastructure across states.
- Improve training of healthcare professionals and transplant coordinators.
- Promote ethical and transparent organ allocation mechanisms.
- Encourage community participation and family consent for organ donation.

KEY HIGHLIGHTS

- India has achieved 5 lakh organ donation pledges.
- Organ donation is critical for addressing end-stage organ failure.
- NOTTO serves as the apex national body for organ transplantation.
- THOTA, 1994 provides the legal framework for organ donation and transplantation.
- Greater awareness and infrastructure development remain essential for increasing donation rates.

PRELIMS BOOSTER BOX

I. **NOTTO**
   A. National Organ and Tissue Transplant Organization.
   B. Apex body for organ procurement and transplantation in India.

II. **THOTA, 1994**
   A. Transplantation of Human Organs and Tissues Act.
   B. Regulates organ donation and transplantation.
   C. Recognizes brain-stem death.

III. **Brain-Stem Death**
   A. Irreversible cessation of all functions of the brain stem.
   B. Legally recognized for organ donation purposes in India.

IV. **Living Organ Donation**
   A. Most commonly involves kidney and partial liver donation.

V. **World Organ Donation Day**
   A. Observed annually on **13 August** to promote awareness about organ donation.

PadhAI-GENERATED UPSC MCQ

Consider the following statements:

1. The National Organ and Tissue Transplant Organization (NOTTO) is the apex body for organ procurement and transplantation in India.
2. The Transplantation of Human Organs and Tissues Act, 1994 recognizes brain-stem death.
3. A deceased donor can potentially donate multiple organs and tissues for transplantation.

Which of the statements given above is/are correct?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

Answer: (d)

5.INDIA BECOMES WORLD'S TOP SHIP RECYCLING NATION IN 2025

Key Highlights

I. India has become the world's largest ship recycling destination in 2025.
II. The country's ship recycling industry is centered around the **Alang Ship Recycling Yard**.
III. Ship recycling contributes to:
    A. Resource recovery.
    B. Circular economy.
    C. Employment generation.
    D. Steel production.
IV. India has undertaken significant reforms to improve environmental protection, worker safety, and compliance with international conventions.

BACKGROUND/CONTEXT

- Ship recycling involves dismantling end-of-life vessels to recover steel, machinery, equipment, and reusable materials.
- The global shipping industry generates a large number of obsolete vessels each year that require environmentally sound disposal.
- Historically, South Asian countries have dominated the global ship recycling industry due to cost advantages and extensive coastal infrastructure.
- India has progressively strengthened its regulatory framework to align with global environmental and occupational safety standards.
- The sector plays a crucial role in promoting resource efficiency and supporting the circular economy by reducing dependence on virgin raw materials.

SHIP RECYCLING: AN OVERVIEW

Definition

- Ship recycling refers to the process of dismantling ships at the end of their operational life for recovering reusable materials and components.

Major Recoverable Materials

- Steel.
- Non-ferrous metals.
- Machinery.
- Electrical equipment.
- Furniture and fixtures.

Importance

- Conserves natural resources.
- Reduces industrial waste.
- Supports sustainable industrial development.

ALANG: THE GLOBAL SHIP RECYCLING HUB

Alang Ship Recycling Yard

Location

- Situated in Bhavnagar district of Gujarat along the Gulf of Khambhat.

Significance

- One of the world's largest ship recycling facilities.
- Handles a substantial share of global ship dismantling activities.
- Provides employment to thousands of workers.

Advantages

- Favorable tidal conditions.
- Extensive coastal infrastructure.
- Established ecosystem for ship dismantling and material recovery.

REGULATORY FRAMEWORK

Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships

International Maritime Organization

Objective

- Ensure safe and environmentally sound ship recycling practices.

Key Provisions

- Hazardous material management.
- Worker safety standards.
- Environmental protection measures.
- Inventory of hazardous materials onboard ships.

Recycling of Ships Act, 2019

Recycling of Ships Act, 2019

Objectives

- Align India's ship recycling sector with international standards.
- Ensure worker safety and environmental protection.

- Promote sustainable ship recycling practices.

ECONOMIC SIGNIFICANCE

Resource Recovery

- Recovered steel serves as an important raw material for industries.

Employment Generation

- Provides direct and indirect employment opportunities.

Industrial Growth

- Supports steel, manufacturing, and ancillary industries.

Foreign Exchange Earnings

- Enhances India's position in the global maritime economy.

ENVIRONMENTAL SIGNIFICANCE

Circular Economy

- Promotes reuse and recycling of valuable materials.

Reduced Resource Extraction

- Lowers dependence on mining and primary metal production.

Waste Minimization

- Ensures scientific disposal and management of ship waste.

Sustainable Development

- Supports environmentally responsible industrial practices.

SIGNIFICANCE

Global Maritime Leadership

- Strengthens India's position in the global maritime sector.

Atmanirbhar Bharat

- Supports domestic industrial and manufacturing ecosystems.

Blue Economy

- Contributes to sustainable utilization of marine resources and maritime infrastructure.

Green Transition

- Encourages environmentally sound recycling and resource efficiency.

CHALLENGES

- Management of hazardous waste materials.
- Ensuring continuous compliance with international standards.
- Occupational safety concerns.
- Need for modernization and technological upgradation.
- Competition from other ship recycling nations.

WAY FORWARD

- Strengthen compliance with global environmental norms.
- Promote adoption of advanced recycling technologies.
- Enhance worker training and safety standards.
- Improve hazardous waste management systems.
- Integrate ship recycling with India's broader circular economy initiatives.

KEY HIGHLIGHTS

- India became the world's top ship recycling nation in 2025.
- Alang Ship Recycling Yard remains the backbone of the sector.
- Ship recycling supports resource recovery, employment, and industrial growth.
- The Recycling of Ships Act, 2019 aligns India with international best practices.
- The sector contributes significantly to the circular economy and sustainable development.

PRELIMS BOOSTER BOX

I. **Alang Ship Recycling Yard**
   A. Located in Bhavnagar district, Gujarat.
   B. One of the world's largest ship recycling facilities.

II. **Recycling of Ships Act, 2019**
   A. Provides a legal framework for safe and environmentally sound ship recycling in India.

III. **Hong Kong Convention**
   A. Adopted under the International Maritime Organization (IMO).
   B. Focuses on safe and environmentally sound recycling of ships.

IV. **Blue Economy**
   A. Refers to the sustainable use of ocean resources for economic growth, livelihoods, and ecosystem health.

V. **Circular Economy**
   A. Economic model emphasizing reuse, recycling, refurbishment, and resource efficiency.

PadhAI-GENERATED UPSC MCQ

Consider the following statements:

1. Alang Ship Recycling Yard is located in Gujarat.
2. The Recycling of Ships Act, 2019 aims to align India's ship recycling sector with international environmental and safety standards.
3. Ship recycling contributes to the circular economy by recovering reusable materials from end-of-life vessels.

Which of the statements given above is/are correct?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

Answer: (d)