DAILY CURRENT AFFAIRS 30-10-2025

GS-3

1. **Rhodamine B**
2. **Parkinson's Disease**
3. **Crew Escape System (CES)**
4. **Bondla Wildlife Sanctuary**
5. **SAIME Initiative (Sustainable Aquaculture in Mangrove Ecosystems)**

Rhodamine B

Syllabus: GS-3; General Science

Context

- Scientists at the **Raman Research Institute (RRI)** have developed a **cost-effective technique using the coffee-stain effect** to detect harmful dyes like Rhodamine B. This method allows easier identification of toxic synthetic dyes in various industries.

About Rhodamine B:

- **Type:** Synthetic dye
- **Appearance:** Green powder; turns bright fluorescent pink in water
- **Solubility:** Water-soluble

Applications:

- Textiles, paper, leather industries
- Scientific research due to its fluorescent properties

Health Impacts:

- Can cause **DNA damage**, mutations, and cancer risk
- Tumor development in organs like liver and bladder in animal studies
- Allergic reactions: itching, redness, skin thickening
- Long-term exposure may lead to chronic allergies and permanent pigmentation changes
- Toxic to humans and can cause oxidative stress if ingested

This technique from RRI could significantly enhance **food, water, and industrial safety monitoring** by quickly identifying toxic dyes.

Parkinson's Disease

Syllabus: GS-3; General Science

Context

- Research indicates that a condition causing people to feel a compelling urge to move their legs may signal a higher risk of developing Parkinson's disease.

About Parkinson's Disease:

- It is a progressive neurodegenerative disorder affecting movement.
- Caused by loss of dopamine-producing neurons in the substantia nigra of the brain.
- Symptoms include tremors, stiffness, impaired balance, slow movement, and difficulty with tasks like walking or talking.
- "Parkinsonian gait" includes forward lean, small quick steps (festination), and freezing while walking.

Risk Factors:

- Mostly affects older adults; men are more prone.
- Family history, exposure to air pollution, pesticides, and solvents increase risk.

Diagnosis & Treatment:

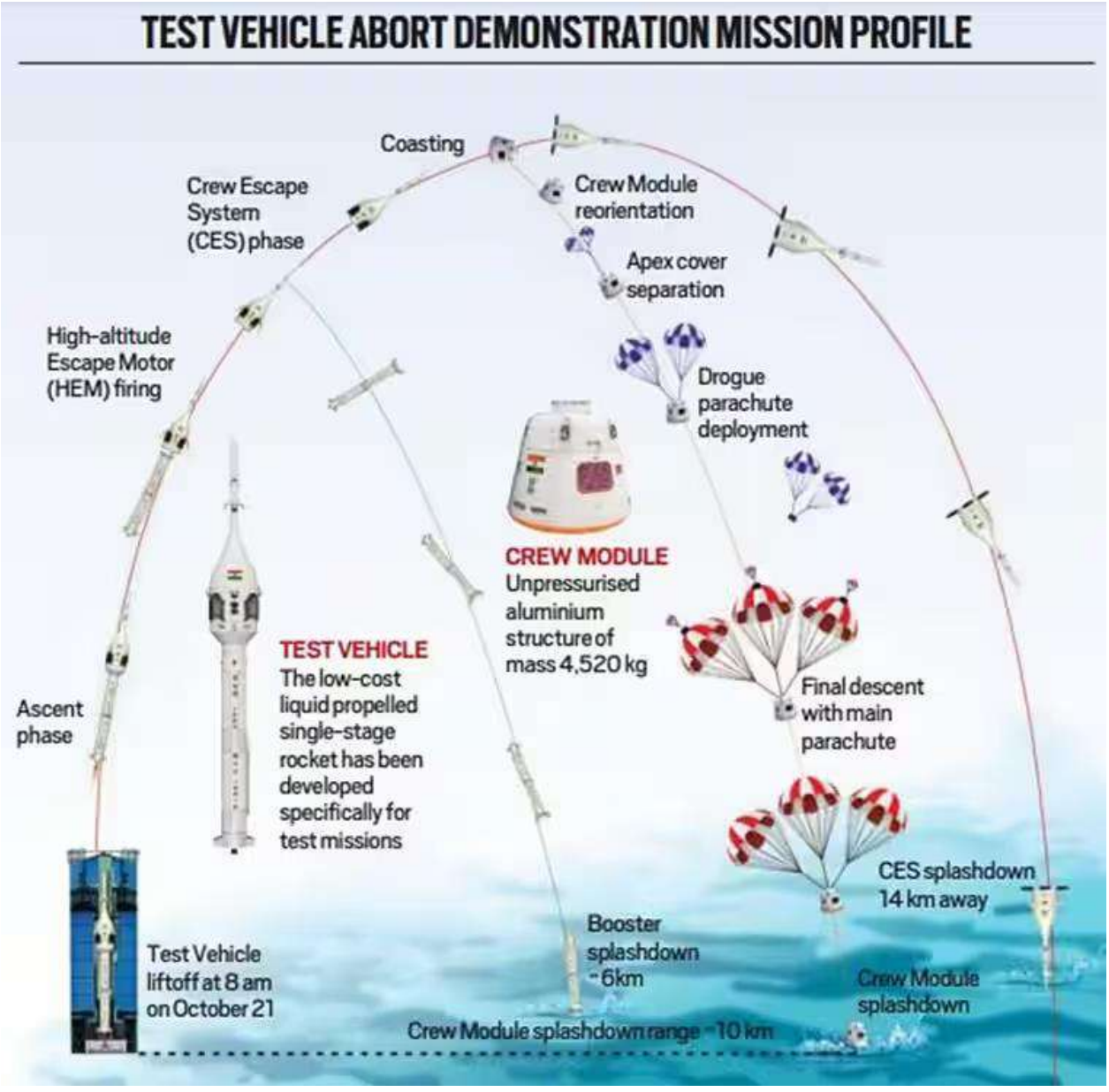
- No blood or radiological tests currently confirm PD.
- Treatments focus on symptom management, often using medications to supplement dopamine or therapies for mobility and balance.

Crew Escape System (CES)

Syllabus: GS-3; Space Technology

Context

- ISRO has developed a **cost-effective, single-stage Test Vehicle** powered by the **Vikas engine** to validate the **Crew Escape System (CES)** under the **Gaganyaan mission**.
- This test vehicle will help simulate emergency abort scenarios during various flight phases, ensuring astronaut safety in the event of a launch anomaly.



About Crew Escape System (CES)

- The **Crew Escape System (CES)** is an **emergency safety mechanism** designed to **pull the crew module and astronauts away from the launch vehicle** in case of a malfunction during liftoff.
- Its purpose is to ensure **crew survival** by rapidly distancing the astronauts from the rocket before an explosion or major failure.

Types of Crew Escape Systems

1. **Puller Type (Used by ISRO's Gaganyaan):**
    - The CES **pulls** the crew module **away from the rocket** using powerful solid motors mounted above the module.
    - Example: ISRO's Gaganyaan, NASA's Saturn V, Russia's Soyuz, and China's Long March rockets.
2. **Pusher Type (Used by SpaceX Falcon 9):**
    - The CES **pushes** the crew module **away from the rocket** using **compact, high-thrust liquid-fuel engines** located at the module's base.
    - Example: SpaceX's Crew Dragon.

How the Crew Escape System Works

1. **Abort Activation:**
    - The **Integrated Vehicle Health Management (IVHM) System** continuously monitors the launch vehicle's health using sensors, electronics, and software.
    - On detecting a critical anomaly, it automatically triggers the CES.
2. **Separation and Escape:**
    - The CES ignites its motors to rapidly **separate the crew module** from the launch vehicle.
    - The module is carried to a **safe altitude and distance** within seconds.
3. **Descent and Recovery:**
    - After a safe distance is reached, the CES **detaches** from the crew module.
    - The module then **deploys a multistage parachute system** to slow its descent in stages.
    - It **splashes down safely in the sea**, where the astronauts await recovery.
4. **Crew Safety:**
    - The entire process ensures astronauts experience **minimal G-forces** and **remain within physiological safety limits** throughout the abort and descent sequence.

Significance

- A critical safety component of **India's first human spaceflight programme — Gaganyaan**.
- The system will ensure **zero-compromise crew safety** during all mission phases — ground, ascent, and early orbit.
- The new **Vikas-powered single-stage Test Vehicle** allows **repeated and cost-effective testing** of the CES, marking a major step toward India's human spaceflight readiness.

Bondla Wildlife Sanctuary

Syllabus: GS-3: Environment – Protected Areas.

Context:

Goa's only zoo, located inside the **Bondla Wildlife Sanctuary**, is set to receive new animals after 12 years — a **barking deer** and a **pair of sloth bears**. This marks a renewed effort to revive the sanctuary's captive animal program and attract more visitors.

About Bondla Wildlife Sanctuary

Location:

- Situated in the **northeastern part of Goa**, in the foothills of the **Western Ghats**.
- Lies about **3000 feet above sea level**, spread over **8 sq. km.**

Unique Aspect:

- Goa's smallest and most popular wildlife sanctuary — often referred to as a **"wildlife resort"** due to its compact and visitor-friendly setup.

Key Features

- **Origin:** Initially established as a **refuge for orphaned and injured animals**.
- **Facilities:**
  - Deer Safari Park
  - Zoo (Goa's only one)
  - Botanical Garden
  - Rose Garden
  - Nature Education Centre
- **Water Bodies:**
  - **Rangado River** – flows along the eastern boundary.
  - **Madhel River** – flows across the northern side.

Vegetation and Flora

- **Type:** Predominantly **moist deciduous forest**, with **semi-evergreen patches** and **cane growth along streams**.
- **Dominant Trees:**
  - Terminalia crenulata (Matti) – **State tree of Goa**
  - Rosewood (Dalbergia latifolia)

Fauna

- **Mammals:** Panther, Leopard Cat, Deer, Wild Boar, Gaur, Malabar Giant Squirrel.
- **Birds:** Common Grey Hornbill, Golden-Backed Woodpecker, Ruby-Throated Yellow Bulbul.
- **Reptiles:** Common Monitor Lizard, Indian Cobra (occasional sightings).

Ecological Significance

- Acts as a **biodiversity microcosm of the Western Ghats**.
- Plays a role in **wildlife conservation education** and **eco-tourism**.

- Serves as a **rehabilitation center** for rescued and injured animals.

Recent Development (2025)

- After a **12-year gap**, the zoo will host new animals:
  - **1 Barking Deer** (symbolizing native forest fauna)
  - **2 Sloth Bears** (for public education and awareness).
- This initiative aims to **enhance conservation outreach** and **increase tourist engagement** in Goa's inland biodiversity sites.

SAIME Initiative (Sustainable Aquaculture in Mangrove Ecosystems)

Syllabus: GS-3; Environmental Conservation, GS-2; Government polices

Context

- The SAIME model in West Bengal's Sundarbans has received **Global Technical Recognition** by the **Food and Agriculture Organization (FAO)** of the United Nations.

About SAIME:

- **Full Form:** Sustainable Aquaculture in Mangrove Ecosystems.
- **Purpose:** Strengthens transformative processes in shrimp trade while protecting mangrove ecosystems.
- **Approach:**
  - Climate-adaptive and conservation-linked livelihood initiative.
  - Integrates **brackish water shrimp-based aquaculture** with **mangrove restoration**.
  - Ecosystem-based, focusing on sustainable livelihoods and biodiversity conservation.
- **Implementation Partners:**
  - Global Nature Fund (GNF)
  - Nature Environment and Wildlife Society (NEWS)
  - Naturland
  - Bangladesh Environment & Development Society (BEDS)

About Mangroves

Definition:

- Salt-tolerant trees and shrubs growing in coastal **intertidal zones**, mainly in tropical and subtropical regions.

Characteristics:

1. **Salt Tolerance:** Specialized roots and leaves to manage high salinity.
2. **Aerial Roots (Pneumatophores):** Roots that obtain oxygen from air in waterlogged soils.
3. **Prop Roots:** Provide stability against tidal waves and storms.
4. **Vivipary (Seed Germination):** Seeds germinate while attached to the parent tree to survive in saline water.
5. **Efficient Carbon Sequestration:** Among the most carbon-rich ecosystems, mitigating climate change.

Ecological Significance:

- Serve as a **buffer between land and sea**, protecting coasts.
- Provide **habitat for diverse marine and terrestrial species**.