7. Short News

1. Bluebird Block-2 Satellite

ISRO's LVM3-M6 mission will launch the BlueBird Block-2 satellite, the largest commercial communications satellite placed in Low Earth Orbit.

About BlueBird Block-2 Communication Satellite

Introduction- BlueBird Block-2 is a next-generation commercial communication satellite developed by AST SpaceMobile (USA) to deliver direct space-based cellular broadband connectivity to standard mobile smartphones without specialised ground equipment.

Mission Objective- To demonstrate and operationalise direct-to-device satellite broadband, enabling seamless mobile connectivity in remote, underserved, and disaster-affected regions using Low Earth Orbit (LEO) infrastructure.

Key Features

1. Direct-to-Smartphone Connectivity- Enables cellular broadband access without terrestrial towers or satellite phones.
2. Low Earth Orbit Deployment- Operates closer to Earth, ensuring lower latency and improved signal strength.
3. High-Capacity Design- Among the largest and heaviest commercial communication satellites deployed in LEO to date.

Significance- The mission strengthens India's role in the global commercial launch market while advancing next-generation satellite-based mobile broadband infrastructure.

About Launch Vehicle- LVM3-M6

Launch Vehicle Mark-3 (LVM3) is ISRO's heavy-lift, three-stage rocket.

Carrying Capacity- It has a lift-off mass of 640 tonnes, a height of 43.5 m, and a payload capability of 4,200 kg to Geosynchronous Transfer Orbit (GTO).

Configuration

1. First Stage- Two solid strap-ons (S200),
2. Second Stage- liquid core stage (L110),
3. Third Stage- cryogenic upper stage (C25).

Mission Significance- Sixth operational flight of LVM3 and the heaviest payload launched by LVM3 from Indian soil. It successfully launched Chandrayaan-2, Chandrayaan-3, and two OneWeb missions carrying 72 satellites.

2. Autophagy

Researchers at Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR) identified the exocyst complex, traditionally known for secretion, as a key missing link in early autophagosome biogenesis. JNCASR is an autonomous institution under the Department of Science and Technology (DST).

About Autophagy

Autophagy is a conserved cellular housekeeping process by which cells degrade and recycle damaged organelles, protein aggregates, and pathogens through lysosome-mediated digestion, thereby maintaining cellular homeostasis.

Exocyst Complex- The exocyst complex is an evolutionarily conserved assembly of eight proteins involved in targeted vesicle trafficking to the cell membrane.

1. Recent findings show it also plays a crucial role in early autophagosome formation, linking secretion machinery with cellular waste clearance.
2. Loss of the exocyst complex disrupts autophagosome formation, leading to defective cellular waste clearance, a mechanism elucidated using yeast model systems.

Process of Autophagy

1. Autophagy begins with the initiation of a membrane structure called the phagophore, which expands to engulf damaged cellular components.
2. This structure matures into a double-membraned autophagosome, often described as a cellular "trash bag".
3. The autophagosome then fuses with a lysosome, where its contents are broken down and recycled for cellular use.
4. The process is especially crucial in long-lived cells like neurons, which cannot dilute damage through cell divisions.

Potential Applications

Neurodegenerative Diseases- Insights can help restore impaired autophagy in Alzheimer's, Parkinson's, and Huntington's diseases, were toxic protein accumulation damages neurons.
Cancer Therapy- Understanding autophagy regulation can enable context-specific interventions, suppressing early tumor formation while preventing cancer cells from hijacking autophagy for survival.
Drug Development- Identification of early-stage molecular regulators provide new therapeutic targets for precision modulation of autophagy pathways.

3. National Mathematics Day

National Mathematics Day was observed on December 22 across India to honour the birth anniversary of legendary mathematician Srinivasa Ramanujan.

About National Mathematics Day

National Mathematics Day is **observed annually** to promote awareness about the importance of mathematics in education, scientific advancement, and everyday problem-solving.
Origin- The Government of India instituted National Mathematics Day in **December 2011**, declaring **December 22** as the observance day to commemorate **Srinivasa Ramanujan's birth anniversary.** It aims to encourage mathematical thinking, strengthen research culture, and inspire students by highlighting mathematics as a foundational discipline for science, technology, and innovation.

About Srinivasa Ramanujan

Introduction- Srinivasa Ramanujan (1887–1920) was a legendary mathematician of India, who was born on 22nd December 1887, in Tamilnadu**.**
Contributions- He made path-breaking contributions to number theory, infinite series, partitions, continued fractions, and modular forms, many of which continue to influence modern mathematics and theoretical physics. The number 1729, known as the Hardy-Ramanujan number, is the smallest positive integer expressible as the sum of two positive cubes in two different ways- $1^3 + 12^3$ and $9^3 + 10^3$
Legacy - The Ramanujan Prize sponsored by the Department of Science and technology extends Srinivasa Ramanujan's legacy by nurturing mathematical excellence and global recognition among young researchers from developing countries.
Death- He died on April 26, 1920, at age 32, in Kumbakonam, India, from complications of tuberculosis.

4. Adamya-Class Fast Patrol Vessel

Recently, Indian Coast Guard Ship *Amulya*, a new-generation Adamya-class Fast Patrol Vessel, was commissioned in Goa strengthening India's coastal security.

About Indian Coast Guard (ICG) Ship 'Amulya'

Introduction- ICG Ship *Amulya* is the third of eight Adamya-class Fast Patrol Vessels, designed and built indigenously by Goa Shipyard Limited, reflecting advanced maritime capability.

Features

1. **Indigenous Design**- Built with over 60% indigenous components, aligning with *Aatmanirbhar Bharat* and *Make in India* initiatives.
2. **Propulsion and Performance**- Powered by two 3000 kW diesel engines, it achieves a top speed of 27 knots with an endurance of 1,500 nautical miles.

3. **Operational Capability**- Equipped with state-of-the-art indigenous weapons and systems, ensuring high manoeuvrability and rapid response at sea.

Base- The vessel will be based at Paradip, Odisha, under the administrative and operational control of the Commander, Coast Guard Region (North East).

Significance

Coastal Security- Enhances surveillance, interdiction, search and rescue, anti-smuggling, and pollution response across India's maritime zones.

Defence Self-Reliance- Demonstrates India's growing capability in indigenous shipbuilding and naval system integration.

Fleet Modernisation- Contributes to the Indian Coast Guard's ongoing fleet expansion, strengthening maritime governance and law enforcement.

5. National Maritime Heritage Complex (NMHC)

India and the Netherlands signed an MoU to collaborate on developing the National Maritime Heritage Complex at Lothal, Gujarat, strengthening maritime heritage cooperation.

About National Maritime Heritage Complex (NMHC)

The National Maritime Heritage Complex is an ambitious cultural and tourism project at Lothal, Gujarat, envisioned as the world's largest maritime heritage complex.

Objective- It aims to showcase India's 4,500-year-old maritime legacy through world-class museums, research facilities, joint exhibitions, and educational outreach. It is supported under the Sagarmala Programme of the Ministry of Ports, Shipping and Waterways.

Significance- The NMHC seeks to place India's maritime history on the global stage while promoting inclusive education, heritage conservation, and cultural tourism.

About Lothal- Lothal is one of the southernmost sites of the Harappan (Indus Valley) civilisation, representing India's early maritime and urban planning heritage.

Location- It is located in the Bhal region of Gujarat, between the Bhogavo and Sabarmati rivers, near the Gulf of Khambhat.

Features

1. World's earliest known dockyard, indicating advanced tidal and maritime engineering.
2. Evidence of bead-manufacturing workshops and extensive trade networks.
3. Maritime trade links with Mesopotamia and Egypt, dating back nearly 4,000 years.

Additional Facts- The site was discovered in 1954 by S.R. Rao and declared UNESCO World Heritage status in 2014.

6. White Spot Disease

The Union Government Informed Parliament that no severe shrimp losses were reported in Andhra Pradesh despite detected cases of White Spot Disease under national surveillance.

About White Spot Disease

White Spot Disease is a highly contagious viral disease in shrimp caused by the White Spot Syndrome Virus (WSSV), posing a major threat to coastal aquaculture.

Impact- The disease can cause mass mortality within days, leading to significant economic losses for shrimp farmers and disrupting export-oriented aquaculture value chains.

Treatment and Management- There is no curative treatment for White Spot Disease; management relies on early diagnosis through PCR-based testing, strict farm hygiene, controlled stocking densities, and rapid removal of infected stock.

Prevention

1. **National Surveillance**- Implemented through the National Surveillance Programme for Aquatic Animal Diseases (NSPAAD) under PMMSY for early detection and reporting.
2. **Biosecurity Measures**- Mandatory quarantine of imported broodstock, registration of hatcheries and farms with the Coastal Aquaculture Authority (CAA), and promotion of Specific Pathogen Free (SPF) shrimp stocks.

3. **Technology Adoption**- Encouragement of Biofloc Technology (BFT) and Recirculatory Aquaculture Systems (RAS) to reduce disease risks.

Government Support Measures

1. **Aquaculture Crop Insurance**- Coverage provided under PM-MKSSY, with insurance claims disbursed to affected farmers.
2. **Digital Reporting**- The "Report Fish Disease" mobile app enables real-time coordination between farmers, field officers, and fish health experts.

7. World Meditation Day

World Meditation Day is observed every year on December 21 to raise global awareness about the benefits of meditation for physical, mental, and emotional well-being.

About World Meditation Day

Observed on- 21 December, coinciding with the Winter Solstice (shortest day and longest night in the Northern Hemisphere).
Theme of World Meditation Day 2025- "Inner Peace – Global Harmony"
Declared by- United Nations General Assembly (UNGA) in December 2024, through a resolution co-sponsored by India.
Objective- To promote mental health, emotional well-being, mindfulness, and inner peace at individual and societal levels.
Global Significance- Highlights meditation as a non-pharmacological, preventive health practice, aligning with SDG 3 (Good Health and Well-being).
India's Role- Reflects India's leadership in yoga and meditative traditions and its philosophy of Vasudhaiva Kutumbakam.
Symbolism of Date- Winter solstice represents transition, renewal, and inner transformation, mirroring the purpose of meditation.
Observance- Marked worldwide through mass meditation sessions, public awareness programmes, and digital campaigns.

About Meditation

Meditation is an ancient mind–body practice that trains attention and awareness to focus on the present moment. Rooted in religious, yogic, and secular traditions, it has been practiced for thousands of years across cultures. It involves techniques such as mindfulness, focused attention, and concentrated contemplation. The practice aims to achieve mental clarity, emotional calmness, and physical relaxation. Scientific studies show benefits such as stress reduction, improved focus, emotional balance, and better sleep. Today, digital platforms and apps have made meditation widely accessible, integrating it into modern lifestyles.