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6. Short News

Pyro processing

Context – Countries such as Japan, South Korea, and the United States are using pyro processing to improve nuclear fuel recycling, reduce radioactive waste, and enhance fuel efficiency in advanced fast reactors.

What is Pyro processing?

1. High-Temperature Process – Pyro processing is a heat-based industrial process that uses very high temperatures to bring about physical or chemical changes in materials.
2. Dry Process – It is a dry processing technique, unlike hydrometallurgy, which uses aqueous solutions.
3. Energy Intensive – The process requires temperatures ranging from hundreds to over 1,400°C, making it highly energy-intensive.

Applications of Pyro processing

1. Cement Manufacturing – Used to convert limestone, clay, and iron ore into clinker, the primary ingredient of cement.
2. Metallurgical Industry – Used for metal extraction through processes such as roasting, smelting, and calcination.
3. Nuclear Fuel Reprocessing – Can be used to recover and separate useful materials from spent nuclear fuel through molten-salt electrochemical techniques.

Auroras (Northern and Southern Lights)

Context – A powerful solar storm in June 2026 raised the possibility of auroral displays being visible in parts of northern India.

About Auroras (UPSC CSE Main 2024)

1. Auroras are natural luminous displays that occur in the Earth's upper atmosphere near polar regions.
2. They are produced when electrically charged particles emitted by the Sun interact with Earth's magnetic field and atmosphere.

Types of Auroras

1. Aurora Borealis (Northern Lights) – Occurs in the Northern Hemisphere.
2. Aurora Australis (Southern Lights) – Occurs in the Southern Hemisphere.

Mechanism of Auroras

3. Solar storms and coronal mass ejections (CMEs) release large numbers of charged particles from the Sun.
4. These particles are guided by Earth's magnetic field towards the polar regions.
5. When they collide with oxygen and nitrogen atoms in the upper atmosphere, energy is released in the form of visible light.
6. Auroral activity increases during periods of intense solar activity and geomagnetic storms.
3. Colours of Auroras – The observed colour depends on the type of atmospheric gas involved and the altitude of the collision.
 1. Green – Produced by oxygen atoms at lower altitudes; the most common auroral colour.
 2. Red – Produced by oxygen atoms at higher altitudes.

3. Blue and Purple – Produced by nitrogen molecules.
4. Common Regions of Occurrence – Frequently observed in high-latitude regions such as Norway, Sweden, Finland, Iceland, Greenland, Canada and Alaska.

Auroras in India

1. Where Auroras Can Be Observed?
 1. Higher-altitude regions of Ladakh, including Pangong Tso and Hanle.
 2. Parts of Kashmir.
 3. Upper Himalayan regions of Uttarakhand.
2. Why Can Auroras Occasionally Be Seen in India?
 1. During exceptionally strong geomagnetic storms, auroral activity expands beyond the polar regions towards lower latitudes.
 2. High-altitude Himalayan regions experience lower atmospheric interference and reduced light pollution, improving visibility.
 3. Northern India lies closer to the expanded auroral zone during intense solar events than most other parts of the country.

Sea of Azov

Context – Recently suspected Ukrainian drone attacks on commercial cargo vessels operating in the Sea of Azov left five merchant sailors dead.

About the Sea of Azov

1. The Sea of Azov is an inland shelf sea located in Eastern Europe and is regarded as the shallowest sea in the world.
2. It forms the northern extension of the Black Sea and is known for its low salinity, high biological productivity and strategic geopolitical importance.
 1. It is connected to the Black Sea through the Kerch Strait, which serves as its only maritime outlet.
 2. The Kerch Strait is flanked by the Crimean Peninsula in the west and the Taman Peninsula in the east.
3. Location – The sea is bordered by Ukraine to the northwest and Russia to the east.
 1. The Crimean Peninsula lies to its west.

Key Regions Around the Sea of Azov

2. Important Ukrainian ports include Mariupol and Berdyansk.
3. Major Russian ports include Taganrog and Yeysk.
4. The city of Rostov-on-Don is located near the sea along the Don River.
5. Notable geographical features include the Syvash lagoons and the Arabat Spit, one of the longest sand spits in the world.

Major Tributaries

6. The Don River and Kuban River contribute over 90% of the freshwater inflow into the sea.
7. Large sediment deposits from these rivers result in an average depth of only about 7 metres.

Significance of the Sea of Azov

1. Ecological Significance – It supports diverse fish species and marine fauna, including the harbour porpoise.
2. Economic Significance – Volga–Don Canal, it provides connectivity between the Black Sea basin and the Caspian Sea.

3. Geopolitical Significance – The sea is strategically important for maritime access, regional security and military operations.

Zojila Tunnel

Context – Recently, the Zojila Tunnel achieved its final breakthrough, paving the way for year-round connectivity across the Himalayas.

About Zojila Tunnel

1. Zojila Tunnel is a 13.14-km-long all-weather, single-tube bi-directional road tunnel connecting the Kashmir Valley with Ladakh's Kargil.
2. Key Specifications – It is situated at an altitude of about 11,578 feet, beneath the Zojila Pass in the Himalayas.
 1. It is constructed at a cost of over ₹6,800 crore.
 2. Features a 7.57-metre-high horseshoe-shaped two-lane tunnel.
 3. Includes four culverts, four Nilgrar tunnels, eight cut-and-cover sections, and a 220-metre vertical ventilation shaft.
3. Construction Technology – Built using the New Austrian Tunnelling Method (NATM), chosen for its suitability to the fragile Himalayan geology and variable rock conditions.
 1. It involves sequential excavation combined with immediate support measures.
 2. It uses shotcrete, rock bolting, and continuous geotechnical monitoring to ensure stability.

Significance of the Zojila Tunnel

1. All-Weather Connectivity – Bypasses the snow-bound Zojila Pass, ensuring uninterrupted year-round road connectivity between Kashmir and Ladakh.
2. Reduced Travel Time – Reduces travel time across the Zojila stretch from nearly three hours to about 20 minutes.

SAFF Championship

Context – India won the SAFF Women's Championship 2026 by defeating Bangladesh 3–1 in the final held at Margao, Goa.

About the SAFF Championship

1. The South Asian Football Federation (SAFF) Championship is the premier international football tournament for national teams in South Asia.
2. Organized by – South Asian Football Federation (SAFF), which functions as a regional sub-confederation under the Asian Football Confederation (AFC).
3. The championship aims to promote football development, regional sporting cooperation and healthy competition among South Asian nations.

Separate tournaments are organized for men's and women's national teams.

Origin and Evolution

SAARC Gold Cup – The tournament was first held in 1993 as the SAARC Gold Cup in Lahore, Pakistan. India won the inaugural edition, becoming the first champion of South Asian football.

1. Formation of SAFF – The South Asian Football Federation (SAFF) was formally established in 1997.
 - Founding members included Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka.

- Afghanistan was formerly a member but later joined the Central Asian Football Association (CAFA).
- 2. Renaming of the Tournament - The competition was renamed the SAFF Championship in 2008.
 - It is generally conducted on a biennial basis.
- 4. Governance Pyramid Of SAFF - organizational structure cascades from the highest global authority down to its sub-continental members -
- 5. FIFA (Federation Internationale de Football Association) - The ultimate global governing body that sets the overarching statutes and financial regulations for all member confederations.
- 6. AFC (Asian Football Confederation) - The continental governing body for Asia.

SAFF is one of five regional federations recognized under the AFC.

- 7. SAFF Executive Committee & Congress - The primary regional governing body.
- 8. Member Associations - The national governing bodies of the respective countries (e.g., All India Football Federation (AIFF) in India), which develop the sport at the grassroots and professional club levels within their borders
- 9. SAFF Secretariat - Headquartered in Dhaka, Bangladesh

Women's SAFF Championship 2026 Edition

- 1. Host - India (Mango, Goa)
- 2. Venue - Pandit Jawaharlal Nehru Stadium
- 3. Winner - India
- 4. Runner-up - Bangladesh
- 5. India defeated Bangladesh 3-1 in the final to reclaim the championship after seven years.

The victory gave India a record-extending sixth SAFF Women's Championship title.