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Electrified Flex-fuel Engine

Context: Nitin Gadkari unveils the world's inaugural prototype of the BS 6 Stage II 'Electrified Flex Fuel Vehicle'.

- Nitin Gadkari, the Union Minister for Road Transport and Highways, launched the world's first prototype of the BS 6 Stage II 'Electrified Flex Fuel Vehicle'.
- The vehicle was developed by Toyota Kirloskar Motor.
- Once the ethanol economy reaches 2 lakh crores, India's agricultural growth rate could increase from the current 12% to 20%.
- The newly launched vehicle is based on the Innova Hycross model and is designed to meet India's stricter emission standards. It is recognized as the world's first BS 6 (Stage II) Electrified Flex Fuel Vehicle prototype.
- The vehicle's development will progress through subsequent stages including refinement, homologation, and certification processes.

Flexible fuel Engines

- A flexible-fuel vehicle (FFV), also known as a flex-fuel vehicle, can operate on multiple fuels, usually a blend of gasoline and ethanol or methanol, stored in a single tank.
- Modern FFV engines adjust fuel injection and spark timing based on the blend detected by an oxygen sensor in the exhaust gases.
- FFVs differ from bi-fuel vehicles that use separate tanks for each fuel, like compressed natural gas (CNG) or liquefied petroleum gas (LPG).
- The most common FFV globally is the ethanol flexible-fuel vehicle, with over 60 million units sold by March 2018. Major markets include Brazil, the US, Canada, and Europe.
- Successful tests have been conducted with methanol and P-series fuels in flex-fuel vehicles.
- North American and European FFVs are optimized for E85, an 85% ethanol and 15% gasoline blend, to reduce emissions and cold weather issues.

SI Engine	CI Engine
1. Known as Spark Ignition engine.	1. Known as Combustion Ignition engine.
2. Uses Gasoline or Petrol as fuel.	2. Uses Diesel as fuel.
3. Compression ratio: 6 to 9.	3. High compression ratio: 15 to 20.
4. Lighter due to lower pressure.	4. Heavier due to higher pressure.
5. Low vibration and noise.	5. More vibration and noise.
6. Operates on Otto cycle.	6. Operates on Diesel cycle.
7. Higher speed.	7. Lower speed.
8. Lower to average thermal efficiency.	8. Higher thermal efficiency.
9. Uses both air and fuel in intake.	9. Uses only air in intake.
10. Relatively cheaper.	10. Relatively more expensive.
11. Also called constant volume cycle.	11. Known as constant pressure cycle.
12. Petrol has high self-ignition temp.	12. Diesel has lower self-ignition temp.
13. Knocking at end of combustion.	13. Knocking at start of combustion.
14. Homogeneous fuel mixture.	14. Heterogeneous fuel mixture.
15. Used in aerospace, automobiles.	15. Used in heavy vehicles (lorries, buses, trucks).
16. Fitted with carburetor, spark plug.	16. Fitted with injection or fuel pump.
17. Ignition by electric spark (spark plug).	17. Ignition by fuel injection into hot compressed air.
18. Temperature range: 250-300°C.	18. Temperature range: 600-700°C.
19. Higher specific fuel consumption.	19. Lower specific fuel consumption.

Reservation in Local Government

Context: The government of Gujarat has declared a 27% quota for Other Backward Classes (OBCs) in local self-governing bodies.

- The Gujarat BJP government has announced a 27% reservation for Other Backward Classes (OBCs) in local self-governing bodies like panchayats, municipalities, and civic corporations.
- The decision is based on recommendations from **the Justice Jhaveri Commission's** report.
- The goal is to facilitate upcoming elections in these local governing institutes.
- Notably, the existing reservation quota for Scheduled Castes (SC) and Scheduled Tribes (ST) remains unchanged.
- The government emphasizes that the 50% reservation ceiling has not been violated.
- This decision replaces the previous 10% reservation for OBCs in Gujarat's local bodies.
- The move follows a Supreme Court directive to align OBC reservations with their population proportions.
- The Gujarat state cabinet approved the recommendation for 27% OBC reservation in local bodies.

Background

- In March 2021, the Supreme Court (SC) instructed the state government to adhere to three conditions for OBC reservation: establish a commission for OBC population data, specify reservation proportion, and ensure total reservation doesn't exceed 50%.
- The government followed by appointing a commission and issuing an ordinance for up to 27% OBC reservation in local bodies without breaching the 50% limit.
- However, the SC halted this in December 2021, requiring empirical data and converting OBC seats to general category for elections.

The 2010 Judgment:

- The SC's 2010 decision in *K. Krishnamurthy (Dr.) v. Union of India* interpreted Articles 243D(6) and 243T(6) allowing OBC reservation in local bodies.
- The ruling emphasized that barriers to political participation differ from education and employment barriers.
- Reservation in local bodies is permissible but requires empirical backwardness findings through the three tests.

Compulsory and Voluntary Provisions in 73rd and 74th Amendment Acts

- **Compulsory Provisions:**
 - **Panchayati Raj and ULB Structure:** Establish Panchayati Raj institutions and urban local bodies.
 - **Direct Elections:** Conduct direct elections for most positions.
 - **Reserved Seats:** Ensure SC/ST reservation and up to one-third for women.
 - **Indirect Chairman Election:** Choose Zila and Block level Chairmen indirectly.
 - **Election and Finance Commissions:** Set up State Election and Finance Commissions.
 - **Fixed Tenure:** Maintain a five-year term with early election provisions.

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- **Voluntary Provisions:**
 - **Extended Voting Rights:** May grant legislators voting rights in these bodies.
 - **Backward Classes Reservation:** Optional provision for backward class reservation.
 - **Financial Autonomy:** Empower with tax and fee setting abilities.
 - **Autonomous and Development:** Aim for autonomy and economic planning.

State of India's Birds-2023

Context: A significant portion of bird species in India is facing either current declines or anticipated long-term declines, as indicated by the report.

State of India's Birds Report Overview

- **Initiation:** Result of India's involvement in the CMS COP 13 (2020) to assess bird status.
- **Reporting:** Regular assessment of distribution, abundance trends, and conservation status for most Indian bird species.
- **Data Source:** Relies on IUCN Red List and categorizes species into three threat-based groups.
- **Categories:** High Conservation Priority, Decline, and Others.

Key Highlights from 2023 Report

- **Decline Trend:** Significant decrease in bird numbers, signifying a gradual, unnoticed population shift.
- **High Conservation Priority:** Several supposedly common species now classified as High Conservation Priority due to ongoing declines.
- **Migratory Birds:** Long-distance migrants declined by 50%, with Arctic breeders wintering in India facing an 80% drop.
- **Specific Species Trends:** Decrease in raptors, migratory shorebirds, and ducks; rise in Indian Peafowl and Asian Koel.

Major Threats to Indian Birds

- **Temperature Increase:** Global temperature up by over 1°C since pre-industrial times, impacting various species.
- **Climate Change Impact:** Disruption of species interactions due to mismatches in timing of events like breeding and migration.
- **Phenological Mismatches:** Mismatches in timing between birds and their prey.
- **Urbanization Effects:** Urban areas with less bird diversity and insectivorous species due to habitat loss.
- **Pollution Impact:** Noise and light pollution affecting behavior, navigation, and survival.
- **Food Scarcity:** Lack of food in urban settings affecting bird communities.
- **Monoculture Impact:** Monoculture practices reducing bird diversity compared to natural forests.
- **Collisions:** Wind turbines and transmission lines causing fatalities among bird species.

Naming of Celestial Objects

Context: The location on the lunar surface where the Chandrayaan-3 lander landed will be designated as "Shiv Shakti."

- PM Modi named the Chandrayaan-3 landing point on the Moon as "Shiv Shakti." He made the announcement while meeting ISRO scientists in Bengaluru.
- Naming successful mission sites is a global tradition.
- The Chandrayaan-2 crash site is now called "Tiranga."
- ISRO Chief K Somnath emphasized that naming Moon sites is a tradition, citing the example of the "Sarabhai" crater.
- Naming sites related to scientific accomplishments is common internationally.

Who owns the moon?

- In 1966, the Outer Space Treaty was introduced by the United Nations Office for Outer Space Affairs during the Cold War era.
- Amid this backdrop, the Treaty aimed to establish shared principles for space exploration.
- Article II of the Treaty asserted that outer space, including the moon and celestial bodies, couldn't be claimed through sovereignty, occupation, or other means.
- This principle encouraged countries to collaborate in space exploration and barred them from claiming ownership of the Moon.
- Notably, the Treaty didn't address the naming of specific Moon sites.
- While it curbed claims to lunar territory, the Treaty fostered international cooperation in space endeavors.

Who names the Celestial Objects?

- IAU plays a vital role in space regulations, counting India among its 92 members.
- Nomenclature of planets and satellites has been overseen by IAU since its establishment in 1919.
- Early Moon mapping credits Italian astronomers Grimaldi and Riccioli for laying the foundation of today's naming conventions.
- The historic Apollo 11 mission landed in Mare Tranquillitatis, a region named by Grimaldi and Riccioli.
- Limited knowledge about the Moon's far side stemmed from its synchronized rotation and revolution around Earth.
- Enhanced spacecraft imaging allowed craters on the far side to be named after scientists and engineers from the USA and USSR.
- Initial naming of mission sites often follows informal routes before seeking IAU approval.
- Apollo missions practiced informal naming for landmarks, creating easy shorthand, with many names later attaining "official" status from the IAU.

Process of Naming

- IAU's Working Groups manage naming process; decisions aren't legally binding but establish conventions to enhance astronomical understanding.
- **Naming procedure:**

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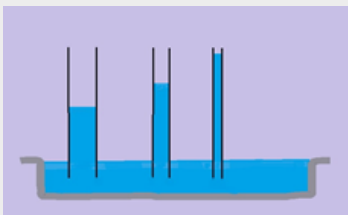


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- Initial themes and names proposed for significant features based on early images.
- As better images emerge, more feature names suggested by researchers.
- Anyone can propose names for consideration, but acceptance isn't guaranteed.
- Task group-recommended names forwarded to WGPN.
- WGPN members' vote leads to approved IAU nomenclature, usable in maps and publications.
- Approved names promptly added to Gazetteer of Planetary Nomenclature and website.
- Objections can be raised within three months after names are posted on the website by emailing IAU General-Secretary.

NEWS IN BETWEEN THE LINES

Capillary Action



About:

- Capillary action is a natural phenomenon exhibited by liquids in their attempt to reduce surface tension.
- Liquids rise in thin tubes with fine bores (capillary tubes) due to the interaction between the liquid, the tube's surface, and gravity.
- A capillary tube is any thin tube with a very fine bore, usually less than 1 mm in diameter.
- When immersed in a liquid, capillary tubes cause the liquid to rise inside them to a level higher than outside.

Blotting Paper:

- Blotting paper is made of cellulose obtained from cotton linter, wood or straw.
- It contains microscopic capillaries formed during paper pressing without any treatment.
- When placed in liquids like ink or water, the solution enters these capillaries and spreads throughout the paper.

Importance: Capillary action has relevance in various natural processes and engineering applications.

Hollongapar Gibbon Sanctuary



The Hollongapar Gibbon Sanctuary has become a forest island after having lost connectivity with surrounding forest patches.

Location:

- The sanctuary is situated in the Jorhat district of Assam, India.
- Formerly known as Gibbon Wildlife Sanctuary or Hollongapar Reserved Forest.

Historical Context:

- Identified as potential sanctuary in late 1980s.
- Established in 1881, connected to Patkai mountain range foothills.

Biodiversity Highlights:

- Houses India's only gibbons - hoolock gibbons.
- Home to Bengal slow loris, Northeast India's only nocturnal primate.

Flora Dominance:

- **Upper canopy:** hollong tree (*Dipterocarpus macrocarpus*).
- **Middle canopy:** nahar tree (*Mesua ferrea*).
- **Lower canopy:** evergreen shrubs, herbs.

Renaming and Distinctiveness:

- Renamed "Gibbon Sanctuary, Meleng" in 1997 due to gibbon population.
- Corrected to "Hollongapar Gibbon Sanctuary" in 2004.

Aksai Chin



Recently, Arunachal Pradesh and Aksai Chin, regions included by China in its official map, were asserted as integral parts of India.

About Aksai Chin:

- Aksai Chin is a region located in the northeastern part of the Indian subcontinent.
- It spans an area of around 37,244 square kilometers and is situated at a high altitude.
- Aksai Chin is a subject of dispute between India and China.
- India claims Aksai Chin as part of its Union Territory of Ladakh.
- The border dispute dates back to the colonial period when British India and Tibet shared a border.
- India inherited the border issue from British India and the princely state of Jammu and Kashmir.
- During British rule, two different lines were proposed to define the border between India and China in the Aksai Chin region: Johnson Line and McDonald Line.

Johnson Line: Proposed by British civil servant A. H. Johnson in 1865.

McDonald Line: Proposed by British diplomat Sir Claude MacDonald in 1893.

Line of Actual Control (LAC):

The effective line separating the Indian and Chinese-controlled areas in the Aksai Chin region is known as the Line of Actual Control (LAC).

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UNICEF 	UNICEF has expressed concern about over 1,300 schools being completely destroyed and others severely damaged in government-held areas of Ukraine due to Russia's 2022 invasion. UNICEF: (Headquarters: New York City) Establishment: ➤ Established in 1946 as International Children's Emergency Fund (ICEF) to aid post-WWII children. ➤ Became permanent UN agency in 1953, named UNICEF. Mandate and Focus: ➤ Aids children's health, nutrition, education and welfare. ➤ Advocates for children's rights, guided by Convention on the Rights of the Child (1989). ➤ Awarded Nobel Prize for Peace in 1965. UNICEF in India: ➤ Entered India in 1949, 16 states currently. ➤ Nodal Ministries: Ministry of Women and Child Development. ➤ Work includes census support, polio campaign, maternal-child health programs. Strategic Plan (2022-2025): ➤ Focuses on child rights, SDGs, recovery from COVID-19. ➤ First of two plans towards 2030, contributes to SDGs.
Y Chromosome 	What is Y Chromosome? ➤ Y chromosome is one of the two sex chromosomes, the other being X. ➤ It determines male characteristics and carries genes related to maleness and sperm production. Role in Male Determination: ➤ Y chromosome bears the SRY (Sex-determining Region Y) gene. ➤ SRY gene triggers development of testes in male embryos, leading to male features. Difference from Other Chromosomes: ➤ Y chromosome is notably smaller than other chromosomes. ➤ It carries fewer genes (27) compared to other chromosomes. ➤ Contains a significant amount of non-coding DNA, often referred to as "junk DNA." "Longread" Sequencing Technique: ➤ Recent sequencing advancements offer accurate Y chromosome sequence. ➤ Reveals structure, functions, and mysteries of Y chromosome. Y Chromosome's Latest Insights: ➤ Recent sequencing confirms Y chromosome's unique features. ➤ Few new genes discovered, mostly extra copies.
Place in News Israel	Recently, Israeli PM Netanyahu thanks Saudi Arabia after emergency plane landing. Capital: Jerusalem Location and Neighboring Countries: ➤ Israel is situated in West Asia, also referred to as the Middle East. ➤ It is bordered by several countries: Lebanon to the north, Syria to the northeast, Jordan to the east and Egypt to the southwest Geographical Features: ➤ Coastal Region: Israel has a coastline along the Mediterranean Sea to the west, with several ports and beaches. ➤ Negev Desert: The southern part of Israel is dominated by the Negev Desert, characterized by arid landscapes. ➤ Jordan Rift Valley: A geological depression runs from northern Syria through Jordan and into Israel, known as the Jordan Rift Valley. ➤ Dead Sea: Part of the Jordan Rift Valley, the Dead Sea is a saltwater lake located at the lowest point on Earth's surface. Etymology and Historical Names: ➤ Historical names include 'Palestine,' 'Land of Israel,' and 'Holy Land.' ➤ Formal adoption of 'State of Israel' upon independence in 1948. 

POINTS TO PONDER

- ❖ Which state in the USA has passed an anti-caste discrimination law? – California
- ❖ From which country have the archaeologists unearthed Priest of Pacopampa? – Peru
- ❖ Candidates Tournament is associated with which sport? – Chess
- ❖ Social Engineering Attack using a SMS and phishing is called? – Smishing
- ❖ What is BRIGHT STAR-23? – Trilateral Military Exercise in Egypt

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