Electrified Flex Fuel Vehicle

For Prelims: Electrified Flex fuel vehicle, **Bharat Stage-6(BS 6) Stage-II**, Bharat Stage Emission Standards, **Ethanol Blending**

For Mains: Flex Fuel Vehicles: Significance and its usage, Green model of development.

Source: PIB

Why in News?

Recently, the Prototype of **the world's 1st** Bharat Stage-6 (BS6) **Stage-II, Electrified Flex fuel vehicle**, developed by Toyota Kirloskar Motor was unveiled.

- This vehicle is capable of **running on up to 85% ethanol blended petrol** and features an **electric powertrain.**
- The Ministry of Petroleum & Natural Gas has also highlighted flex-fuel vehicles' potential to substitute petrol with higher ethanol blends **beyond 20%.**

Note:

- **Flex-fuel vehicles (FFV):** They have engines that can run on flexible fuel - **a combination of Petrol/Diesel/Electric and ethanol, which can include up to 100% ethanol.**

What are the Electrified Flex Fuel Vehicles?

- **About:**
  - Electrified Flex Fuel Vehicle integrates both a **Flex Fuel engine** and an **electric powertrain**, offering the dual benefit of **higher ethanol use and improved fuel efficiency.**
  - Flex Fuel Strong Hybrid Electric Vehicles (FFV-SHEV): When FFV is integrated along with **strong hybrid electric technology, it is referred as FFV-SHEVs.**
    - Strong hybrid is another term for full hybrid vehicles, which have the capability to **run solely on either electric or petrol modes.**
    - In contrast, **mild hybrids cannot run purely on one of these modes and use the secondary mode merely as a supplement** to the main mode of propulsion.
- **Significance:**
  - The integration of an electric powertrain **reduces reliance on conventional fuels**, contributing towards **sustainable transportation** and India's **'Aatmnirbhar Bharat' initiative** as production of **ethanol** increases.
  - Similar to **SHEVs**, this vehicle can achieve significantly **higher fuel efficiency, optimizing the use of ethanol and electricity.**
  - By promoting the use of FFVs, India can capitalize on its abundant **ethanol potential,**

reducing petrol consumption.
    - The vehicle represents a significant stride towards **decarbonization and greener mobility, aligning with global efforts to combat climate change.**

What are BS6 (Stage II) Norms?

- **BS6 Norms:** The Bharat Stage (BS) norms are emission standards instituted by the Government of India to regulate the output of air pollutants from motor vehicles.
    - The BS regulations are **based on the European emission standards** and the **Central Pollution Control Board** implements these standards.
    - Presently, every newly sold and registered vehicle in India is required to adhere to the **BS-VI version of emission regulations.**
- **BS6 Stage II:** BS6(Stage II) has even **stricter emission limits compared to the initial** BS6 norms.
    - BS6 (Stage II) incorporates **Real Driving Emissions (RDE)** and **Corporate Average Fuel Economy (CAFE 2)** and On-Board Diagnostics.
    - The new RDE test figures will provide a more realistic estimation of the amount of emissions likely to be produced by vehicles in real traffic conditions with frequent changes in speed, acceleration, and deceleration.
    - Onboard diagnostic (OBD) systems monitor and report the status and performance of various vehicle subsystems and sensors.

Ethanol Blending:

- **About:**
    - **Ethanol,** a key **biofuel** produced through fermentation of sugars by yeasts or petrochemical methods.
    - The **Ethanol Blending Programme (EBP)** in India aims to decrease oil imports, curb emissions, achieve energy self-sufficiency, and **doubling farmers' income**, transitioning them to **'urjadata' while remaining 'annadata'**, and contributing to environmental improvement.
    - The Government of India has advanced the **target for 20% ethanol blending in petrol (also called** E20**) to 2025 from 2030.**
        - India has been increasing its ethanol blending in petrol from 1.53% in 2013-14 to **11.8% in August, 2023.**
- **Other Initiatives to Promote Ethanol Blending in India:**
    - **National Policy on Biofuels 2018**
    - **E100 Pilot project**
    - **Pradhan Mantri JI-VAN Yojana 2019**
    - **Repurpose Used Cooking Oil (RUCO)**

UPSC Civil Services Examination, Previous Year Questions (PYQ)

Q. According to India's National Policy on Biofuels, which of the following can be used as raw materials for the production of biofuels? (2020)

1. Cassava
2. Damaged wheat grains
3. Groundnut seeds
4. Horse gram
5. Rotten potatoes
6. Sugar beet

Select the correct answer using the code given below:

(a) 1, 2, 5 and 6 only
(b) 1, 3, 4 and 6 only
(c) 2, 3, 4 and 5 only
(d) 1, 2, 3, 4, 5 and 6

Ans: (a)

Super Blue Moon

Source: IE

Why in News?

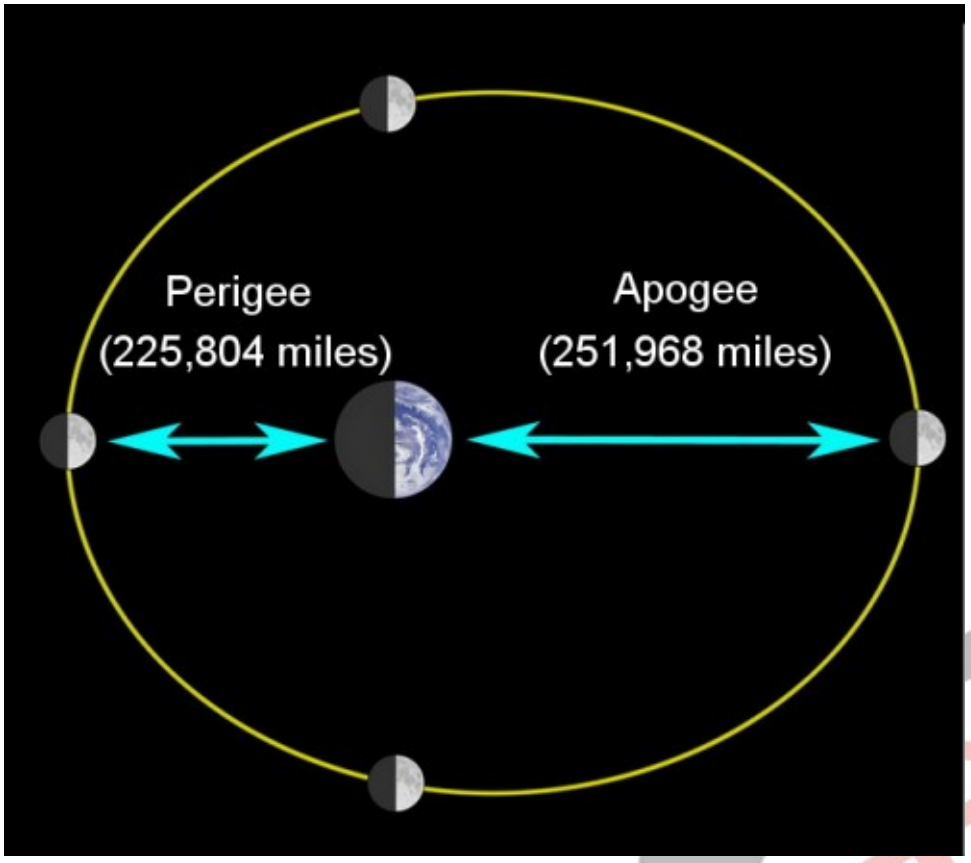
On August 30, 2023, the night sky was illuminated by a **rare phenomenon: a super blue moon.** However, despite its name, this **full moon was neither blue in colour nor super in size.**

- The last blue supermoon was in 2009, according to the **National Aeronautics and Space Administration (NASA)**, and the next is not expected until 2037.

What is a Super Blue Moon?

- A super blue moon combines a **supermoon and a blue moon.**
- A supermoon occurs when the **moon aligns closely with Earth during its orbit, making it appear larger and brighter.**
    - This alignment, called **perigee, contrasts with apogee, when the moon is farthest** in its elliptical orbit around earth. While the difference is subtle, near the horizon, an **optical illusion can make it seem larger.**
    - The term **"supermoon" was coined in 1979 by astrologer Richard Nolle.**
- A blue moon is the **second full moon in a month**. Despite its name, **a blue moon isn't blue**; it's the traditional name for the second full moon in a month.
    - Sometimes, smoke or dust in the air can scatter red wavelengths of light, as a result of which the moon may, in certain places, appear more blue than usual, but this has **nothing to do with the name “blue” moon.**

//



- **Effect:**
  - The moon's gravitational pull during a supermoon slightly affects tides, causing minor fluctuations in coastal high and low tides. However, the difference is **usually not significant enough to cause major disruptions.**

Related Reading: Total Lunar Eclipse

Flora Fauna and 'Funga'

For Prelims:. **United Nations Biodiversity**, Flora and Fauna, **Funga**, Species Survival Commission (SSC), **International Union for Conservation of Nature (IUCN)**

For Mains: Fungi and their Significance in Conservation

Source: PIB

Why in News?

Recently, **United Nations Biodiversity** has urged people globally to use the word **'funga'** whenever they say **'flora and fauna',** in order to **highlight** the **importance of** fungi.

Why has the UN Biodiversity urged to use the word 'Funga'?

- According to **UN Biodiversity** "It is time for **fungi to** be recognised and protected on an equal footing with **animals** and plants in **legal conservation frameworks.**
- This is not the first time when a request has been made to include **fungi** along with **flora and fauna.**
  - Earlier, the **Species Survival Commission (SSC)** of the **IUCN** announced that it would use **"mycologically inclusive"** language in its internal and public-facing communications and to incorporate **fungi** in **conservation strategies** with **rare** and **endangered plants** and **animals.**
- There would be **no life on Earth** without **fungi, the** yeasts**, molds** and **mushrooms** as they are critical to **decomposition and forest regeneration, mammalian digestion,** carbon sequestration**, the global nutrient cycle and** antibiotic medication.

What is Fungi?

- **About:**
  - **Fungi or fungus** are a diverse group of **eukaryotic microorganisms or macroscopic organisms** that belong to their own **biological kingdom**, distinct from **plants, animals,** and **bacteria**.

- **Characteristics:**
  - **Eukaryotic**: Like **plants, animals,** and **protists, fungi** have complex, **membrane-bound cell organelles and a true nucleus.**
  - **Heterotrophic: Fungi** are primarily **decomposers** or **saprophytes**, meaning they obtain nutrients by **absorbing organic matter** from their **surroundings.**
  - **Secrete Enzymes:** Fungi secrete enzymes to **break down complex organic compounds** into simpler substances, **which they can then absorb.**
- **Benefits:**
  - **Nutrient Cycling**
    - **Fungi** can convert nutrients to make them accessible to **plants,** acting as **decomposers** by **breaking down organic matter,** thereby enhancing **nutrient cycling** and **soil fertility.**
  - **Carbon Cycling and Climate regulation:**
    - **Fungi** play a vital role in **soil carbon storage** by participating in the **carbon cycle.** They decompose **organic matter, cycling carbon** from **dead plants,** and form **symbiotic relationships** with **plant roots.**
    - **Mycorrhizal fungi** form **symbiotic relationships** with **plant roots**, aiding in nutrient uptake.
  - **Fungi as Food:**
    - It has **numerous beneficial applications. Yeasts,** for instance, are used in **baking** and **brewing. Fungi** also produce **antibiotics** like **penicillin.**
    - Some **fungi,** like **mushrooms and truffles**, are **edible** and **prized in cuisine.** Others, like **molds,** are used in **cheese production.**
  - **Environmental Protection:**
    - **Fungi** have been found to help degrade **various pollutants** from the **environment,** such as **plastic** and other **petroleum-based products, pharmaceuticals and personal care products, and oil.**
- **Harmful Effects of Fungi:**
  - **Human and Animal Diseases:**
    - **Fungi** can cause a variety of diseases in **humans** and **animals. Examples** include **athlete's foot (caused by dermatophytes), ringworm**, **histoplasmosis**, and **aspergillosis.**
    - Some fungi produce **toxic compounds known as mycotoxins, which can contaminate food** and lead to **health problems when consumed.**
  - **Crop and Plant Diseases:**
    - **Fungal pathogens** can infect and damage **crops** and **plants**, leading to **significant economic losses** in agriculture.
    - **Examples** include **rusts, powdery mildews,** and various types of **fungal blights.**

- **Allergic Reactions:**
    - Exposure to **fungal spores**, especially in **indoor environments** with **high humidity,** can **trigger allergies** and **respiratory problems** in some individuals.
    - Conditions like **allergic rhinitis** and **allergic bronchopulmonary aspergillosis** are associated with **fungal allergens.**
- **Biodegradation of Materials:**
    - **Fungi** can **break down** materials such as **textiles, leather,** and **paper,** which can be detrimental if these materials are not properly preserved or stored.

Way Forward

- **Promoting Fungal Conservation:** Advocate for the inclusion of fungi in **legal conservation frameworks** at national and international levels. This would involve recognizing and protecting **fungi-rich ecosystems** and habitats.
    - Allocate adequate **funding and grants** specifically for **fungal conservation projects** for **research, habitat protection,** and **restoration efforts.**
- **Research and Education:**
    - Invest in research to study fungal diversity, distribution, and ecological roles. This knowledge is **crucial for effective conservation efforts.**
    - Launch **awareness campaigns** and **educational programs** to inform the **public, policymakers,** and conservationists about fungi's vital contributions to **ecosystem health**, **nutrient cycling,** and **biodiversity.**
- **Mycological Inclusivity:** Encourage governmental agencies, research institutions, and conservation organisations to adopt **"mycologically inclusive"** language in their communications, policies, and reports.

Rapid Fire Current Affairs

Sree Narayana Guru Jayanti

Recently, the Prime Minister paid tributes to Sree Narayana Guru on his Jayanti.

- **Sree Narayana Guru (1856-1928)** was a revered **Indian spiritual leader and social reformer born in Chempazhanthy, Kerala.**
- He advocated for **equality, education, and social upliftment regardless of caste.** Guru's philosophy emphasized, **“One Caste, One Religion, One God for All" (Oru Jathi, Oru Matham, Oru Daivam, Manushyanu)** promoting harmony among different communities.
- He became one of the greatest proponents and re-evaluators of **Advaita Vedanta,** the **principle of non-duality put forward by Adi Shankara.**
- He established a philanthropic society as the founder of the **Sree Narayana Dharma Paripalana Yogam (SNDP).**

Read more: Sree Narayana Guru

Indigenously Developed Electric Nuclear Power Reactor

- The **indigenously developed 700 MWe nuclear reactor** at Gujarat's **Kakrapar Atomic Power Project (KAPP-3)** is now operating at full capacity.
- KAPP-3 is **India's largest indigenously developed Pressurised Heavy Water Reactor (PHWR), using natural uranium as fuel and heavy water as a moderator.**
- It features an advanced safety system called the **'Passive Decay Heat Removal System,'** capable of removing decay heat (the heat released as a result of radioactive decay) from the reactor core without requiring any operator actions.
- India aims to increase its nuclear power capacity from 7,480 MWe to 22,480 MWe by 2031.

Read more: India's Nuclear Power Capacity

Attitude and Aptitude

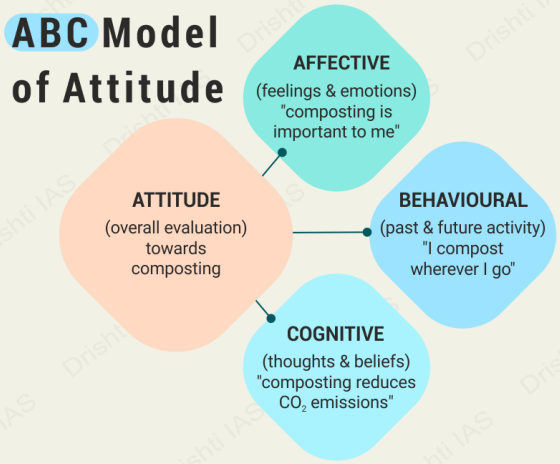
ATTITUDE AND APTITUDE

Drishti IAS

ATTITUDE

A psychological tendency where one evaluates something with some degree of favour/disfavour

- ***Classification:***
  - **Explicit** (formed consciously)
  - **Implicit** (subconscious behaviour)



- ***Changing Attitude:***
  - **Classical/ Pavlovian Conditioning:**
    - Exposing one to a positive and neutral stimulus repeatedly so that the response towards both becomes same eventually

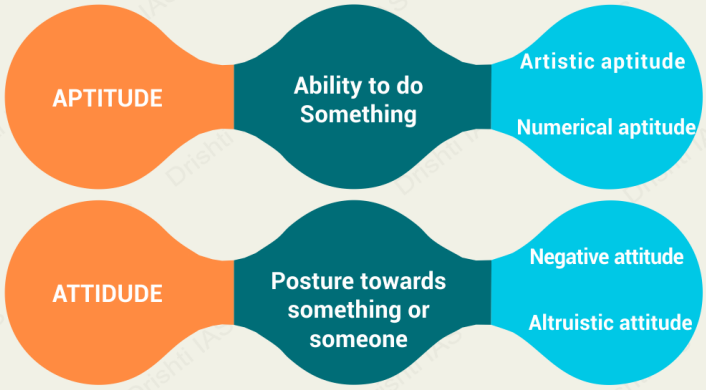
  - **Instrumental Conditioning:**
    - Rewarding positive behaviour besides punishing negative behaviour
  - **Social Observation:**
    - Learning from social environment

APTITUDE

A natural, inborn ability that enables one to learn/do something more easily

Aptitude v/s Interest/Skill/Intelligence

Aptitude v/s	*Meaning*	*Difference from Aptitude*
Interest	Attraction towards a task	Even if one has interest but not the potential (aptitude), they may not succeed
Skill	Knowledge to do a given task with ease and precision	Skills can be acquired; aptitude is inborn, unique
Intelligence	Capacity for learning, reasoning, understanding etc.	It is the ability to apply skills; aptitude helps to master a skill



- While aptitude is related to competence, attitude is to do with character
- **Aptitude without Attitude is Blind; Attitude without Aptitude is Lame**

Read More: Attitude **and** Aptitude

CSIR PRIMA ET11and Simplified Tractor Testing Process

For Prelims:. Tractor Testing Guidelines, **Ease of Doing Business**, Electric Tractor- CSIR PRIMA ET11.

For Mains: Significance of Electric Vehicles in Sustainable Agriculture and Ease of doing business.

Source: PIB

Why in News?

Recently, **CSIR's Central Mechanical Engineering Research Institute (CSIR-CMERI)** has indigenously designed and developed compact **100% Pure Electric Tractor** named **CSIR PRIMA ET11** mainly to cater **small** and **marginal farmers** of **India.**

- Additionally, in a major step towards encouraging **Ease of Doing Business** and **promoting trust-based governance,** the Government has simplified the **process of testing tractors for performance evaluation.**

What are the Important Features of CSIR PRIMA ET11?

- **About:** The introduction of the **CSIR PRIMA ET11, a 100% Pure Electric Tractor,** underscores India's commitment to **sustainable agriculture.**
  - The **entire tractor** has been **designed** and **manufactured** with **indigenous components** and **technologies** and to cater the demand of agriculture field application.
- **Features:** The **developed technology** is designed to be **user-friendly,** with particular consideration for the convenience and ease of use by women.
  - The tractor is provided with a port called **V2L i.e. vehicle to load**, This means when the tractor is not in operation, its battery power can be utilised for other secondary applications like pump and irrigation etc.
- **Significance:**
  - Traditionally tractors use diesel, thus contributing significantly to the environmental pollution.
    - According to an estimate they **consume about 7.4% of our country's annual diesel usage** and account for **60% of total agricultural fuel usage.**
    - Also their **PM2.5** and **NOx emissions are likely to increase 4-5 times** the current level in next two decades.
  - Global carbon footprint reduction strategy necessitates rapid transition of this sector towards electrification.
    - Therefore, **electrification of tractors is a necessary step** that aids our country in achieving climate related targets.

Note:

- **The CSIR-CMERI** is a premier research institute located in **Durgapur, West Bengal.** It was established in 1958 under the CSIR
- CSIR CMERI has a long history in design and development tractors of various ranges and capacities; the **very first indigenously developed being SWARAJ Tractor** in 1965, followed by **35hp Sonalika tractor** in 2000 and then **Small diesel tractor of 12hp Krishishakti** in 2009 for small and marginal farmers demand.

What is the Simplified Procedure for Tractor Testing?

- Tractor manufacturers shall now be allowed to participate in the **subsidy scheme** on the basis of **CMVR/Conformity of Production (COP) certificates** and a **self-declaration** to be given by the

company that the tractor proposed for inclusion under subsidy conforms to the benchmark specifications given by **Department of Agriculture & Farmers' Welfare.**
- The manufacturers shall give a **minimum of three years warranty** on the **tractor** to be supplied under subsid.
- The tractor testing process will follow the some mandatory tests i.e., **Drawbar Performance Test, PTO Performance and Hydraulic Performance Test** and **Brake Performance.**
    - All these tests will be done through the use of load cars Central Farm Machinery Training and Testing Institute (CFMTTI) or at Mahindra Research Valley (MRV) or any other Government authorised institute or at their own facilities provided.
- **Brake Performance Test** shall be done as per the requirements under **Central Motor Vehicles Rules (CMVR).**

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims:

Q. Which of the following has/have occurred in India after its liberalization of economic policies in 1991? (2017)

1. Share of agriculture in GDP increased enormously.
2. Share of India's exports in world trade increased
3. FDI inflows increased.
4. India's foreign exchange reserves increased enormously.

Select the correct answer using the codes given below:

(a) 1 and 4 only
(b) 2, 3 and 4 only
(c) 2 and 3 only
(d) 1, 2, 3 and 4

Ans: (b)

- Economic reforms in India refer to the neo-liberal policies introduced by the government in 1991 and in the later years. The central point of the reforms was the liberalization of the economy, simplifying regulations and giving more role to the private sector. The New Industrial Policy of 1991 is the heart of the new economic reforms.
- Following are the main features of New Economic Reforms:
    - De-reservation of the industrial sector.
    - Industrial de-licensing policy.
    - Opening up of the economy to foreign competition– the economic reforms introduced extensive liberalisation of foreign trade and foreign investment. The import substitution and import restriction policies were abandoned and instead import liberalisation and export promotion policies were introduced. This increased India's share in exports. **Hence, statement 2 is correct.**
    - Liberalisation of trade and investment
- However, there was a gradual decline in the agriculture sector's contribution to the Indian economy. Presently agriculture contributes about 17% to the GDP, down from 29% in 1991. **Hence, statement 1 is not correct.**
- Foreign investment was almost negligible before 1991. On the investment front, the economic reforms mark the era of capital mobility in the country. Foreign capital in the form of FDI (Foreign Direct Investment) and FPI (Foreign Portfolio Investment) entered into the country. **Hence, statement 3 is correct.**

Mains:

Q. How far is the Integrated Farming System (IFS) helpful in sustaining agricultural production? **(2019)**