Prelim Bits 24-08-2022 | UPSC Daily Current Affairs

Hydrogen Fuel Cell Technology

A hydrogen fuel cell bus developed by KPIT-CSIR in Pune was unveiled by Union minister of state for Science and Technology.

- Hydrogen fuel cells work in a similar manner to conventional batteries found in electric vehicles but they do not run out of charge and don't need to be recharged with electricity.
- They continue to produce electricity as long as there is a supply of hydrogen.
- Just like conventional cells, a fuel cell consists of an anode (negative electrode) and cathode (positive electrode) sandwiched around an electrolyte.
- Hydrogen is fed to the anode and air is fed to the cathode.
- At the anode, a catalyst separates the hydrogen molecules into protons and electrons and both subatomic particles take different paths to the cathode.
- The electrons go through an external circuit, creating a flow of electricity that can be used to power electric motors.
- The protons, on the other hand, move to the cathode through the electrolyte.
- Once there, they unite with oxygen and electrons to produce water and heat.

Advantages

- The primary advantage of hydrogen fuel cell electric vehicles (FCEV) is that they produce no tailpipe emissions.
- They only emit water vapour and warm air.
- Another advantage is that they are more efficient than internal combustion engine vehicles.
- Hydrogen fuel cell electric vehicles have another advantage when it comes to refuelling time.
- This makes them more practical than battery-powered electric vehicles for public transportation purposes.
- Even with the fastest charging technologies, it could take hours to charge a battery-powered electric bus.
- Meanwhile, hydrogen can be refilled in a fuel cell vehicle in a matter of minutes.

Reference

1. https://indianexpress.com/article/technology/science/hydrogen-fuel-cell-electric-bus-8104087/
2. https://www.energy.gov/eere/fuelcells/hydrogen-and-fuel-cell-technology-basics#:~:text=In%20a%20fuel%20cell%2C%20hydrogen,energy%20produced%20from%20other%20sources.

Nicaragua

Tensions between Nicaragua and the Catholic Church are again on the rise after a series of actions taken by the government of Daniel Ortega, the country's President.

- It is the largest of the Central American republics.
- Nicaragua can be characterized by its agricultural economy, its history of autocratic government, and its imbalance of regional development.
- Almost all settlement and economic activity are concentrated in the western half of the country.
- The country's name is derived from Nicarao, chief of the indigenous people living around present-day Lake Nicaragua during the late 15th and early 16th centuries.
- Nicaragua has a unique history in that it was the only country in Latin America to be colonized by both the Spanish and the British.
- Nicaragua's population is made up mostly of mestizos (people of mixed European and indigenous ancestry).
- The national capital is Managua, which also is the country's largest city and home to about one-sixth of the population.

Reference

1. https://www.thehindu.com/news/international/explained-nicaragua-and-its-current-conflict-with-the-catholic-church/article65787623.ece?homepage=true
2. https://www.britannica.com/place/Nicaragua

Cloudbursts

Over 20 people have been killed in destruction caused by cloudbursts and flash floods in different parts of Himachal Pradesh and Uttarakhand.

- A cloudburst is a localised but intense rainfall activity.
- Short spells of very heavy rainfall over a small geographical area can cause widespread destruction, especially in hilly regions where this phenomenon is the most common.
- Not all instances of very heavy rainfall, however, are cloudbursts.
- A cloudburst has a very specific definition, rainfall of 10 cm or more in an hour over a roughly 10 km x 10-km area is classified as a cloudburst event.
- By this definition, 5 cm of rainfall in a half-hour period over the same area would also be categorized as a cloudburst.
- In a normal year, India, as a whole, receives about 116 cm of rainfall over the entire year.
- This means if the entire rainfall everywhere in India during a year was spread evenly over its area, the total accumulated water would be 116 cm high.
- There are, of course, huge geographical variations in rainfall within the country, and some areas receive over 10 times more than that amount in a year.
- However, on average, any place in India can be expected to receive about 116 cm of rain in a year.

- During a cloudburst event, a place receives about 10% of this annual rainfall within an hour.
- Cloudbursts are not uncommon events, particularly during the monsoon months.
- Most of these happen in the Himalayan states where the local topology, wind systems, and temperature gradients between the lower and upper atmosphere facilitate the occurrence of such events.

Reference

1. https://indianexpress.com/article/explained/explained-what-are-cloudburst-incidents-and-are-they-rising-across-india-8103789/
2. https://www.thestatesman.com/environment/phenomenon-cloudburst-1503103343.html

Modern Slavery

The United Nations Security Council named modern slavery a serious concern in areas affected by armed conflict.

- Modern slavery takes many different forms, including child soldiers, sex trafficking and forced labor, and no country is immune.
- From cases of family controlled sex trafficking in the United States to the enslavement of fishermen in Southeast Asia's seafood industry and forced labor in the global electronics supply chain, enslavement knows no bounds.
- The vast majority of armed conflict between 1989 and 2016 used some kind of slavery.

Coding conflict

- The Uppsala Conflict Data Program (UCDP), looks at how much, and in what ways, armed conflict intersects with different forms of contemporary slavery.
- The Uppsala database breaks each conflict into two sides.
- Side A represents a nation state, and Side B is typically one or more non-state actors, such as rebel groups or insurgents.
- Using that data, the research team examined instances of different forms of slavery, including sex trafficking and forced marriage, child soldiers, forced labour and general human trafficking.
- This analysis included information from 171 different armed conflicts.
- The information from a variety of sources were compared which included human rights organisations like Amnesty International and Human Rights Watch, and intergovernmental organisations.
- About 8 per cent of cases took place in Myanmar, 5 per cent in Ethiopia, 5 per cent in the Philippines and about 3% in Afghanistan, Sudan, Turkey, Colombia, Pakistan, Uganda, Algeria and Iraq.
- The connections between slavery and conflict are vicious but still not well understood.

Reference

1. https://www.downtoearth.org.in/news/governance/slavery-and-war-are-tightly-connected-but-we-had-no-idea-just-how-much-until-we-crunched-the-data-84477

Sex ratio at birth

Sex ratio at birth normalises, and the son bias is in the decline in India.

- The latest study by the Pew Research Centre has pointed out that "son bias" is on the decline in India as the average annual number of baby girls "missing" in the country fell from 480,000 (4.8 lakh) in 2010 to 410,000 (4.1 lakh) in 2019.
- The missing refers to how many more female births would have occurred during this time if there were no female-selective abortions.
- The problem began in the 1970s with the availability prenatal diagnostic technology allowing for sex selective abortions.
- Among the major religions, the biggest reduction in sex selection seems to be among the groups that previously had the greatest gender imbalances, particularly among Sikhs.
- The world over, boys modestly outnumber girls at birth, at a ratio of approximately 105 male babies for every 100 female babies.
- That was the ratio in India in the 1950s and 1960s, before prenatal sex tests became available across the country.
- India legalised abortion in 1971, but the trend of sex selection started picking up in the 1980s due to the introduction of ultrasound scan technology.
- In the 1970s, India's sex ratio was at par with the global average of 105-100, but this widened to 108 boys per 100 girls in the early 1980s, and reached 110 boys per 100 girls in the 1990s.
- A large imbalance of about 111 boys per 100 girls was recorded in India's 2011 census.
- However, the sex ratio at birth appears to have normalised slightly over the last decade, narrowing to about 109 in the 2015-16 wave of the National Family Health Survey and to 108 boys in the latest wave of the NFHS, conducted from 2019-21.

Reference

1. https://www.thehindu.com/todays-paper/tp-national/sex-ratio-at-birth-normalises-slightly-study/article65803516.ece
2. https://www.pewresearch.org/religion/2022/08/23/indias-sex-ratio-at-birth-begins-to-normalize/#:~:text=This%20natural%20sex%20ratio%20at,2000%20and%202019%20were%20girls.

SHANKAR IAS PARLIAMENT
Information is Empowering