DAILY CURRENT AFFAIRS ANALYSIS

07 NOVEMBER 2023

1 - China plans to construct the biggest "ghost particle" detector in the world:

GS II

International issues

- **Context:**

- China is constructing a massive telescope in the western Pacific Ocean to look for neutrinos, sometimes referred to as "ghost particles."

- **A ghost particle: what is it?**

- **Are atoms defined?**

- One must comprehend the significance of atoms in order to comprehend what a ghost particle, or neutrino, is.
- Our universe is made up of atoms.
- Atoms make up all matter with mass.

- **Ghost particles and neutrinos:**

- cientists believed for a very long time that atoms were the tiniest particles in the universe.

- **They then learned that they are made up of much smaller subatomic particles:**

- protons, which are positively charged particles,
- negative charge electrons and
- protons (charge-free).
- Similar to neutrons, neutrinos are an electron type that lacks charge.
- Trillions of neutrinos pass through you every second; they are among the smallest and most prevalent particles in the universe.
- Before scientists discovered evidence that suggests neutrinos do have a very small mass, the particle was thought to be massless.
- Because of their weak charge and essentially nonexistent mass, neutrinos are infamously hard for scientists to observe.
- They are only visible in conjunction with other particles.
- It is nearly hard to track interactions with other particles because they occur seldom.

- Because the great majority of them scuttle around unnoticed, that is why they are called ghost particles.

- **How do researchers find ghost particles?**

- Rarely do ghost particles communicate with other particles.
- They can interact with molecules of water at times.
- China is constructing an undersea ghost molecule telescope for this reason.
- When particles pass through ice or water and produce byproducts, scientists have occasionally seen ghost particles.
- These "muons" produce light bursts that are detectable with advanced underwater telescopes, providing one of the few means of investigating the energy and origin of neutrinos.
- The "IceCube" telescope at the University of Madison-Wisconsin is currently the largest telescope for detecting neutrinos.
- Nestled in the heart of the Antarctic, the telescope's sensors cover an area of around one cubic kilometre.
- According to China, the "Trident" telescope will cover an area of 7.5 cubic kilometres in the South China Sea.
- Its size, according to scientists, will make it 10,000 times more sensitive than current underwater telescopes and enable it to detect more neutrinos.

- **The meaning of ghost particles:**

- Numerous scientific enigmas will be resolved with a solid understanding of neutrinos, including:
- the source of the enigmatic cosmic rays, known to include neutrinos.
- There is proof that neutrinos are necessary to comprehend the universe's beginnings.

- ***Source → The Hindu***

2 – Cubism:

GS II

International issues

- **Context:**

- Pablo Picasso (1881–1973), a well-known Spanish artist and master of cubism art, recently celebrated his 142nd birthday.

- **What is Cubism?**

- Despite its brief existence, cubism was one of the most important artistic movements of the early 20th century.
- It opened the door for non-representational art styles like surrealism to flourish.
- Cubes have no bearing on cubism.
- It appears that Henri Matisse (1869–1954), a French artist, mockingly referred to one of Braque's works as "a picture made up of small cubes," which is where the term "cubism" originated.
- In contrast to its forebears, cubism required painters to observe a subject from every possible perspective rather than just one.
- It was the rejection of the conventional method of creating art, in which the artists simply copied objects or the natural world and used time-honored methods like perspective, modelling, and foreshortening.
- Recognising the canvas' two-dimensionality is fundamental to cubism, and attempting to replicate the appearance of three dimensions—a cube, for instance—is definitely NOT the goal.
- Cubism aimed to provide a more accurate depiction of how people actually perceived an object and draw attention to commonplace items that were typically ignored.

- **How developed cubism?**

- **The art movement evolved into two separate stages, which included:**

- Original cubism of analysis
- Subsequent development dubbed synthetic cubism.
- The majority of the artwork produced during the analytical cubism period (1907–1912) featured objects from various perspectives and were painted in muted shades of ochre, grey, and black.
- The period of synthetic cubism (1912–1914) featured more vibrant hues and simpler designs.
- Most importantly, though, was that actual items had to be used.

- ***Source → The Hindu***

3 - Comprehending the SIM card's components:

GS III

Science and Technology related issues

- **Context:**

- Despite there being only seven billion people on the planet in 2021, there were over 14 billion cellular devices.

- **About SIM card:**

- "Subscriber identification module" is what "SIM" stands for.
- In particular, the subscriber on a particular network is identified by an integrated circuit, sometimes known as a microchip.

- **The GSM protocol:**

- A SIM card is required in order for a mobile phone to connect to any cellular network that adheres to the Global System for Mobile Communications (GSM) standard.
- A distinct authentication key, which a user requires to "unlock" access to the network, is used to establish this relationship.
- This data is stored on every SIM card, and it is made so that the user cannot access it with their phone.
- Rather, the key "signs" the signals that the phone sends into the network, and the network uses the signature to determine whether the phone's connection is authentic.
- If you have access to a SIM card's key and store it in numerous cards, you can make duplicates of them.

- **SIM cards additionally retain data regarding:**

- its unique integrated circuit card identifier, or ID number,
- the Identity of International Mobile Subscribers (IMSI),
- the location area identify of the subscriber (current location),
- a list of the subscriber's preferred networks, to which they can connect while roaming
- urgent phone numbers, and

- **How are SIM cards operated?**

- The International Organisation for Standardisation and the International Electrotechnical Commission maintain the ISO/IEC 7816 international standard, which is followed in the design of SIM cards.
- It covers smart cards and other electronic identity cards.
- The integrated circuit in this standard is attached to a silicon substrate on the upper side of the card.
- The gold-colored side of the SIM card is formed by metal contacts on the other side of the substrate.

- The integrated circuit's bottom side is connected via wires to the top side's metal contacts, which are interfaced with the phone's data connectors.
- The metal connections seem to be divided into segments.
- Every segment—referred to as a pin—has a distinct function.
- Pin 1, for instance, is responsible for gathering the operating voltage that powers it.
- You may access the SIM's clock, etc., using pin 3.
- The ISO/IEC 7816-2 standard specifies several pin-wise roles.
- The SIM assists a phone in finding its position within a cellular network from the network side.
- A telephone exchange receives data from a subscriber's phone when they call a recipient's number. This data is sent over the network.
- The call is routed to the recipient if they are linked to the same exchange, as the network verifies their identity.
- A network-connected computer relays the call to the recipient if they are "located" somewhere else using the best possible route.

- **About the eSIM:**

- The SIM card has become smaller over time, going from a SIM to a mini SIM to a micro SIM to a nano SIM.
- The eSIM is the most recent on this route.
- In the eSIM paradigm, the SIM software is put onto a UICC that is fixed, non-removable, and permanently placed in the mobile equipment within the manufacturer.

- When joining or switching networks, users of mobile equipment equipped with this feature don't have to worry about physically swapping out their SIM cards.
- Alternatively, the network operator only needs to remotely reprogram the eSIM.

- **Benefits of eSIM ownership:**

- Because it can be reprogrammed, there is no need to use additional plastic or metal to create a new SIM, making it more environmentally friendly than a physical SIM.
- The SIM application cannot be accessed separately or duplicated by a malevolent individual who manages to get access to your phone.

- **Cons of using an eSIM:**

- Users can programme their own eSIMs in certain nations, such as the United States.
- However, older people or others with little digital literacy may find this approach challenging.
- Theoretically, especially in the absence of data privacy rules, an eSIM might enable network providers to track customers' data, including inside apps on the device.

- ***Source → The Hindu***

4 - Adding a QR code to food labels to assist those with visual impairments:

GS III

Biotechnology related issues

- **Context:**

- For food goods to be accessible to those with visual impairments, the Food Safety and Standards Authority of India (FSSAI) has advised using rapid response (QR) codes.

- **Important information:**

- According to a recent guideline from the FSSAI, guaranteeing universal access to information is a basic right for all residents.
- Food goods must be branded in a way that makes them accessible to all customers, including those who are visually impaired.
- The purpose of the information is to enable customers to choose food goods with knowledge and confidence.

- **Importance of QR code scanning:**

- Accessibility and the promotion of health for people with disabilities are given priority under the Rights of Persons with Disabilities Act, 2016, which acknowledges the needs and rights of people with disabilities.
- Using Quick Response (QR) codes on product labels is one practical way to accomplish this.
- Complete product information, such as ingredients, nutritional data, allergies, manufacturing date, best before/expiry/use by date, allergen notice, and contact details for customer concerns, should be included in these QR codes.
- As required by applicable rules, the use of a QR code for information accessibility does not eliminate or replace the need to present mandatory information on the product label.

- **About FSSAI:**

- The Food Safety and Standards Act of 2006 created the Food Safety and Standards Authority of India (FSSAI), a statutory organisation.

- By regulating and overseeing food safety, FSSAI is in charge of safeguarding and advancing public health.
- It is led by a non-executive chairperson who was chosen by the Central Government and who currently has or was held the post of Secretary to the Indian Government.
- There is a chairperson and 22 members of the FSSAI.
- The Ministry of Health and Family Welfare has administrative jurisdiction over the FSSAI.

- **Statutory Authority:**

- Drafting legislation to establish guidelines for food safety.
- Establishing standards for food testing laboratory accreditation.
- Supplying the Central Government with technical assistance and scientific guidance.
- Contributing to the creation of global food technical standards.
- Gathering and compiling information on food consumption, contamination, new dangers, etc.
- Spreading knowledge and raising awareness of nutrition and food safety in India.

- **Regulatory structure:**

- The main legislation governing the regulation of food items is the Food Safety and Standards Act (FSS), 2006.
- The establishment and implementation of food safety regulations in India are also facilitated by this act.
- State-level food safety authorities are chosen by the FSSAI.

- ***Source → The Hindu***

5 - The new EV charging standard that is made in India:

GS III

Environmental Conservation related issues

- **Context:**

- An indigenously created AC and DC combination charging connector standard for light-electric vehicles (LEVs), such motorcycles, scooters, and rickshaws, has been accepted by the Bureau of Indian Standards (BIS).

- **Important information:**

- The standards for mobile phone charging connectors, like the USB Type-C or Apple Lightning chargers, are essentially comparable to those for electric vehicle (EV) charging connectors.

- **What is the new standard for EV charging?**

- For LEVs, the locally created charging standard is the first in the world to combine direct current (DC) and alternating current (AC).
- Electric four-wheeler combined AC and DC charging standards, such as the widely used Combined Charging System (CCS) standard in Europe, are already in use globally.
- A combined charging standard's compatibility makes it appealing.
- It implies that a variety of EV models and charging infrastructure suppliers can use it.

- **India's requirement for a national standard:**

- EV manufacturers are not required to adhere to a certain standard for charging connectors in India.
- For this reason, multiple charging standards are used by manufacturers of electric two-wheelers.
- But unlike phones, there are too many EV charging standards, so it's challenging for public charging stations to support every kind.
- Even today, EV manufacturers are not required to use a consistent standard that can assist ease range anxiety and encourage faster adoption of EVs, even though the newly adopted standard resolves the issue of disparate standards for AC and DC charging by providing a combined standard.

- **What is the state of affairs in other nations worldwide?**

- **China:**

- A national standard for EV charging connectors known as GB/T is used by the largest market for electric cars in the world, both in terms of sales and number of vehicles on the road.
- The nationwide standard and one of the world's densest networks of charging stations have made it possible for China to effectively address range anxiety problems.

- **USA:**

- Although there isn't a national standard in the US, EV manufacturers have been working together to promote some level of commonality.
- To enable their EVs to use Tesla's network of fast chargers across North America, Ford and General Motors (GM) are implementing the North American Charging Standard (NACS), which was created by Tesla.

- **Europe:**

- The European Union (EU) mandates that EV charging networks adhere to the CCS standard, which is the most widely used charging connector standard in Europe.
- Tesla has equipped all of its vehicles for the European market with CCS charging connectors. Additionally, the company has integrated CCS into its Superchargers, which are public chargers that are accessible to both Tesla and other electric vehicle users.

- ***Source → The Hindu***