Prelim Bits 01-02-2022 | UPSC Daily Current Affairs

Quiet Diplomacy

Speaking at the UN Security Council meeting on Ukraine, India called for quiet diplomacy and the peaceful resolution of the Russia-Ukraine tensions.

- Quiet diplomacy is also known as the "softly softly" approach.
- It is the attempt to influence the behaviour of another state through secret negotiations or by refraining from taking a specific action.
- This method is often employed by states that lack alternative means to influence the target government, or that seek to avoid certain outcomes.

Reference

https://www.thehindu.com/todays-paper/tp-international/india-calls-for-quiet-diplomacy-on-ukraine/article38356208.ece

Mahatma Gandhi - Out of the box Thinker

- Mahatma Gandhi was an open-minded soft reader of concepts and categories. So, he saw his place among the weakest and the poorest.
- His notion of a **just and truthful politics** was that in such an environment, the weakest should have the same opportunities as the strongest.
- He was a chief doubter of oppressive systems and a rebel against all forms of hidden and open authority.
- Gandhi is an example of **simplicity and transparency**. His simplicity was reflected in his deeds and acts, but mostly in his mode of life.
- Gandhi is a perpetual **truth seeker**. In fact, he is victorious through his effortful trials.
- Gandhi was an ambiguous personality, but he never wore a mask. He neither masked himself nor put a mask on the face of Indian history.
- Rather, he challenged Indian history. Practically, there was moral or spiritual interrogation in all of Gandhi's historical actions.
- Therefore, he led Indians to a historical and civilisational awareness that went as far as a spiritual conversion to non-violence.
- The Gandhian maieutic completely reversed the relationship between a leader and his people.
- Like Socrates, Gandhi was a **midwife of minds** (Gandhi was very much influenced by Socrates and his method of thinking).
- His philosophy was that of a spiritual exercise, accompanied by an active reflection on truth and a lively awareness of all walks of life.
- Gandhi believed that the true test of life for the individual can be summarised in two principles: **self-discipline and self-restraint**.
- He believed in the interrelated nature of human existence. In the same manner, the **self-transformative** nature of the citizens interested him into democracy.
- This process of self-transformation should influence not only the inner life of the individual but also public life.

- In conclusion, as a global thinker with a transhistorical and transgeographical influence, Gandhi was a moral and political leader who stayed out of the box.

Reference

https://www.thehindu.com/todays-paper/tp-opinion/mahatma-gandhi-the-out-of-the-box-thinker/article38351278.ece

X-particles in Quark-gluon Plasma

Researchers have found evidence of elusive short-lived "X" particles in the CERN's particle accelerator.

- In the **first millionths of a second** after the Big Bang, the universe was a roiling, trillion-degree plasma of quarks and gluons.
- The quarks and gluons are the elementary particles that briefly glommed together in countless combinations before cooling and settling into more stable configurations to make the neutrons & protons of ordinary matter.
- Before cooling, a fraction of these quarks and gluons collided randomly to form short-lived 'X' particles, so named for their unknown structures.
- Today, X particles are extremely rare. But they may be created in particle accelerators through **quark coalescence**.
- In quark coalescence, the high-energy collisions can generate similar flashes of quark-gluon plasma.

Tetraquarks - Uncommon

- Generally, the basic building blocks of matter (neutron and the proton) are made from three tightly bound quarks.
- For years, we had thought that for some reason, nature had chosen to produce particles made only from two or three quarks.
- Only recently have physicists begun to see signs of exotic "tetraquarks" -- particles made from a rare combination of four quarks.

X-particles

- X particles that were produced in the quark-gluon plasma in the CERN's Large Hadron Collider (LHC), Switzerland are of a type known as X (3872), named for the particle's estimated mass.
- As the background was overwhelming after the quark-gluon plasma forms and cools down, a **machine-learning algorithm** was used to pick out decay patterns characteristic of X particles.
- X (3872) is either a **compact tetraquark** or an entirely new kind of molecule made from not atoms but two loosely bound mesons.
- [Mesons are the subatomic particles that are made from two quarks.]
- **Discovery** - X (3872) was first discovered in 2003 by the Belle experiment, a particle collider in Japan that smashes together high-energy electrons and positrons.
- Within this environment, however, the rare particles decayed too quickly for scientists to examine their structure in detail.
- It has been hypothesized that X (3872) and other exotic particles might be better illuminated in quark-gluon plasma.
- **Significance** - In the next few years they want to use the quark-gluon plasma to probe the X

particle's internal structure, which could change our view of what kind of material the universe should produce.

Reference

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Advanced Light Helicopter MK III

Tri-Service Andaman & Nicobar Command inducts the indigenous Advanced Light Helicopter MK III.

- The indigenously designed and developed Advanced Light Helicopter (ALH-DHRUV) is a twin engine, multi-role, multi-mission new generation helicopter in the 5.5 ton weight class.
- The basic Helicopter produced in skid version and wheeled version of the aircraft is manufactured by Hindustan Aeronautics Limited.
- The major variants of Dhruv are classified as Dhruv Mk-I, Mk-II, Mk-III & Mk-IV.
- Amongst its variants, the MK III variant is a **maritime role variant** encompassing state-of-the-art sensors and weapons that add punch to India's prowess at sea.
- The ALH MK III aircraft with its glass cockpit, Shakti engines, advanced Maritime Patrol Radar, Electro–optical payload and Night Vision Device will act as a force multiplier in keeping India's territories safe.
- The state-of-the-art aircraft has multirole capabilities including maritime surveillance, support for Special Forces, medical evacuations besides search and rescue roles.

Reference

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2. https://hal-india.co.in/Product_Details.aspx?Mkey=54&lKey=&CKey=24

DNA Replication Licensing

A new study has revealed for the first time the dynamics of an important process called the 'DNA Replication Licensing'.

These findings may help explain why certain portions of the genome are relatively susceptible to DNA damage during replication in some cancer cells.

- Cells use the 'DNA Replication Licensing' or 'origin licensing' process to regulate, or license the replication of their genomes during cell division.
- The DNA replication licensing system ensures that chromosomal DNA is replicated precisely once before cell division occurs.
- **Location** - Origin licensing occurs in the initial, preparatory phase of cell replication, known as the G1 phase.
- Licensing takes place several hours before origins are activated to undergo replication in S-phase.
- **Process** - Licensing involves sets of special enzymes that attach to the DNA in chromosomes at various locations where DNA-copying is to originate.
- The enzymes essentially license the copying of DNA so that cells don't copy their genomes

more than once.

- The new study has shown in particular how the dynamics of the process differ in the two basic states of genomic DNA,
    1. Euchromatin state - Relatively loose and open DNA for gene activity, and
    2. Heterochromatin state - DNA wound more tightly to silence gene activity.
- **Findings** - Heterochromatin DNA loads the above mentioned licensing enzymes relatively late compared to what we observe in the euchromatin.
- This finding hinted that in dividing cells with an abnormally shortened G1 phase, heterochromatin might never be fully licensed for replication.
- This could potentially result in large mutations during replication and even cell death.
- Cells can have a shortened G1 phase for different reasons, including due to cancer.
- So the study suggests that the "genomic instability" or tendency to develop more mutations of some cancer types, and the genomic locations of that instability, might be explained in part by faulty origin licensing.

Reference

1. https://www.sciencedaily.com/releases/2022/01/220126165543.htm
2. https://pubmed.ncbi.nlm.nih.gov/15353274/#:~:text=The%20DNA%20replication%20licensing%20system,DNA%20for%20replication%20to%20initiate.&text=Licensing%20takes%20place%20several%20hours,undergo%20replication%20in%20S%2Dphase.