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Nanosniffer

- It is the world's first Microsensor based Explosive Trace Detector (ETD) developed by an Indian Institute of Technology (IIT) Bombay incubated startup called NanoSniff Technologies.
- Its core technology is protected by patents in the U.S. & Europe.
- NanoSniffer is an advanced, affordable and a 100% Made in India product in terms of research, development & manufacturing.
- It will reduce dependency on imported ETD devices.
- It can accurately detect nano-gram quantity of military, commercial and homemade explosives. It delivers the results in less than 10 seconds.
- It detects all classes of military, conventional and homemade explosives.

Indo-US Naval Relationship

- The USS John Paul Jones, the U.S. Navy destroyer ship, had carried out Freedom of Navigation Operation (FONOP) in the Indian Exclusive Economic Zone (EEZ), without requesting India's prior consent.
- India has protested the U.S. decision to conduct a patrol in the Indian EEZ in the western Indian Ocean. It also rejected the U.S.'s claim that its domestic maritime law was in violation of international law.
- India said that the United Nations Convention on the Law of Sea (UNCLOS) doesn't allow other States to carry out military manoeuvres in EEZ and on continental shelf without the consent of the coastal state.
- India's Territorial Waters, Continental Shelf, EEZ and Other Maritime Zones Act, 1976 defines the EEZ of India.
- It says that the EEZ is an area beyond and adjacent to the territorial waters, and the limit of such zone is 200 nautical miles from the appropriate baseline.
- India's limit of the territorial waters is the line every point of which is at a distance of 12 nautical miles from the nearest point of the baseline.
- Under the 1976 law, all foreign ships (other than warships) shall enjoy the right of innocent passage through the territorial waters.
- [Innocent passage being one that is not prejudicial to the peace, good order or security of India.]

United Nations Convention on the Law of Sea (UNCLOS)

- It is the international agreement that resulted from the 3rd United Nations Conference on the Law of the Sea.
- It provides a regulatory framework for the use of the world's seas and oceans.
- The United Nations has no direct operational role in the implementation of the Convention.
- Under UNCLOS, which India ratified in 1995, the sea and resources in the water and the seabed are classified into three zones:
    1. Internal waters (IW) - It is on the landward side of the baseline; includes gulfs and small bays. Coastal states treat IW like land.
    2. Territorial sea (TS) - It extends outwards to 12 nautical miles from the baseline. The coastal nations enjoy sovereignty over air, sea, seabed and subsoil and all living and non-living resources therein.
    3. Exclusive economic zone (EEZ) - This extends outwards to 200 nautical miles from the baseline.
- In EEZ, the coastal nations have sovereign rights for exploration, exploiting, conserving and managing all the natural resources therein.

Shrinking Marine Life Richness

- A study by the National Academy of Sciences has found a strong correlation between marine species decline and rising temperature - Fish species diversity tended to either plateau or decline at or above 20℃.
- **Threats to marine life** - Overfishing and pollution, the warming of waters due to climate change have impacted tropical species.
- Globally, the total number of open-water species declined by about half in the 40 years up to 2010 in tropical marine zones. During that time, sea surface temperatures in the tropics rose 0.2℃.
- The total number of species attached to the seafloor remained somewhat stable in the tropics between the 1970s and 2010.
- Climate change is already impacting marine species diversity distribution, with changes being more dramatic in the Northern Hemisphere where waters have warmed faster.
- Some were also found beyond the tropics, suggesting they had expanded their ranges. Species that can move are moving. But, for fixed species like corals, moving is not an option.

Right to Choose Religion

- The Supreme Court said that the people are free to choose their own religion, while hearing a petition claiming mass religious conversion happening across the country.

- The Bench said that people have a right to freely profess, practise and propagate religion, subject to public order, morality and health, under the Article 25 of the Constitution.
- It said that every person is the final judge of their own choice of religion or who their life partner should be.
- Courts can't sit in judgment of one's choice of religion or life partner.
- Religious faith is a part of the fundamental right to privacy, under the Article 21 of the Constitution. This article equated the right to privacy with the rights to life, of dignity and liberty.

G-SAP

- Through the Government Securities Acquisition Programme (G-SAP), the Reserve Bank of India (RBI) will purchase government securities worth Rs 1 lakh crore in the first quarter of FY 2021-22.
- Periodically, the RBI purchases the government bonds from the market through Open Market Operations (OMOs).
- G-SAP is in a way an OMO but there is an upfront commitment by the RBI to the markets that it will purchase bonds worth a specific amount.
- This will ensure liquidity conditions evolve in consonance with the stance of monetary policy.
- In addition to the G-SAP plan, the RBI will continue to deploy regular operations under the LAF, longer-term repo/reverse repo auctions, forex operations and OMOs.
- **Benefits** - G-SAP will help reduce the spread between repo rate and the yield on the 10-year GSec.
- It will also help to reduce aggregate cost of borrowing for the centre and states in fiscal year 2022.

Government Securities

- Government securities are government debt issuances used to fund daily operations, and special infrastructure and military projects.
- They guarantee the full repayment of invested principal at the maturity of the security and often pay periodic coupon or interest payments.
- They are considered to be risk-free as they have the backing of the government that issued them.
- The trade-off of buying risk-free securities is that they tend to pay a lower rate of interest than corporate bonds.
- Investors in government securities will either hold them to maturity or sell them to other investors on the secondary bond market.
- Currently, while the yield on 10-year GSec is over 6%, the yield on 5-year

Gsec is around 5.6% and that on 3-year Gsec is 4.85%.

Muon g-2 Experiment

- The American particle accelerator Fermilab that carries the 'Muon g-2' experiment found that the Muons are not wobbling the way they should when exposed to magnetic fields.
- The 'g-factor' measures the strength of a muon's internal magnet, which determines the measure by which it wobbles when exposed to a magnetic field.
- The experiment measured the extent of the anomaly and announced that 'g' deviated from the amount predicted by the 'Standard Model' of particle physics.
- In the Muon g-2 experiment, the muons are exposed to a magnet and a flurry of other sub-atomic particles known as the 'quantum foam'.
    1. The particles of the quantum foam pop into existence and go out in really short durations of time.
    2. While the magnet causes the greatest change in the g-factor, the quantum foam can also influence the g-factor to an extent.
- A new force of nature or a new fundamental sub-atomic particle is perhaps influencing the muons.

Muon

- Muon or fat electron is an elementary subatomic particle similar to the electron but 207 times heavier. It has two forms - the negatively charged muon and its positively charged antiparticle.
- Muon acts like a tiny magnet and therefore gets influenced by magnetic fields. When placed in an external magnetic field, the muon wobbles.

Source: PIB, The Hindu, The Indian Express, Down To Earth

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