

ECONOMY

❖ **India's Trade with China**

➤ **CONTEXT: India's imports from China reached record high in 2022, and the trade deficit surged beyond \$100 billion.**

- India's import from China: India's imports accounting for \$118.5 billion, up from \$97.5 billion. Indian imports of Chinese goods were up by more than 21% last year.
- India's export to China: India's exports to China fell from \$28.1 billion to \$17.48 billion. The trade deficit reached \$101.02 billion, up by 45%, from \$69.4 billion in 2021.
- Overall trade: India's bilateral trade with China reached a record \$135.98 billion in 2022. It was up by 8.4% last year.
- China and other nations and Groupings:
 - ✓ ASEAN: Trade with ASEAN, China's biggest trading partner, increased 11.2% to \$975.34 billion.
 - ✓ EU: The EU ranked second among China's trading partners, with trade up 2.4% to \$847.32 billion
 - ✓ The U.S.: Trade up 0.6% to \$759.42 billion.
- Reason for Increasing imports:
 - ✓ Recovery in demand in India,
 - ✓ Increasing imports of intermediate goods, and
 - ✓ Imports of new categories of goods such as medical supplies.
 - ✓ In the past couple of years, India's biggest imports from China included active pharmaceutical ingredients (APIs), chemicals, electrical and mechanical machinery, auto components, and medical supplies.

➤ **Trade Deficit**

- A trade deficit occurs when a country's imports exceed its exports during a given time period. It is also referred to as a negative balance of trade (BOT).
- **Advantages:** It allows a country to consume more than it produces. In the short run, trade deficits can help nations to avoid shortages of goods and other economic problems.
 - ✓ It creates downward pressure on a country's currency under a floating exchange rate regime. Domestic currency depreciation also makes the country's exports less expensive and more competitive in foreign markets.
 - ✓ Trade deficits can also occur because a country is a highly desirable destination for foreign investment.
- **Disadvantages:** If a country continually runs trade deficits, citizens of other countries acquire funds to buy up capital in that nation.
 - ✓ That can mean making new investments that increase productivity and create jobs.
 - ✓ However, it may also involve merely buying up existing businesses, natural resources, and other assets.
 - ✓ If this buying continues, foreign investors will eventually own nearly everything in the country.
- Trade deficits are generally much more dangerous with fixed exchange rates.
 - ✓ Under a fixed exchange rate regime, devaluation of the currency is impossible, trade deficits are more likely to continue, and unemployment may increase significantly.

➤ **Current Account Deficit (CAD)**

- It is the shortfall between the money flowing in on exports, and the money flowing out on imports.
- It measures the gap between the money received into and sent out of the country on the trade of goods and services and also the transfer of money from domestically-owned factors of production abroad.
- **Different from the Balance of Trade:** It is slightly different from the Balance of Trade, which measures only the gap in earnings and expenditure on exports and imports of goods and services.
 - ✓ Whereas, the current account also factors in the payments from domestic capital deployed overseas.
 - ✓ For example, rental income from an Indian owning a house in the UK would be computed in the Current Account, but not in the Balance of Trade.
- **Causes:** Existing exchange rate, consumer spending level, capital inflow, inflation level, and prevailing interest rate. For the Current Account Deficit in India, crude oil and gold imports are the primary reasons behind high CAD.
- **Implications:** Current Account Deficit may be a positive or negative indicator for an economy depending upon why it is running a deficit. It may help a debtor nation in the short term, but it may worry in the long term as investors begin raising concerns over adequate return on their investments.
- **Method to Deal:** It could be reduced by boosting exports and curbing non-essential imports such as gold, mobiles, and electronics. Currency hedging and bringing easier rules for manufacturing entities to raise foreign funds could also help. The government and RBI could also look to review debt investment limits for FPIs, among other measures.

➤ **Conclusion**

- India's growing imports from China are both a worry, reflecting continued dependence for a range of key goods, and as a positive indicator of the Indian economy importing more intermediate goods.

SCIENCE AND TECHNOLOGY

❖ **Europe's largest known deposit of rare earth elements found in Sweden**

➤ **CONTEXT:** Swedish state-owned mining company, LKAB, recently announced that it has discovered more than one million tonnes of rare earth oxides in the northern area of the country. This is the largest known deposit in Europe, the company added.

- Currently, no rare earths are mined in Europe and it mostly imports them from other regions. According to a report in the BBC, 98 per cent of rare earths used by the European Union were sent by China.
- Electrification, the EU's self-sufficiency and independence from Russia and China will begin in the mine.
- The discovery can also prove to be a significant turning point not just for the EU but also for other western countries as they have been trying to reduce their reliance on China for the import of these rare earth elements and other key industrial supplies, especially since the outbreak of the corona virus pandemic.

➤ **What are rare earths?**

- Rare earth elements or rare earth metals are a set of 17 chemical elements in the periodic table — the 15 lanthanides, plus scandium and yttrium, which tend to occur in the same ore deposits as the lanthanides, and have similar chemical properties.
- The 17 rare earths are cerium (Ce), dysprosium (Dy), erbium (Er), europium (Eu), gadolinium (Gd), holmium (Ho), lanthanum (La), lutetium (Lu), neodymium (Nd), praseodymium (Pr), promethium (Pm), samarium (Sm), scandium (Sc), terbium (Tb), thulium (Tm), ytterbium (Yb), and yttrium (Y).
- Despite their classification, most of these elements are not really "rare". One of the rare earths, promethium, is radioactive.

➤ **What are rare earths used for?**

- These elements are important in technologies of consumer electronics, computers and networks, communications, clean energy, advanced transportation, healthcare, environmental mitigation, and national defence, among others.
- Scandium is used in televisions and fluorescent lamps, and yttrium is used in drugs to treat rheumatoid arthritis and cancer. Rare earth elements are used in space shuttle components, jet engine turbines, and drones. Cerium, the most abundant rare earth element, is essential to NASA's Space Shuttle Programme.
- In recent years, rare earths have become even more important because there has been an increase in demand for green energy. Elements like neodymium and dysprosium, which are used in wind turbine motors, are sought-after more than ever as wind mills across the world continue to grow.
- Moreover, the push for switching from internal combustion cars to electric vehicles has also led to a rise in demand for rare earth magnets (made from neodymium, boron, and iron) and batteries.



➤ **What does the discovery mean for Europe and the world?**

- Against the backdrop of the fraught relations between China and other western countries, the new discovery of a deposit of rare earth elements in Sweden has come as a relief for the latter.
- Over the years, China has repeatedly used its monopoly in the rare earths market for furthering its geopolitical agendas. For instance, in 2010, Beijing blocked Japan's access to rare earth elements over Tokyo's detention of a Chinese fishing trawler captain. A decade later, when USA tried to take action

against telecom giant Huawei, China “threatened to include certain products using rare earths in Beijing’s technology-export restrictions.

- Therefore, it didn’t come as a surprise when last year in August, the US and 10 other nations — Australia, Canada, Finland, France, Germany, Japan, the Republic of Korea (South Korea), Sweden, the United Kingdom, and the European Commission — came together in a bid to break China’s dominance in the global market and formed the Minerals Security Partnership (MSP).
 - ✓ The alliance was “seen as primarily focused on evolving an alternative to China, which has created processing infrastructure in rare earth minerals and has acquired mines in Africa for elements such as Cobalt.
- However, China’s monopoly is likely to persist for the next few years. Experts suggest that it can take years to start operations at the Kiruna mine in Sweden, where the deposits have been found.
- According to a Reuters report, LKAB has planned to submit an application for an “exploitation concession in 2023” but it might take 10 to 15 years for it to potentially begin mining the deposit and shipping to market.

PRELIMS

1. James Webb telescope discovers its first Earth-sized exoplanet

➤ **CONTEXT: The National Aeronautics and Space Administration (NASA) recently announced that the James Webb Space Telescope has discovered its first new exoplanet.**

- Researchers have labelled the planet as LHS 475 b, and it’s roughly the same size as Earth.
- Located just 41 light-years away, the planet orbits very close to a red dwarf star and completes a full orbit in just two days.
- Researchers hope that in the coming years, owing to the Webb telescope’s advanced capabilities, they will be able to detect more Earth-sized planets.
- So far, most of the discovered exoplanets are similar to Jupiter as Earth-sized planets are much smaller in size and harder to discover with older telescopes.

➤ **What are exoplanets?**

- Exoplanets are planets that orbit other stars and are beyond our solar system.
 - ✓ According to NASA, to date, more than 5,000 exoplanets have been discovered. Scientists believe that there are more planets than stars as each star has at least one planet orbiting it.
- Exoplanets come in a host of different sizes. They can be gas giants bigger than Jupiter or as small and rocky as Earth. They are also known to have different kinds of temperatures (boiling hot to freezing cold).

➤ **Why and how do we study them?**

- Studying exoplanets not only broadens our understanding of other solar systems but also helps us piece together information about our own planetary system and origin. However, the most compelling reason to learn about them is to find the answer to one of the most profound and thought-provoking questions of humankind — are we alone in this universe?
 - In a bid to understand the characteristics of an exoplanet, researchers look for its mass and diameter along with determining if it is solid or gaseous or even has water vapour in the atmosphere.
 - Another important element of the study is finding out the distance between an exoplanet and its host star. This helps scientists determine if a discovered world is habitable or not. If an exoplanet is too close to the star, it might be too hot to sustain liquid water. If it’s too far, it might only have frozen water. When a planet is at a distance that enables it to have liquid water, it is said to be in the “Goldilocks zone”.
 - With the launch of the Webb telescope, scientists believe that they would now be able to better study exoplanets as it is the only telescope that is capable of characterising the atmospheres of Earth-sized planets orbiting distant stars.
 - ✓ “Webb is sensitive enough to detect a range of molecules in LHS 475 b’s atmosphere, but the researchers are yet to make definitive conclusions. In fact, it is even possible that the planet has no atmosphere.”

➤ **How are exoplanets discovered?**

- Discovering exoplanets is quite tough as they are small and hard to spot around their bright host stars.
- Scientists rely on indirect methods, such as the transit method, which is “measuring the dimming of a star that happens to have a planet pass in front of it.

➤ **What are red dwarf stars?**

- The newly discovered exoplanet orbits around a red dwarf star.
 - ✓ Such types of stars are the most common and smallest in the universe.
 - ✓ As they don’t radiate much light, it’s very tough to detect them with the naked eye from Earth.
 - ✓ However, as red dwarfs are dimmer than other stars, it is easier to find exoplanets that surround them. Therefore, red dwarfs are a popular target for planet hunting.

2. Doppler Weather Radar(DWR)

➤ **CONTEXT: Union Minister Dr Jitendra Singh says, Entire Country will be covered by Doppler Weather Radar Network by 2025 to predict extreme weather events more accurately.**

- IMD has taken pro-active steps to increase the Radar Network from mere 15 in 2013 to 37 in 2023 and will add 25 more in next 2-3 years.
- IMD has augmented Doppler Weather Radar network in HP, Uttarakhand, Ladakh and J&K which will help further to predict extreme weather events more accurately.
- Dr Jitendra Singh dedicated 4 Doppler Weather Radar Systems to the Western Himalayan States of Jammu and Kashmir, Uttarakhand and Himachal Pradesh.
- He also dedicated 200 Agro Automated Weather Stations to the Nation.
- Under Agro-Meteorological Services, it is targeted to establish 660 District Agro Meteorological Units (DAMUs) by 2025 and increase from 3,100 blocks in 2023 to 7,000 blocks in 2025.
- The web GIS services launched by IMD in 2022 have been augmented further with addition of hazard and vulnerability element in collaboration with other state and central agencies is helping the public, disaster managers and stakeholders to initiate timely response action to mitigate the disasters further.
- The accuracy has increased by about 20-40% for different severe weather events forecast during last five years. The Weather Department is making best use of Space based observation of INSAT-3D and 3DR, OceanSat satellites for prediction of other weather events.
- IMD has succeeded in minimizing loss of lives from various extreme events like cyclone, heavy rain, thunderstorm, heat wave and cold wave etc. in the recent years with its precise forecasting and timely warnings.
- Recently introduced Flash Flood Guidance in 2021 has been augmented further by increasing the number of watersheds from 30,000 to 1,00,000 of the country in 2022. It is being provided every 6 hours to Nepal, Bhutan, Bangladesh and Sri Lanka apart from our national use.

➤ **What is Radar?**

- RADAR which stands for Radio Detection and Ranging System is an electromagnetic system used to detect the location and distance of an object from the point where it is placed.
- DWRs are remote sensing instruments and are capable of detecting particle types of objects (rain, snow, hail, insects, etc), intensity, and motion. They can be used to determine the structure of storms and also to predict the severity of storms.

➤ **How does a DWR work?**

- In radars, a beam of energy called radio waves is emitted from an antenna. When this beam strikes an object in the atmosphere, the energy scatters in all directions, with some reflecting directly back to the radar.
- The larger the object deflecting the beam, the greater is the amount of energy that the radar receives in return.
- Observing the time required for the beam to be transmitted and returned to the radar allows weather forecasting departments to identify raindrops in the atmosphere, and measure their distance from the radar.
- The specialty of DWR is that it can provide information on both the position of targets as well as their movement by tracking the phase of transmitted radio wave pulses. (Phase meaning the shape, position, and form of those pulses).
- As computers measure the shift in phase between the original pulse and the received echo, the movement of raindrops can be calculated, and it is possible to tell whether the precipitation is moving toward or away from the radar.
- With the radar observations, updated every 10 minutes, forecasters can follow the development of weather systems as well as their varying intensities, thus can predict weather events and their impact.
- As per the US National Weather Service, in an hour, a Doppler radar transmits a signal for only over seven seconds and spends the remaining 59 minutes and 53 seconds listening to returned signals.

➤ **Application**

- These radars are used to study cloud formation because they can detect microscopic water particles, and they can also detect light precipitation like snow.
- Because X band radars are easily attenuated (become less effective), they are only utilized for very short-range weather observation.
- Because of its tiny size, the radar can be carried around like the Doppler on Wheels (DOW). To detect turbulence and other weather disturbances, most big airplanes are fitted with X band radar.
- Certain police speed radars and some space radars use this band as well.

➤ **Why are they called Doppler radars?**

- The phase shift in DWRs works on the same lines as the Doppler effect observed in sound waves.

- The sound pitch of an object approaching the observer is higher due to the compression of sound waves (a change in their phase) and as the object moves away from the observer, the sound waves stretch, resulting in lower frequency.
- This effect explains why an approaching train's whistle sounds louder than the whistle when the train moves away and the discovery of the phenomenon is attributed to Christian Doppler, a 19th-century Austrian physicist.
- **DWR in Indian Scenario**
- In India, DWRs of varying frequencies such as S-band, C-band, and X-band are commonly used by the IMD to track the movement of weather systems and cloud bands and gauge rainfall over its coverage area of about 500 km.
- X band radars: They operate at a frequency of 8-12 GHz and a wavelength of 2.5-4 cm. The X band radar is more sensitive and can detect tiny particles due to its shorter wavelength.
- X-band radar also is used to detect thunderstorms and lightning whereas C-band guides in cyclone tracking.

ANSWER WRITING

Q. Is diversity and pluralism in India under threat due to globalization? Justify your answer

“India is the cradle of the human race, the birthplace of human speech, the mother of history, the grandmother of legend, and the great grandmother of tradition. Our most valuable and most artistic materials in the history of man are treasured up in India only.” – Mark Twain.

- India has long been considered as the most pluralistic and diversified society in the world. Her past is full of amalgamation of foreign tribes with indigenous ones. This amalgamation created a unique synthesis of cultural traditions and customs. The present-day Indian society is a continuation of these traditions.
- Eversince globalization, beginning from the 18th century onwards, Indian society is constantly interacting with other global societies and exchanging customs and traditions more rapidly.
- The reactions to global events are clearly manifested in Indian society. For example, religious fundamentalism has gained ground in India. The ISIS militant group has seen participation from Indian youths as well. Religious brainwashing through misinformation has eroded religious fabric. The communal riots have also been recorded in many parts of India. As a counteraction to this, various hardline groups have also emerged among other sections.
- Moreover, religious conversion movements have also sparked debates as cases of forcible conversions and conversion through monetary incentives are recorded. Some of them have been most active in Tribal areas and Northeastern part of India. Their distinct culture and traditions are impacted by these activities. Further, the ridiculing of ancient Indian traditions in the name of modernity and westernization has also been on rise.
- However, globalization has also contributed to women empowerment and has put some of the most regressive Indian traditions such as Sati and Purdah on a rational test. Also, it has helped to export our cultural practices such as cuisine, dances, and various other art forms, etc. all over the world particularly Yoga. This, in turn, has boosted tourism in the country and resulted in generation of even more unique customs and traditions.
- Thus, spaces where unhindered access to global forces is given, there have been cases of violation of India's diversity and pluralism. But on the other hand, active participation from Indians and foreign elements in a healthy environment has resulted in exchange of information and promotion of Indian culture.

MCQs

1. Consider the following parameters in respect of RADAR principle:
 1. It is an active sensing system.
 2. Electromagnetic radiation of wavelength is in centimetre range
 3. It operates in visible region.
 4. It comprises Radio detection and ranging.
 Which of the above statement/s is/are correct?
 (a) 1, 2 and 3 (b) 2, 3 and 4 (c) **1, 2 and 4** (d) 1, 2, 3 and 4
2. The term 'Goldilocks Zone' is often seen in the news in the context of
 - (a) The limits of habitable zone above the surface of the Earth
 - (b) Regions inside the Earth where shale gas is available
 - (c) **Search for the Earth-like planets in outer space**
 - (d) Search for meteorites containing precious metals
3. Consider the following statements with reference to the term “LHS 475 b” recently seen in news

1. It is an Exomoons recently discovered
 2. It is the first Exomoons discovered by James webb telescope
- Which of the above statement/s is/are not correct?
- (a) 1 only (b) 2 only (c) **Both 1 and 2** (d) Neither 1 nor 2
4. Recently, there has been a concern over the supply of a group of elements called 'rare earth metals.' With reference to this consider the following.
 1. China, which is the largest producer of these elements, is also the largest exporter of the metal to Europe.
 2. Other than China, Australia, Canada and Chile, these elements are not found in any country.
 3. Rare earth metals are essential for the manufacture of various kinds of electronic items and there is a growing demand for these elements.

Which of the statements given above is/are correct?

(a) 1 only (b) 2 and 3 only (c) 1 and 3 only (d) **1, 2 and 3**
 5. Consider the following actions which the Government can take:
 1. Devaluing the domestic currency.
 2. Reduction in the export subsidy.
 3. Adopting suitable policies which attract greater FDI and more funds from FIIs.

Which of the above action/actions can help in reducing the current account deficit?

(a) 1 and 2 only (b) 2 and 3 only (c) 3 only (d) **1 and 3 only**
 6. With reference to The Ganga Vilas cruise, consider the following cities
 1. Patna
 2. Kolkata
 3. Dhaka
 4. Guwahati
 5. Sahibganj

Which of the above cities does The Ganga Vilas route include?

(a) 1, 2, 4 and 5 (b) 2, 3 and 4 (c) 1, 2, 3 and 4 (d) **1, 2, 3, 4 and 5**
 7. The case 'Ramkripal vs State of Madhya Pradesh' recently heard in media is relates to which of the following?
 - (a) Communication network
 - (b) **Women's Modesty**
 - (c) Child adoption
 - (d) Hate speech
 8. Pashu sakhi initiative often mentioned in news is associated with which of the following state?
 - (a) **Jharkhand**
 - (b) Odisha
 - (c) Haryana
 - (d) Gujrat
 9. With reference to Saltie census 2023 consider the following
 1. The population of saltwater crocodiles in the water bodies of Bhitarkanika National Park and its nearby areas in Odisha's Kendrapara district has marginally increased.
 2. In 1975, the ministry of forest and environment, in collaboration with the United Nations Environmental Programme, had started a crocodile breeding and rearing project in Dangamala within Bhitarkanika.

Which of the above statement/s is/are not correct?

(a) 1 only

(b) **2 only**

(c) Both 1 and 2

(d) Neither 1 nor 2
 10. With reference to HELINA missile consider the following
 1. HELINA also called Dhruvastra is a third generation 'fire and forget' anti-tank missile (ATGM) system.
 2. It is capable of operating in all weather conditions.

Which of the above statement/s is/are correct?

(a) 1 only

(b) 2 only

(c) **Both 1 and 2**

(d) Neither 1 nor 2