27 June 2021: UPSC Exam Comprehensive News Analysis

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A. GS 1 Related

Category: GEOGRAPHY

1. Clues from meteorite to Earth's mantle

Context:

- Study of the **Kamargaon meteorite** by researchers from the Indian Institute of Technology (IIT) Kharagpur.

Background:

Kamargaon meteorite:

- In November 2015, a meteorite fell near the town of Kamargaon in Assam, India.
- The meteorite **originated in the asteroid belt between Mars and Jupiter** and was sucked in by Earth's gravity.
- Based on its mineral composition, it was classified as **a chondrite**, a variety of stony meteorite.

Shocked meteorite:

- **The kamargaon meteorite is a shocked meteorite**. It means that the meteorite has gone through **high-pressure and high-temperature conditions**.
- These meteorites would have survived high-pressure and high-temperature events during their formation and fall on Earth (**impact event**) due to the planet's gravitational pull.
    - The meteorite has experienced the kind of pressure around 24 Giga Pascal (equivalent of pressure found in Earth's mantle), which is 2,50,000 times more than the atmospheric pressure and temperatures up to 2,500 degrees Celsius.

Structure of the Earth:

- The Earth is composed of three layers — **the crust, mantle and core.**
    - The upper crust layer is relatively thin, followed by the **intermediate silicate mantle** and then the centre **iron-nickel alloy core.**

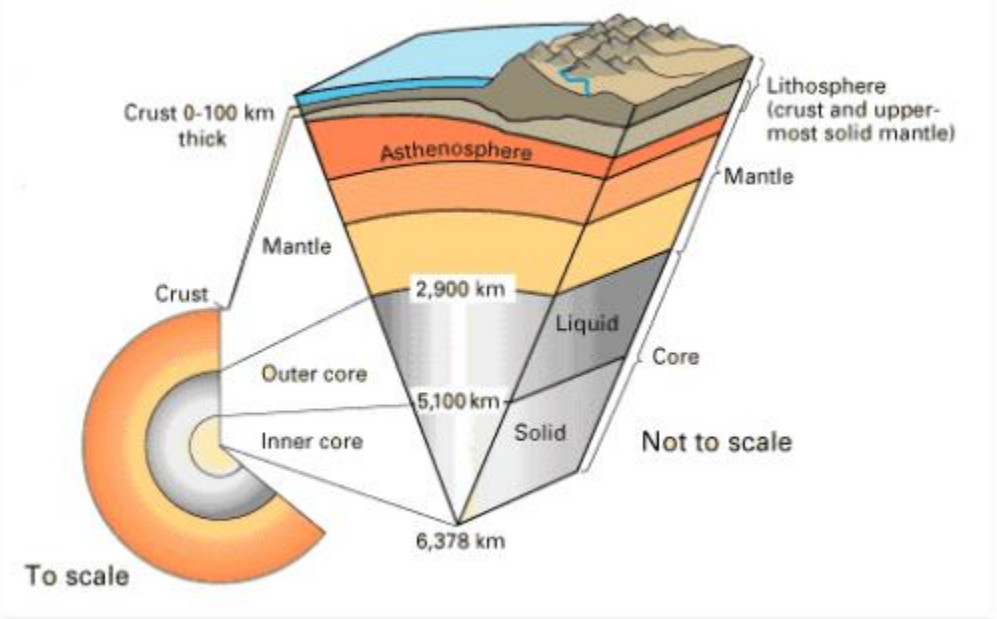

Image source: NCERT

Details of the study:

Meteorite composition:

- The meteorite is mostly made up of a substance known as **Olivine.**
    - Olivine is a rock-forming mineral found in dark-coloured igneous rocks and has a **very high crystallisation temperature** compared to other minerals. It is considered an **important mineral in Earth's mantle.**

Olivine dissociation:

- **Olivine breaks down into Bridgmanite and Magnesiowustite under high temperature and pressure conditions** like those observed in the Earth's lower mantle.
    - The mantle faces high temperature and pressure. When materials are transported to the lower mantle by **convection or subduction**, there would be high-temperature conditions in the lower mantle.
- Using new **high-resolution electron microscopy and spectroscopy**, researchers studied the dissociation reaction of olivine in the Kamargaon meteorite. They have found mechanisms and reactions that may be driving the transformation of olivine.

Significance of the study:

Understanding of the mantle:

- The meteorite provides a valuable sample of naturally occurring high-pressure minerals like those believed to make up the Earth's mantle. Thus the **analysis of the shocked meteorite offers new clues about the Earth's mantle and its process of formation**.

Challenges in the study of structure of the earth:

- While much is known about the crust composition and formation, **very little is known about the mantle and the core due to their inaccessibility.**
- Given the relative inaccessibility of deeper layers of the earth, the only way to study material from such immense depths is through **volcanic eruptions and magma samples**. The **study of different meteorites** also provides valuable insights into the formation of the earth.

Better understanding of geophysical phenomenon:

- The understanding of the **olivine dissociation**, which is one of the most important reactions that **largely control the properties in the Earth's interior** will better understand the geophysical phenomenon associated with it.
- The samples found in the meteorite are similar to those observed on plate tectonics and could prove useful in **studying earthquakes and volcanic activities.**

B. GS 2 Related

Nothing here for today!!!

C. GS 3 Related

Category: SCIENCE AND TECHNOLOGY

1. Why bacteria develop multi-drug resistance

Context:

- Research into the **process of evolution of bacteria**, from the Population Biology Lab at Indian Institute of Science Education and Research, Pune.

Background:

Bacterial evolution:

- Bacterial evolution refers to the **heritable genetic changes that a bacterium accumulates during its life time**, which can arise from **adaptations in response to environmental changes or the immune response of the host.**
- Because of their **short generation times and large population sizes, bacteria can evolve rapidly**.

Fitness cost of antibiotic resistance evolution:

- The cost to the 'fitness' of an organism is it's ability to replicate and survive in a competitive environment.
- Consider an antibiotic which targets an important biological pathway. Mutations that confer antibiotic resistance often involve modification of the target enzyme to prevent antibiotic binding. These **mutations often make these enzyme suboptimal compared to evolutionary optimized "wild-type" version.**
- This **can reduce fitness, manifesting as decreased virulence, transmission, and growth rate in antibiotic-free environment**. However, despite being less fit under normal growth conditions, this **mutant can survive under conditions of antibiotic treatment**. So this is a trade-off also known as fitness cost.
- Thus when bacteria become fit in one environment, they either lose fitness or fail to increase fitness in other environments. Thus the evolution of antibiotic resistance carries **a fitness cost, expressed in terms of reduced competitive ability in the absence of antibiotics.**
- If antibiotic resistance could be acquired by bacteria without any "fitness cost" all the human bacteria (as well as all the environmental ones) would be pan-resistant already. The differing fitness cost associated with different bacteria's is the reason why some bacteria evolve multi-drug resistance while others do not.
    - Gram-positive bacteria are more resistant to antibiotics and the **Gram-positive bacteria have a significantly greater fitness costs associated with resistance mutations** when compared with Gram-negative bacteria.

Details:

- **E. coli bacteria** which was selected for the study, were evolved in fluctuating and steady environments and observed. During evolution, the fitness costs experienced by bacteria under constant and fluctuating environments were analysed using **whole-genome, whole-population sequencing analysis**
- **Population size was found to be an important factor.** The population size determined the kind of mutations available to the bacteria, which in turn, leads to the type of fitness costs they evolve.
- The study concluded that when the environment is fluctuating, **large (but not small) populations can by-pass the effect of fitness cost better.**
    - Large populations were able to develop certain **compensatory mutations** that allowed them to survive in different environments.
    - Larger populations contained **greater number of mutations** which enabled them to bypass the fitness costs.

Category: ENVIRONMENT AND ECOLOGY

1. A fabled wonder in danger

Context:

- The **World Heritage Committee's** drawing up of a **resolution to inscribe Australia's Great Barrier Reef (GBR) on the 'List of World Heritage in Danger'**.
    - Given the **geological history of the GBR** and the vast **diversity of marine life** that it hosts, it was listed under UNESCO's World Heritage List in 1981.

Background:

GBR under threat:

- The 2019 Outlook Report of the Great Barrier Reef Marine Park Authority, notes with concern the long-term **state of the ecosystem deteriorating from poor to very poor.**
    - The Outlook Report records widespread and significant declines in many coral species since 2014. It notes the decline in coral larvae and the reduction of adult brood stock.

Threats:

- The reef system faces severe environmental threats.

Climate change risks:

- The climate change crisis has led to **warming of the ocean waters** and has also contributed to **rising sea levels**. This has contributed to the GBR experiencing **three big events of coral bleaching in 2016, 2017 and 2020.**

Environmental pollution:

- Increasing use of chemicals in the agricultural sector and the **farm run-off** and the **coastal pollution** has been a big challenge to the GBR.

Impact of developmental activities:

- The **coastal development and other commercial uses of the GBR** like limestone mining has impacted the reef ecosystem.
- The **Carmichael Coal Mine project** with its increased shipping traffic through the Great Barrier Reef heritage area could have a negative impact on the reef

Other factors:

- Coral growth is also endangered by the **proliferation of crown-of-thorns starfish**, which consumes them.

Concerns:

Ecological:

- The destruction of the GBR will **negatively impact the delicate ecological balance between the various organisms in the reef ecosystem.**
- The GBR hosts an assemblage of fishes and invertebrates in the reefs, including the dugongs, green turtles and other species in seagrass meadows, and sharks, rays, anemones, sponges, worms.

Economic:

- The GBR is a major tourist destination.
- In 2015-16, **tourism, fishing, recreational uses and scientific activities** contributed an estimated $6.4 billion to the Australian economy.
- The threat to the GBR will thus **an economic impact on Australia.**

Conclusion:

- The updated **Reef 2050 Plan** that Australia is pursuing for conservation of the GBR ecosystem should incorporate the urgent need for resolute action on climate and pollution threats to the GBR.

D. GS 4 Related

Nothing here for today!!!

E. Editorials

Category: ECONOMY

1. ED transfer of defaulters' assets to PSBs

Context:

- The Enforcement Directorate's (ED) transfer of seized assets of the three fugitive businessmen- Vijay Mallya, Nirav Modi and Mehul Choksi to the affected public sector banks.
    - Vijay Mallya and Nirav Modi have been declared **fugitive economic offenders under the Fugitive Economic Offenders Act, 2018.**

Details:

- Though the **seizure and the liquidation of assets may help in paying back a significant share of the liabilities that these fugitives owe to banks**, the article argues that it will not alleviate the financial sector from the bad loans crisis.

Huge burden of bad loans:

- The recovered amount is unlikely to have any major impact on the overall health of banks which continues to be under stress owing to the increase in bad loans.
- The size of bad loan write-offs by banks has steadily increased. **The size of fresh bad loans accumulated by banks has increased.**
- The overall amount of bad loans in the books of banks continues to be high. As per available estimates, the total bad loans of Indian banks stood at more than ₹8 lakh crore at the end of September 2020. This is **only expected to grow further** to ₹10 lakh crore by the end of the financial year 2022 **due to the impact of the COVID-19 pandemic on repayments.**

For related information on the health of the Indian financial system refer to:

UPSC Comprehensive News Analysis of 3rd Jan 2021

Challenges in liquidation of the seized assets:

- The liquidation of the seized assets is a major challenge given that the previous attempts at it have **failed to attract significant buyer interest**. This would reduce the potential for recovery of the losses.

Long drawn process:

- The legal challenges in courts by various stakeholders in the liquidation process has only lead to **long delays in the recovery process.**
- The delays result in **low-value liquidationdue to a high economic rate of depreciation**
- The undue delays in the recovery process also leads to increase in costs of the associated process of recovery.

Interest foregone by banks:

- These banks have had to forego the interest after having recognized the loans as a **non performing asset.**
    - A Non-Performing Asset is a loan or advance wherein interest or installments of principal remain overdue.
- The banks have had to continue paying interest to lenders even when a borrower defaults. This constitutes a significant amount and is unlikely to be recovered by the sale of the seized assets. This will only strain the fragile financial health of the banks.

Systemic issues:

- The recent developments of seizure and liquidation of the assets though welcome, will still not be sufficient to address the root problem of banking scams in India, which is systemic.

- Often loans given by public sector banks to powerful industrialists are **influenced by crony, non-business considerations.**
- Most of the loan amount disbursed by public sector banks are concentrated towards a small group of industrialists.
- There is **very little oversight** of the purposes for which the allocated loans are put to use. This allows for siphoning of loans for undeclared purposes.
- **The public sector banks are heavily prone to political influence.** This adversely impacts their financial efficiency.

Issues with the new debt resolution regime:

- Though the new debt resolution regime of the **Insolvency and Bankruptcy Code (IBC), 2016**, has helped improve the recovery of dues from defaulters, it continues to be plagued by some issues.
  - As against envisioning of the IBC as a time bound relatively short time resolution process, **the recovery process continues to be long drawn**. Cases have been piling up and the existing Benches of the National Company Law Tribunal have been unable to dispose of cases within deadlines.
  - The **absence of a robust market for the sale of stressed assets** has negatively impacted the recovery amounts made by the lenders during the liquidation process.

For more related information on the IBC, 2016 refer to the following article:

UPSC Comprehensive News Analysis of 05th Oct 2020

2. Reining in the Big Four

Context:

- The U.S. proposed package of bills to better **regulate the Big Tech.**

Background:

- The U.S. has been undertaking **anti-trust scrutiny of the Big Tech** over the last few years.
  - Anti-trust laws are meant to **prevent unfair business practices.**

For detailed information of the anti-trust concerns with respect to the Big Tech and the corresponding American laws refer to the following articles:

UPSC Comprehensive News Analysis of 15th Dec 2019

UPSC Comprehensive News Analysis of 29th Jan 2021

- Given that experts have been warning that the **evolution of technology** and the **advent of new business models** have rendered the existing anti-trust laws ineffective, there have been calls for better regulation of the Big Tech.

Details:

- The new package of six Bills that is now in the U.S. Congress is an attempt to consolidate anti-trust proceedings against new-age tech firms.

- The package of bills aim to **outlaw certain business practices** that form the core of Big Tech companies such as Google, Facebook, Amazon and Apple.
- Some of the major highlights of these bills include the following:
    - The Platform Competition and Opportunity Act would **prevent big tech companies by buying up smaller rivals**, to remove potential competition early one.
    - The Ending Platform Monopolies Act would **prevent companies from becoming players on their own platforms** which has allowed the Big Tech to enjoy substantial control in the sector while rendering others uncompetitive and unsustainable.
    - The American Choice and Innovation Online Act would **prevent companies from giving preferences to their own products i**n the marketplaces they run.
    - One of the bills **promotes interoperability**, which would let users take data such as contacts lists and profile information with them while migrating to other platforms.
    - The Merger Filing Fee Modernization Act increases the **government fee on large corporate mergers.**

Arguments in favour:

- Given the **huge power that the Big Tech enjoy and the potential of misuse of this position**, there is the urgent need to regulate such companies.

Arguments against:

- Sceptics have dismissed the bills based on the potential **adverse impact on the industry**, which has **helped contribute more jobs for the people, taxes to the government and economic growth**
- Some have termed the new laws as **excessive government control** on private enterprises which could have undesirable long term outcomes.

Significance for India:

- Many nations have been taking legal or legislative routes to limit the influence of the Big Four, including in India.
- The proposed laws in the U.S., which is the biggest market of the Big Tech may be followed up by similar regulation in all other countries as well.
- This will be **in line with India's attempts to regulate the Big Tech.**

F. Prelims Facts

1. Army Aviation raises tempo in operations along the LAC

List of army's aviation related defence assets:

Indigenously developed:

- Cheetah and Chetak helicopters
- Advanced Light Helicopters (ALH) and **Rudra**

- Rudra is a weaponised variant of Advanced Light Helicopters (ALH).
- Light Combat helicopter (LCH)

Procured from other countries:

- **AH-64 Apache**
  - The AH-64 Apache is an **advanced multi-role combat helicopter** and considered the world's best attack helicopter. India is purchasing these from the
- **Heron-TP** Medium Altitude Long Endurance **(MALE) Unmanned Aerial Vehicles (UAV).**
  - It is satellite communication-enabled and can fly up to an altitude of 45,000 feet and has an endurance of over 30 hours.
  - It is being leased from **Israel Aircraft Industries.**
- **Ka-226T** utility helicopter
  - It is under negotiations with **Russia**

2. Earth-borne aliens

Gaia:

- Gaia is a **space observatory of the European Space Agency (ESA).**
- The spacecraft is designed for astrometry: measuring the positions, distances and motions of stars with unprecedented precision.
- The Gaia mission aims to construct the largest and most **precise 3D space catalogue of astronomical objects including stars, planets, comets, asteroids, quasars, etc.**

G. Tidbits

1. Experts oppose decision to open Corbett, Rajaji round the year

- Wildlife experts in Uttarakhand have opposed the **State government's decision to open Corbett and Rajaji tiger reserves for visitors all round-the-year**.
  - Currently, these tiger reserves remain closed to visitors every year from end June to mid November.
- The basis for the opposition is that such a move would amount to cruelty to the animal world and also the movement of both animals and humans in the wild during the season may also **give rise to man-animal conflict situations.**

2. Govt. raises alert on Delta Plus

- **The Union government has warned the States about the Delta Plus varian** It has directed the States to initiate more focused and stringent measures to contain the spread of the virus.
- Given the **increased transmissibility, immune escape and potential reduction in monoclonal antibody response** associated with the delta plus variant, if this variant is not controlled in a timely manner, this could lead to a rapidly occurring ferocious **third wave of the COVID pandemic**.

- **The Delta Plus variant is a variant of concern** and has already been identified and isolated in over 10 countries and nearly 50 cases have already been seen in India.

3. India, Greece seek respect for territorial integrity

- During the visit of External Affairs Minister to Athens, India and Greece held discussions over the **situation in Cyprus** and have called for respect of sovereignty and territorial integrity by all members of the international community.
- This is seen as an indirect response to Turkey's plan to mark the anniversary of 1974 invasion of the island by Turkish forces.
    - **The northern part of the Cyprus Island is controlled by Turkey** and is known as the Turkish Republic of Northern Cyprus.
- Several countries have condemned the move by Turkey over fears that the move could further **escalate tensions in the eastern Mediterranean region.**

H. UPSC Prelims Practice Questions

Q1. Which of the following statements with respect to Ethanol Blending of Petrol is/are correct?

1. It ensures thorough combustion of fuel as Ethanol is high in oxygen content.
2. It will solve the problem of agricultural waste.
3. India has set a target of 20 per cent ethanol blending in petrol by 2030.

Options:

a. 1 and 2 only
b. 2 and 3 only
c. 1, 2 and 3 only
d. 1 only

Answer: a

Explanation:

- Ethanol burns well because it is an oxygenate, meaning that ethanol molecules contain oxygen. Oxygen atoms inside ethanol join forces with oxygen molecules in the air to help ethanol burn more completely. This extra amount of oxygen also helps gasoline burn better when it is blended with ethanol. Hence, carbon monoxide production from ethanol fuel is significantly lower than that of petrol engines.
- Given that ethanol can be produced from a variety of feed stocks such as sugar cane, bagasse, switch grass and also other cellulose biomass waste, it can be a potential solution to agricultural waste
- The government has advanced the country's target of 20 per cent ethanol blending in petrol by five years to 2025, from the earlier 2030.

Q2. Which of the given statement/s with respect to Integrated Child Development Services (ICDS) is/are correct?

1. The beneficiaries of the programme are Children in the age group of 0-14 years, pregnant women and lactating mothers.
2. It is a central sector scheme under the ministry of Women and Child Development.
3. It aims to provide pre-school non-formal education to children.

Options:

a. 1, 2 and 3
b. 2 only
c. 3 only
d. None of the above

Answer: c

Explanation:

- The beneficiaries under the Scheme are children in the age group of 0-6 years, pregnant women and lactating mothers.
- ICDS is a centrally sponsored scheme implemented by state governments and union territories.
- The following services are sponsored under ICDS to help achieve its objectives:
    - Immunization
    - Supplementary nutrition
    - Health checkup
    - Referral services
    - Pre-school education(Non-Formal)
    - Nutrition and Health information
    - Contraceptive counselling for adolescents

Q3. Which of the given statements with respect to Green Sea Turtles is/are correct?

1. Global warming contributes to the feminization of green sea turtles.
2. They are found in tropical and subtropical seas around the world except for the Indian Ocean.
3. Their presence in seas helps in providing a nursery for numerous species of fish, shellfish and crustaceans.

Options:

a. 1 and 2 only
b. 1 and 3 only
c. 2 only

d. None of the above

Answer: b

Explanation:

- Research has indicated that the global warming seems to be having an impact on the gender ratio of the green turtles. Warmer temperatures have led to feminization of green turtles, leading to significant scarcity or absence of adult males.
- The Green turtle feeds on sea grass beds and by cropping the grass provide a nursery for numerous species of fish, shellfish and crustaceans.
- Green sea turtles are found around the world in warm subtropical and tropical ocean waters, including the Indian Ocean.

Q4. Which of these UNESCO World Heritage Sites in India have been on the "List of World Heritage in Danger"?

1. Group of Monuments at Hampi
2. Group of Monuments at Mahabalipuram
3. Manas Wildlife Sanctuary
4. Ellora Caves
5. Sundarbans National Park

Options:

a. 2, 3 and 5 only
b. 1 and 5 only
c. 2 and 4 only
d. 1 and 3 only

Answer: d

Explanation:

- The List of World Heritage in Danger is compiled by UNESCO.
- The list is intended to increase international awareness of the threats and to encourage counteractive measures.
- Previous delisted India sites include:
    - Group of Monuments at Hampi
    - Manas Wildlife sanctuary

Q5. The term 'Domestic Content Requirement' is sometimes seen in the news with reference to

a. Developing solar power production in our country

b. Granting licenses to foreign T.V. channels in our country
c. Exporting our food products to other countries
d. Permitting foreign educational institutions to set up their campuses in our country

Answer: a

Explanation:

- The domestic content requirement (DCR) category was instituted in the Jawaharlal Nehru National Solar Mission from the beginning of 2010 in an effort to create a healthy and robust indigenous manufacturing base and to elevate India's status as a solar hub.

I. UPSC Mains Practice Questions

1. Highlight the major drawbacks surrounding India's nationalized banks and discuss measures to improve efficiency and accountability. (10 marks, 150 words)[GS-3, Economy]
2. Antitrust Bills initiated in the US House of Representatives will hold the Big Tech companies accountable for anti-competitive conduct and set a global precedent. Do you agree? Substantiate. (10 marks, 150 words)[GS- 3, Economy]