# 22 Aug 2021: UPSC Exam Comprehensive News Analysis

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## A. GS 1 Related

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# B. GS 2 Related

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# C. GS 3 Related

## Category: SCIENCE AND TECHNOLOGY

### 1. U.S. lab makes headway in nuclear fusion energy

**Context:**

- Breakthrough in Nuclear fusion technology achieved at the U.S. National Ignition Facility (NIF).

**Background:**

**Nuclear fusion technology:**

- Nuclear fusion is a reaction in which **two light atomic nuclei are combined to form a heavier atomic nucleus and subatomic particles**. The difference in mass between the reactants and products is manifested as energy as explained by **Einstein's equation ($E=mc^2$),** which says that mass and energy can be converted into each other.
- If scientists develop a way to harness energy from fusion in machines on Earth, it could be an important method of energy production.
- Nuclear fusion is a **clean and green route to producing energy.**
    - A fusion reactor is carbon neutral, it does not create carbon dioxide.
    - Nuclear fusion unlike Nuclear fission does not give out any remnant radioactive waste products
    - The fuel used for Nuclear fusion is easily available.

**Deuterium-tritium (DT) fusion reaction:**

- Fusion can involve many different elements in the periodic table. However, researchers working on fusion energy applications are especially interested in the **deuterium-tritium (DT) fusion reaction.**
    - **DT fusion reaction releases much more energy than most fusion reactions and they occur at lower temperatures than other elements.**
- Deuterium (D) and tritium (T) fusion reaction produces a helium nucleus (or alpha particle) and a high energy neutron. The neutrons from DT reactions are harvested to produce energy.

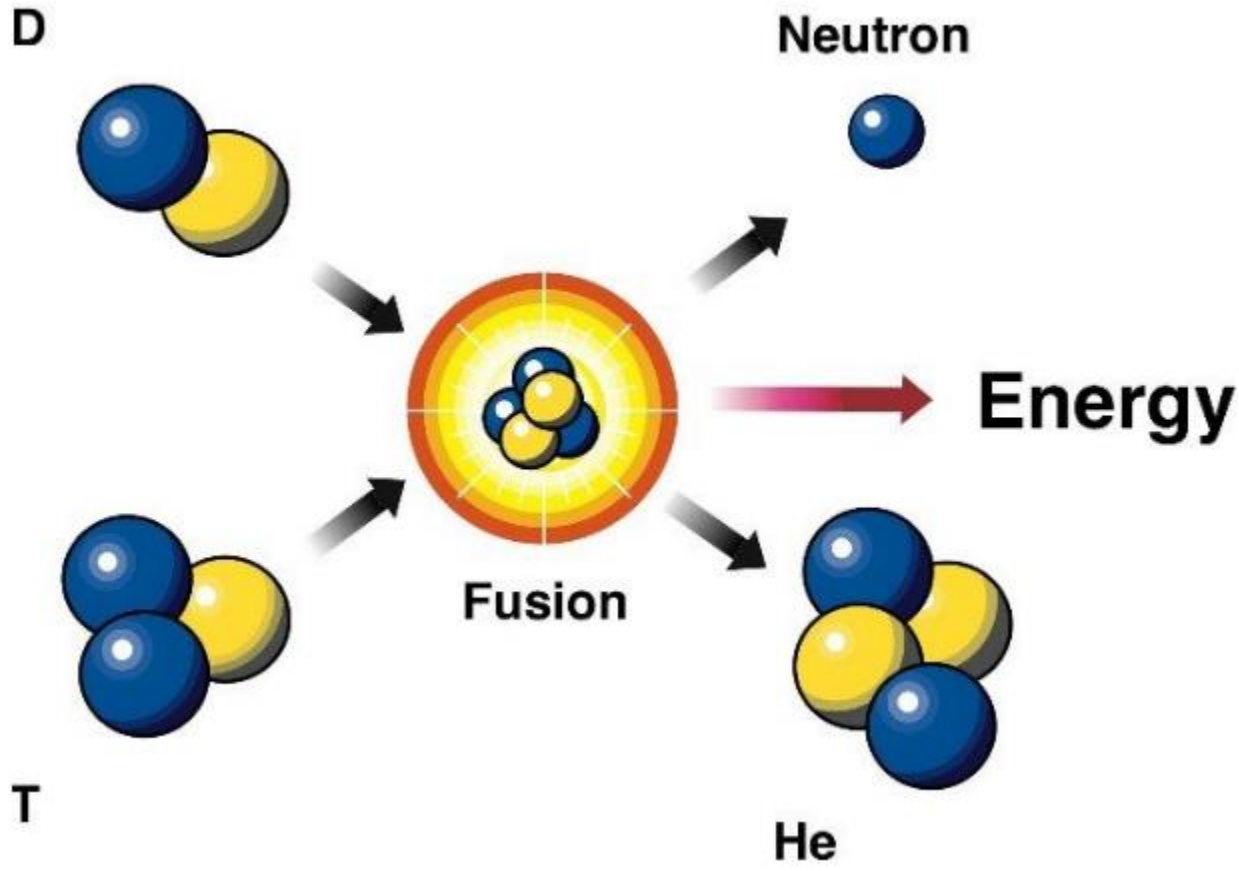



Image Courtesy: Energy.gov

**Challenges in harnessing nuclear fusion energy:**

- Although nuclear fusion has the potential to offer almost unlimited clean energy, **harnessing it is extremely difficult**. Several steps remain before a viable nuclear fusion reactor can be realised.
    - **Plasma reaching temperatures of 150 million degrees Celsius needs to be produced for fusion to be initiated**. This temperature needs to be maintained to sustain the fusion reaction as well. This leads to **material constraints** given the fact that there are very limited materials which can sustain such high temperatures for sustained periods of operation. Also such high temperatures would also necessitate much higher **cooling system capability** as compared to that observed in Nuclear fission reactors.
    - Even though nuclear fusion gives rise to large energy output, considering the fact that a large energy input is necessary to maintain the conditions necessary for nuclear fusion, the **net energy output continues to remain low or even negative based on current technological developments**. This makes nuclear fusion technology unviable for energy generation based on current technological advancement.
        - To be functional and financially viable, a nuclear fusion reactor has to produce an output that is at least tens of times the input energy.

- The technology to convert the neutron energy into electricity has to be developed. **Means have to be found to extract the neutron energy as heat and produce electricity**.

**Details:**

- An experiment at the U.S. National Ignition Facility (NIF) has for the first time in a controlled laboratory setting has **produced nearly as much energy as was supplied to initiate the reaction**.
- Also unlike previous attempts, the hotspot was able to **ignite a self-sustaining chain reaction**, fusing more hydrogen atoms together and continuing the process of energy generation.

**Experiment:**

- The experiment involved an **inertial fusion system (laser driven fusion system).**
    - A tiny pellet of the fuel (deuterium and tritium- heavier isotopes of hydrogen) was placed in a cylindrical thumbnail-sized vessel, known as a hohlraum that had holes on both faces. Laser beams were directed through the holes to strike the walls of the hohlraum. This caused the hohlraum to emit x-rays which, in turn, impinged on the pellet and compressed it. The heated core of the pellet reached 100 million degrees temperature to initiate the fusion reaction.

- Experts have hailed the **breakthrough in maintaining the sustainability of this reaction and achieving the energy break-even** as a giant step toward the holy grail of Nuclear fusion energy research

**Additional information:**

**Tokamak:**

- A tokamak is a device which uses **a powerful magnetic field to confine plasma** in the shape of a torus. The tokamak is one of several types of magnetic confinement devices being developed to produce **controlled thermonuclear fusion power.**

**Stellarator:**

- A stellarator is a plasma device that **relies primarily on external magnets to confine a plasma.**

## Category: ENVIRONMENT AND ECOLOGY

### 1. Rainfall at Greenland ice summit for first time

**Context:**

- **Heavy rainfall has been recorded across Greenland** and there has been the first ever recording of rainfall at the highest point on the Greenland ice sheet.
    - Greenland has recorded the largest amount of rainfall since records began in 1950. Rainfall was recorded for several hours at the ice sheet's 3,216-metre summit.

**Details:**

- The unprecedented rains can be attributed to **change in air circulation patterns, indicating the presence of warm and moist air over Greenland.**

- Also notably, **the temperature at the ice cap which typically remain above freezing temperature have fallen below the freezing temperature thrice in less than a decade**
- Experts have warned that the record rains at the summit of Greenland is not an isolated event and is part of a string of warning signs with respect to global warming and climate change. Along with rising floods, fires, and other extremes, the rains in greenland is one of many "alarm bells" signalling the need to reduce greenhouse gas emissions.

**Concerns:**

**Impact of rainfall on ice sheet melting:**

- Rainfall on an ice sheet is not a healthy sign for an ice sheet. **Water on ice makes the ice sheet more prone to surface melt** as the water is not only warmer than the usual snow but it is also darker – so it absorbs more sunlight.
- The rainfall would only increase the rate of ice sheet melting due to global warming.

**Rise in sea levels:**

- The melt water from ice sheets stream into the ocean, causing sea levels to rise.
    - Greenland's ice sheet is the world's second-largest icesheet after Antarctica's . The Greenland ice sheet is two miles thick and covers about 650,000 square miles.
- As per available estimates, **melting from Greenland's ice sheet has caused around 25% of global sea level rise seen over the last few decades**. This share is only expected to grow, as global temperatures increase further.
    - Scientists claim the Arctic is warming faster than any other region on Earth.

**Impact of global climate:**

- Increased rainfall and melting of the Greenland Ice sheet may be contributing to the observed **slowing down of the Gulf Stream Ocean current and its influence on the Atlantic Meridional Overturning Circulation (AMOC) system.**

For more related information refer to the following article:

***UPSC Comprehensive News Analysis 0f 07th Mar 2021***

## Category: INTERNAL SECURITY

### 1. 'LeT, JeM may intensify infiltration bids'

**Context:**

- Subsequent to the **Taliban takeover of Afghanistan**, there have been concerns raised over the negative impact of this development on **India's internal security.**

**Background:**

**Linkage between Taliban and anti-India terror outfits:**

- Anti-India terror outfits such as the **Lashkar-e-Taiba (LeT) and the Jaish-e-Mohammed (JeM) have extended active support to the Taliban over the years.**
    - The JeM has been deploying senior commanders and trained cadres for Taliban operations. It has also been providing refuge to the cadre of the Taliban.
    - The LeT has also been a major source of armed men for the Taliban and the Haqqani Network against the U.S.-led forces in Afghanistan for the past several years.
- The JeM was founded by Masood Azhar in 2000, after his release from an Indian prison along with two others in exchange for passengers on board the hijacked Indian Airlines flight IC-814. The hijacked plane had been taken to the then Taliban-controlled Kandahar.
- LeT was founded in the Kunar province of Afghanistan in 1987 by Hafiz Saeed and others.

**Continued presence of anti-India terror outfits in Afghanistan:**

- LeT cadres continue to operate in the Kunar, Nangarhar and Nuristan provinces, while JeM fighters are active in the Ghazni, Kandahar and Helmand provinces of Afghanistan.

**Haqqani network link:**

- **The LeT and JeM leadership have been in contact with top Taliban functionaries through the Haqqani Network**. Following the Taliban takeover, the Haqqani network group is now controlling security for Kabul. This leads to the high possibility of LeT and the JeM operatives getting a base at Kabul and support from the Taliban.

**Taliban and al-Qaeda link:**

- As per a UNSC report in June, the Taliban and al-Qaeda continue to be closely aligned, with Al-Qaeda elements believed to be residing in at least 15 Afghan provinces.
- **Al-Qaeda in the Indian Subcontinent also operates under the Taliban umbrella** from Kandahar, Helmand and Nimruz provinces.

**Prisoner release:**

- Among the hundreds of prisoners released from Afghan prisons subsequent to the Taliban takeover, includes many from the LeT and the JeM outfits.

**Security threat assessment for India:**

- The latest threat assessment from Indian security agencies, warns of a situation wherein after things settle down a little in Afghanistan, **terrorist outfits like the LeT and the JeM may shift their focus to Jammu and Kashmir region** and intensify efforts to infiltrate into Indian territory.
- Attempts to infiltrate via the Jammu-Rajouri sector had already increased.

## D. GS 4 Related

***Nothing here for today!!!***

## E. Editorials

# Category: ECONOMY

## 1. Power play

**Context:**

- **Draft Electricity (Amendment) Bill, 2021.**

**Background:**

**Bad state of the Discoms:**

- Electricity distribution has remained the sore point in the country's power network.
- The distribution companies (discoms) which by and large come under the control of the States, have been **plagued by a variety of issues.**
    - Thirty-six out of 56 discoms have reported aggregate **losses of around Rs. 32,900 crore** as on March 31, 2020. They owe over Rs. 90,000 crore to power producers at the end of June 2021.
    - Discoms continue to be saddled with **structural challenges in governance and regulation.**
        - The Regulatory Commissions in many states have not been able to function with the desired speed or efficiency.
    - They face the problems of **underinvestment, line losses and issues in billing, metering, and collection** which seems to be acting as a body blow to their financial viability.
        - Aggregate Technical & Commercial (AT&C) losses lies in the range of around 20%.
- The government has tried several times to make discoms financially viable through schemes like **UDAY**, but their efforts have not met with the desired success.

**Major provisions of the amendment bill:**

- The broad objectives of the legislation are to **ensure consumer-centricity, promote ease of doing business, enhance sustainability of the power sector and promote green power.**
- One of the main provisions includes the move to **de-license power distribution and allow for greater private sector participation in the electricity distribution sector.** This will let consumers choose a distribution company in their area. It also proposes a role for distribution sub-licensees with regulators' nod.
- There is the provision of a **universal service obligation fund**, which shall be managed by a government company. This fund shall be utilised to meet any deficits in cross-subsidy.
- The draft bill **proposes direct benefit transfer (DBT) of subsidies**, reduction of cross subsidies, and the establishment of the electricity contract enforcement authority.
- It provides that the Commissions shall determine **tariffs that are reflective of cost** so as to enable Discoms to recover their costs.
- There will also be a **penalty for not meeting renewable energy (RE) purchase obligations** that require power distribution companies to buy a fixed amount of RE and reduce their reliance on fossil fuels. The responsibility of fixing renewable power obligation (RPO) is shifted from state commissions to the central government.

- The other major changes that the Bill is expected to bring about include the appointment of a member with legal background in every **electricity regulatory commission**, and the strengthening of the Appellate Tribunal for Electricity.

For more information on the provisions of the amendment bill refer to the following article:

***UPSC Comprehensive News Analysis of 18th Apr 2020***

**Arguments in favour:**

**Increased competition and associated benefits:**

- The de-licensing provision will help **end the monopoly of state-run distribution companies** and overcome their financially non viability. By incentivizing greater private participation in the distribution sector it will help **increase competition** and thus aid in unleashing of next-generation power sector reforms in India.
- It will have a **positive bearing on distribution efficiency and help reduce tariffs**. The anticipated technological upgrades including smart metering and infrastructure advancements that is expected through greater private participation will help reduce the huge AT&C losses.
- Increased competition will not only empower customers but also help **bring huge investments into the sector and accelerate technology adoption.**

**Impact on Renewable energy sector:**

- The reforms will especially **make the RE generation, transmission and distribution financially more attractive to investors.**
- The provision regarding renewable energy (RE) purchase obligations will **help India meet its RE and global climate commitments.**

**Reduce subsidy foregone:**

- The introduction of Direct Benefit Transfer (DBT) of power subsidies will **ensure greater transparency and accountability** and ensure that the subsidy reaches people who are entitled to it, as we have seen in the case of LPG.
- This will help cut down on subsidy to the electricity sector and help ensure a better cost-reflective tariff.

**Robust regulatory regime:**

- The strengthening of electricity regulatory commission and the Appellate Tribunal for Electricity will **ensure faster resolution of long-pending issues and reduce the legal hassles for all stakeholders.**

**Arguments against:**

- Opposition parties and several organisations have objected to certain features in the draft Electricity (Amendment) Bill, 2021.
    - The proposed de-licensing of distribution has been opposed by some state governments. They fear that a greater role for private distribution companies and franchisees would only

lead to **"cherry-picking of remunerative areas"** by these companies, leaving it to the State discoms to serve social sector obligations and rural areas. This would only push the State discoms to incur more massive losses.

- Some states have opposed the proposed amendment on the grounds that it goes **against the federal structure of the Constitution as electricity is in the concurrent list**.
- Those opposing the Bill contend that it will lead to more private players in the power sector, making electricity unaffordable for vulnerable sections. A greater stake for private sector could lead to a scenario where the new private service providers could **undertake unreasonable tariff hikes for profiteering.**
- There is also the fear that the proposed DBT will **do away with the heavily subsidised or free power supply to the farm sector.**
- Other specific complaints from the state includes the one from the state of Tamil Nadu, which argues that hydro-power purchase obligation cannot be fixed separately as hydro-power generation is seasonal, monsoon-dependent and not in the control of its discom.

For more related information refer to the following article:

***UPSC Comprehensive News Analysis of 19th May 2020***

**Conclusion:**

- The proposed amendment can be a game-changer for the power sector provided its lacunae are covered for and it is implemented as envisaged.

### 2. Will changes in AERA Act help smaller airports?

**Context:**

- Parliament passed the **Airports Economic Regulatory Authority of India (Amendment) Bill, 2021** in the recently concluded monsoon session.

This topic has been covered previously and for information on the provisions and significance of the AERA (amendment) bill refer to the following article:

***UPSC Comprehensive News Analysis of 30th July 2021***

## Category: SCIENCE AND TECHNOLOGY

### 1. How will human trials for new HIV vaccine work?

**Context:**

- Moderna company has indicated that it may begin **human trials for a vaccine for HIV (human immunodeficiency virus)** soon, employing the same mRNA platform that it has used in its COVID-19 vaccine.

**Background:**

**Treatment of HIV-AIDS:**

- While treatment with **Anti-Retroviral Therapy** has significantly improved the longevity of those with HIV-AIDS, this is a lifelong treatment.
    - According to the World Health Organization, there are around 37.7 million living with HIV as of 2020.
- **Traditional vaccine approaches have not worked for HIV, and in fact, some of them have gone on to worsen infection**.
- The quest to develop an HIV vaccine is considered among the holy grails of scientific research.

**mRNA technology:**

- **Messenger ribonucleuc acid (mRNA)** plays a vital role in human biology, specifically in a process known as **protein synthesis.**
    - mRNA is a single-stranded molecule that carries genetic code from DNA in a cell's nucleus to ribosomes, the cell's protein-making machinery.
- Unlike the traditional pharmaceutical approach which used small molecules or the traditional biologics which used recombinant proteins and monoclonal antibodies for treatment, **mRNA medicines are sets of instructions**. And these instructions direct cells in the body to make proteins to prevent or fight disease.

**Details:**

- The vaccine designated formally as mRNA-1644, is made in a way to stimulate the **B cells of the immune system.**
    - The B cells are a class of white blood cells that produce what is referred to as **broadly neutralising antibodies (bnAbs).**
- These antibodies attach to the surface proteins of HIV and disable them by accessing key but hard-to-reach regions on the virus and deactivate them.

**Significance of the mRNA approach:**

- Using mRNA as a drug opens up a breadth of opportunities to treat and prevent disease. **mRNA medicines can go inside cells to direct protein production**, something not possible with other drug approaches. Thus it opens up immense potential to treat or prevent diseases that today are not addressable – potentially improving human health and impacting lives around the world.
- RNA-based immunogens in vaccines **do not involve the use of a live virus, can be made relatively easily, can be quickly deployed and safely administered.**

**Challenges associated with mRNA approach:**

- The **instability of mRNA vaccines** is a challenge.
- A major challenge with m-RNA vaccines is that they are **sensitive to temperature in storage**, and is a challenge for arranging for the necessary cold chain infrastructure in resource starved developing countries.

**Conclusion:**

- The success of m-RNA COVID vaccines in reducing hospitalisation and mortality has led to confidence in the underlying m-RNA platform and its potential needs to be studied further.

# F. Prelims Facts

### 1. Makers of madur mats win accolades

**Madur mats:**

- Madur mats are unique to **West Bengal.**
- 'Masland' a fine quality madur mat.
- **Madur mats are made of natural fibres**. Madurkathi is a rhizome-based plant (Cyperus tegetum or Cyperus pangorei) found abundantly in the alluvial tracts of Purba and Paschim Medinipur district of West Bengal.
- Madurkathi was **awarded the geographical indication (GI) tag** by the Geographical Indication Registry in April 2018.
- About 80% to 90% of the entire workforce engaged in this traditional craft comprise of women.

**Context:**

- Two women from Sabang in West Bengal have been given the **National Handicraft Award** in recognition of their outstanding contribution to the development of crafts.

### 2. Green mermaid

- A **new species of marine green algae has been discovered from Andaman and Nicobar Islands**.
    - Algal diversity is one of the highest in the Andaman & Nicobar Islands.
- It has been named **Acetabularia jalakanyakae.**
- The species is the first of the genus Acetabularia to be discovered in India.
    - What is unique about the species is that the **whole plant is made up of just one gigantic cell with only one nucleus.**
    - Another feature of Acetabularia is their regenerative potential.

**Significance of algae:**

- **Oxygen producers:**Marine algae produce almost two-third of oxygen in the air.
- **Food producers:**Single-celled marine species are key to all the life forms on Earth. Algae convert atmospheric carbon dioxide into food for the marine ecosystem. They are at the base of the food chain. Also, when the algae die, they are consumed by organisms called decomposers (mostly fungi and bacteria).
- **Petroleum fossils:**Algae are also responsible for petroleum. When they die, they sink to the ocean floor. Over the years, this layer turns into what we know as petroleum.
- **Industrial and medical usage:** Marine algae have been used as food and medicine for many centuries. They are not only used as food but also used as extracts in food, dairy, cosmetics, and

industrial uses. Algae is used as one of important medical source due to **its antioxidant, anticancer, antiviral properties. .**

**Threat to algaes:**

- **Climate change and global warming**– Rise in water temperature decreases oxygen levels in the water
- **Ocean acidification**

**Significance of the new discovery:**

- **Research & studies:** The newly discovered species has a giant cell. aving such a giant cell is advantageous for molecular biologists who study cellular processes; as they can see it and manipulate it with the naked eye. For this reason, Acetabularia is considered a model organism.

# G. Tidbits

### 1. 41 kg of heroin seized on border

- Punjab police have foiled a major bid to smuggle heroin from Pakistan into India and have filed an FIR under Sections 21, 61 and 85 of the **Narcotic Drugs and Psychotropic Substances Act** against the accussed.

### 2. A battery powered by human sweat

- Scientists from the Nanyang Technological University (NTU), Singapore, have introduced a **stretchable battery that is powered by human perspiration.**

**Significance:**

- The battery can be affixed to a flexible sweat-absorbent textile which draws power from sweat and transfers it to wearable devices, including smart watches and arm straps, via Bluetooth.
- The **battery does not contain heavy metals or toxic chemicals unlike conventional batteries,** which are often built using unsustainable materials that are harmful to the environment and at times pose a threat of explosion.

# H. UPSC Prelims Practice Questions

**Q1. Which of the following statements is/are correct with respect to Narcotic Drugs and Psychotropic Substances (NDPS) Act?**

1. NDPS Act views drug offences very seriously and penalties are uniform irrespective of the quantity
2. It is only the central government which can add or omit from the list of psychotropic substances

**Options:**

a. 1 only
b. 2 only
c. Both

d. None

**Answer: b**

**Explanation:**

- Narcotic Drugs and Psychotropic Substances (NDPS) Act views drug offences very seriously and penalties are stiff. The quantum of sentence and fine varies with the offence. For many offences, the penalty depends on the quantity of drug involved – small quantity, more than small but less than commercial quantity or commercial quantity of drugs. Small and Commercial quantities are notified for each drug.
- Power to add to or omit from the list of psychotropic substance is available only with the Central Government.

**Q2. With reference to Madurkathi mats, which of the following statements is/are incorrect?**

1. They are woven in Bihar
2. Women of the households are involved in weaving

**Options:**

a. 1 only
b. 2 only
c. Both
d. None

**Answer: a**

**Explanation:**

**Madur mats:**

- Madur mats are unique to West Bengal.
- 'Masland' a fine quality madur mat.
- Madur mats are made of natural fibres. Madurkathi is a rhizome-based plant (Cyperus tegetum or Cyperus pangorei) found abundantly in the alluvial tracts of Purba and Paschim Medinipur district of West Bengal.
- Madurkathi was awarded the geographical indication (GI) tag by the Geographical Indication Registry in April 2018.
- About 80% to 90% of the entire workforce engaged in this traditional craft comprise of women.

**Context:**

- Two women from Sabang in West Bengal have been given the National Handicraft Award in recognition of their outstanding contribution to the development of crafts.

**Q3. Which of the following is/are Erosional landforms due to Glaciers?**

1. Cirque
2. Esker
3. Moraine

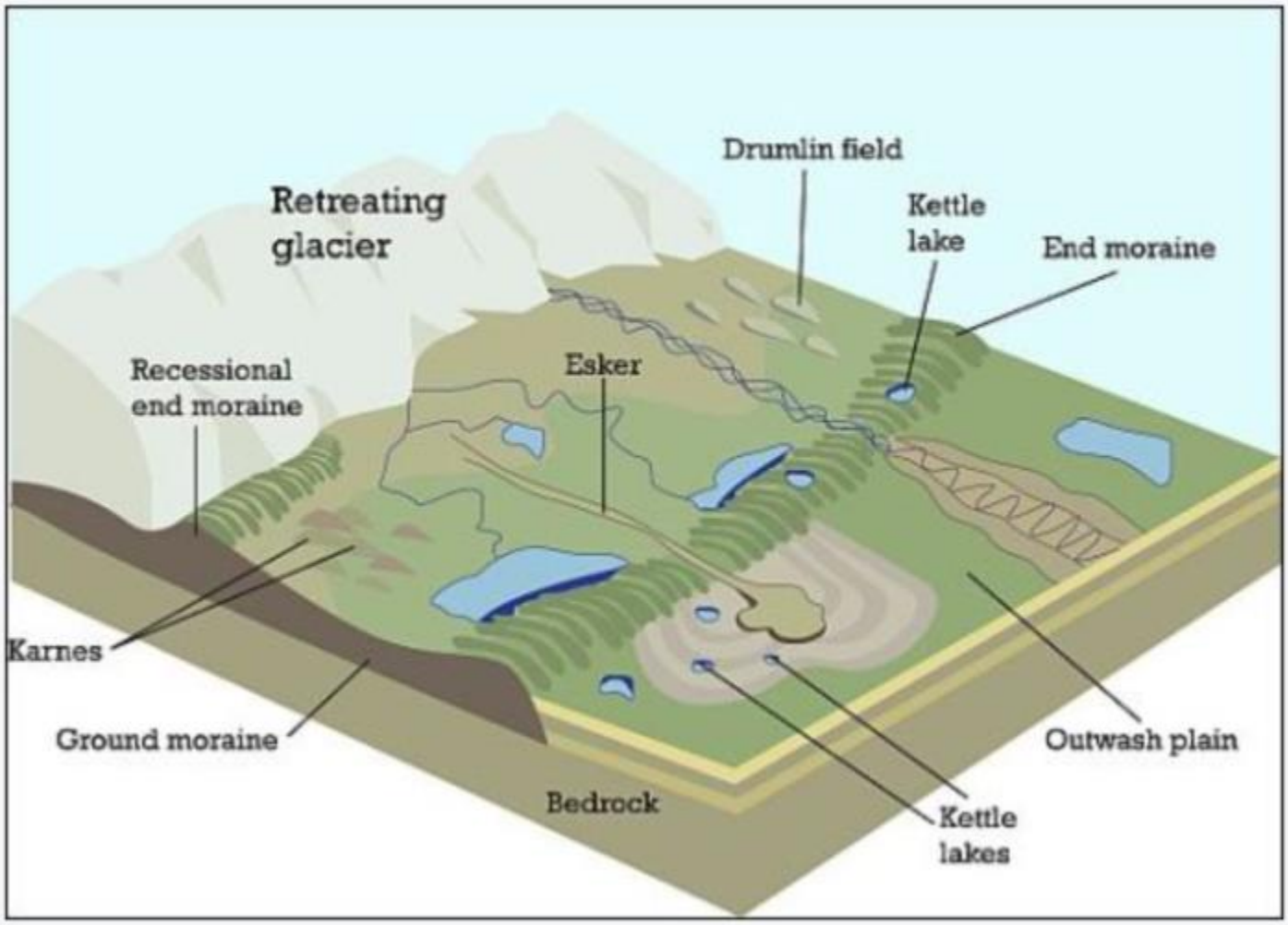
**Options:**

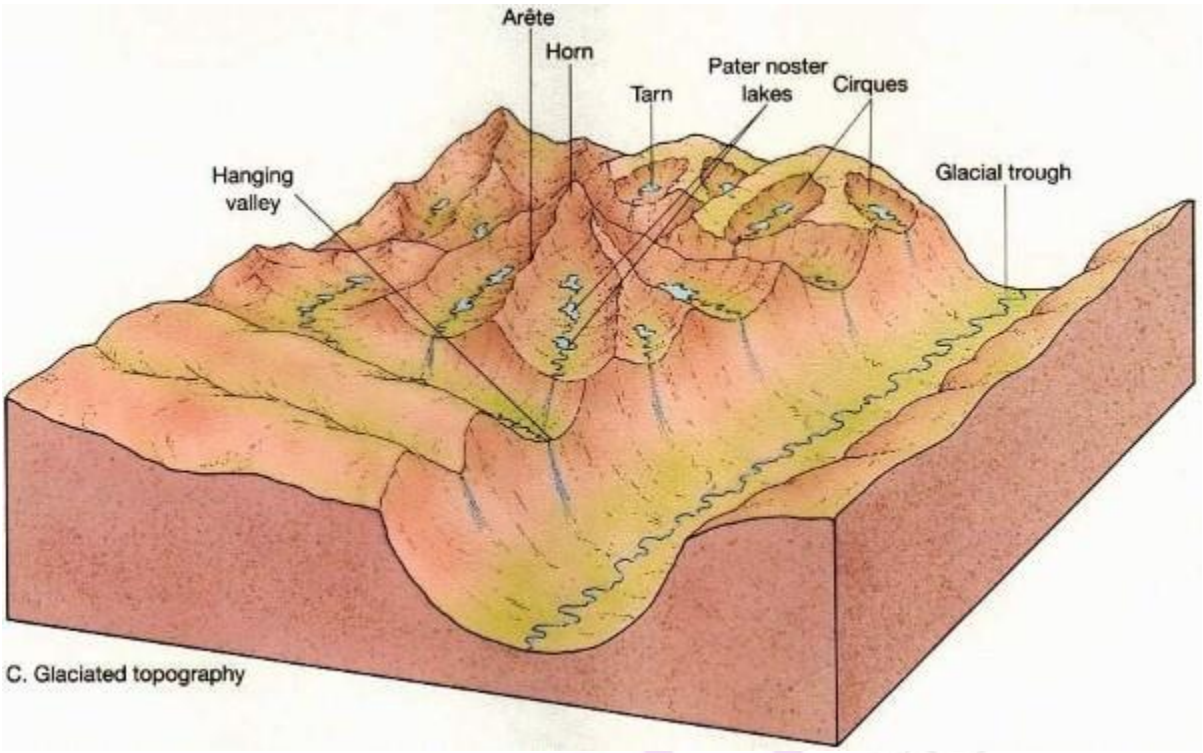
a. 1 only
b. 1 and 2 only
c. 2 and 3 only
d. 1, 2 and 3

**Answer: a**

Explanation:

- Cirque is an erosional landform formed by the action of glaciers. Cirques are bowl-shaped depressions that glaciers carve into mountains and valley sidewalls at high elevations.
- Eskers and moraines are depositional landforms created by glacial action.
    - Eskers are ridges made of sands and gravels, deposited by glacial meltwater flowing through tunnels within and underneath glaciers, or through meltwater channels on top of glaciers.
    - Moraines are accumulations of dirt and rocks that have fallen onto the glacier surface or have been pushed along by the glacier as it moves. The dirt and rocks composing moraines can range in size from powdery silt to large rocks and boulders


Retreating glacier
Drumlin field
Kettle lake
End moraine
Recessional end moraine
Esker
Karnes
Ground moraine
Bedrock
Kettle lakes
Outwash plain




**Q4. Consider the following statements:**

1. It is a region in the North-central Afghanistan near the Hindu Kush mountain range.
2. It is Afghanistan's last remaining holdout where anti-Taliban forces seem to be working on forming a guerrilla movement

**The above statements best describes:**

a. Spin Boldak
b. Panjshir Valley
c. Mazar-i-Sharif
d. Kunduz

**Answer: b**

**Explanation:**

- Panjshir valley is located in North-central Afghanistan, 150 kilometres (93 mi) north of Kabul, near the Hindu Kush mountain range.
- The Panjshir Valley is Afghanistan's last remaining holdout where anti-Taliban forces seem to be working on forming a guerrilla movement to fight against the Taliban.

**Q5. Consider the following statements:**

1. The Legislative Council of a State in India can be larger in size than half of the Legislative Assembly of that particular State
2. The Governor of a State nominates the Chairman of Legislative Council of that particular State.

**Which of the statements given above is/are correct?**

a. 1 only
b. 2 only
c. Both 1 and 2
d. Neither 1 nor 2

**Answer: d**

**Explanation:**

- Strength of the legislative council is from 40 to one third that of the legislative assembly. The constitution has fixed the maximum and minimum limits but actual strength is fixed by parliament.
- The legislative Council elects its Chairman, who plays the role of presiding officer and Deputy Chairman from amongst its members.

## I. UPSC Mains Practice Questions

1. Periodic attacks on the Chinese workers in Pakistan paints a grim picture for the China-Pakistan Economic Corridor (CPEC) project. Discuss the possible reasons for such attacks. (10 Marks, 150 Words)[GS-2, International Relations]
2. Critically examine the draft Electricity (Amendment) Bill, 2021. (10 Marks, 150 Words)[GS Paper 3/Economy]