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WEEKLY CURRENT AFFAIRS

YOJNA IAS WEEKLY CURRENT AFFAIRS

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Delhi Office

706 Ground Floor Dr. Mukherjee Nagar
Near Batra Cinema Delhi – 110009

Contact No. : +91 8595390705

Noida Office

Basement C-32 Noida Sector-2
Uttar Pradesh 201301

website : www.yojnaias.com

SEPTEMBER CURRENT AFFAIRS

CONTENTS

Nobel Prize for Physiology or Medicine

Source: The Hindu; The Indian Express

News: Recently Swedish scientist Svante Pääbo was awarded the Nobel Prize in medicine for mapping the Neanderthal genome.

About Nobel Prize:

- Alfred Nobel(inventor of dynamite) established prizes in medicine, physics, chemistry, literature and peace.
- First Nobel awards in medicine, physics, chemistry, literature and peace were handed out in 1901.
- The Nobel in economics, officially known as the Bank of Sweden Prize in Economic Sciences, was created by Sweden's central bank in 1968 in memory of Alfred Nobel.
- Each prize worth of 10 million kronor (nearly $900,000) is handed out on Dec. 10 the date of Nobel's death with a diploma and gold medal.
- Anyone from around the world such as university professors, lawmakers, previous Nobel laureates and the committee members themselves are eligible to submit nominations for the Nobel Prizes.
- According to the wish of Alfred Nobel, the Nobel Peace Prize is presented in Norway while the other awards are handed out in Sweden.

Key Contributions of Svante Pääbo:

- Developed research methodologies to extract 'clean' DNA from thousands of years old human fossils.
- Evolve methodologies to read the genetic information contained by old fossils.
- Earlier **Deduction method** were used by scientists where after studying genomes of current human beings extrapolate the information into the past. Paabo's methodologies have eliminated scientifically valid but indirect and uncertain deduction methods and rely on direct observation. **For example**: His revelation that one particular skull bone, called petrous, preserves DNA better than the rest of the body was very useful in knowing genetic information.
- He has been awarded Nobel Prize for Physiology for the year 2022 "for his discoveries concerning the genomes of extinct hominins and human evolution."
- Academy said in its press release that through his pioneering research, Svante Pääbo accomplished something seemingly impossible: sequencing the genome of the Neanderthal, an extinct relative of present-day humans.
- Paabo also discovered the existence of **Denisovans (an unknown sub-species of the human family)** who lived around the same time as the Neanderthals.

Importance of Svante Pääbo's discoveries:

- His research established an entirely new scientific discipline known as **paleogenomics.**
- Helps the scientific community to better understand human evolution and migration. **For Example:** Scientific community got indications from powerful sequence analysis that archaic hominins may also have mixed with Homo sapiens in Africa. But, accelerated degradation of archaic DNA in tropical climates lead to failure in sequencing genomes from extinct hominins in Africa**.**
- Through **Svante Pääbo's discoveries**,the scientific community understood the influence of archaic gene sequences of human's extinct relatives on the physiology of present-day humans. **Examples:** Present day Tibetans can survive on high altitudes due to the presence of **Denisovan version of the gene EPAS1** among them and also immune response to different types of infections are affected by Neanderthal genes**.**
- Paabo's research has shown that the **Neanderthals and Denisovans** are not only ancestors of modern humans, but also co-existed for about 20,000 years, during which they interacted and inter-bred with each other. **Example:** Some modern human population contains approximately one and three per cent Neanderthals genome.
- Paabo produced remarkable **genetic evidence regarding interbreeding** among different subspecies of human beings in ancient times. **Example:** Findings from human skeleton showed that his/ her father was a Neanderthal and the mother a Denisovan. In another case, findings from the human skeleton showed that it was four generations subsequent to the mating between ancestors of modern humans and Neanderthal.
- **Implications for modern science:** Paabo's work establishes the genetic evolution of human beings. Modern human being's response towards infections or strength of immune system got affected due to ancient flow of genes to present day humans.

- These groundbreaking findings will help to know the composition of ancient populations in the Indian region through genome mapping of the Rakhigarhi excavation site in Haryana.

Article:

1. Svante Paabo was awarded the Nobel Prize in Medicine: Mapping Neanderthal genome.

2. Medicine Nobel goes to Swedish scientist Svante Pääbo for sequencing Neanderthal genome

3. Nobel season is here: 5 things to know about the prizes

Sharad

Light Combat Helicopter (LCH) Prachand

Source: The Hindu; The Indian Express

News: Induction of indigenously built multi-role Light Combat Helicopter (LCH), Prachand paved way for self reliance or Atmanirbharta in defence manufacturing.

History of development of LCH Prachand:

- **During Kargil war 1999,** armed forces felt the need for a dedicated platform for operating at high altitudes and delivering precision strikes.
- **In October 2006**, the government sanctioned the design and development of an India-made attack helicopter that is LCH and finally the Indian Army joined the programme in December 2013.
- Four LCH prototypes were built by HAL **(technology demonstrators or TDs)** along with rigorous flight testing with over 1,600 total flights logging 1,239 flight hours.
- These helicopter prototypes went through rigorous testing under difficult conditions for around a decade in extreme events or situations in Chennai(sea trials),Leh(extreme cold weather), Jodhpur (desert)and Siachen (high altitudes).

Timelines of testing:

- In 2010, LCH carried its first ground run after that first prototype 'TD-1' took its maiden flight to carry out low-speed, low-altitude checks on the systems.
- In 2011, the second prototype, TD-2 after being equipped with weapons, took its first flight.
- In November 2014, the third prototype,TD-3 made its maiden flight
- Fourth prototype, TD-4 was tested IN 2015.
- Outcome of testing: The LCH landed with a 500-kg weight at a forward base in the area and at a height of 4,700 metres.

- On August 26, 2017, LCH received initial operation clearance after extensive flight testing in diverse terrains and weather conditions.
- In February 2020, LCH was declared ready for production.
- **Defence Minister Rajnath Singh** inaugurated a new LCH production hangar at Helicopter Division of HAL with production capacity of 30 choppers.
- In 2021, LCH was handed over to the Indian Air Force by Prime Minister Narendra Modi
- In 2022, the Cabinet Committee on Security of the government headed by PM Modi approved the procurement of 15(10 for the IAF and 5 for the Indian Army) limited series production (LSP) variants.

- Currently indigenious content in LSP LCH is 45%, but HAL aims to progressively increase to more than 55%.
- On September 29, 2022 formal induction of first Light Combat Helicopter by the Indian Army.

Features of LCH:

- LCH is developed by collaborative effort of the HAL and France's Safran company.
- It is powered by twin French-origin **Shakti engines.**
- **Weight:** LCH is a 5.8-tonne class combat helicopter
- LCH has aerial combat capability along with potent ground attack.
- **Defence Ministry's description of LCH** "The helicopter possesses modern stealth characteristics, robust armour protection and formidable night attack capability. Onboard advanced navigation system, guns tailored for close combat and potent air to air missiles make the LCH especially suited for the modern battlefield,".
- **Maximum flying speed** of the LCH helicopter is 288 kmph and **combat radius** is 500 km.
- These helicopters are ideal to operate in Siachen as the service ceiling of LCH can go up to 21,000 feet.
- Although LCH inherits many features of the Advanced Light Helicopter(ALH) such as Dhruva and Rudra, but it is more sleeker than previous ALH due to nature of the tandem cockpit configuration.

Stealth features of LCH: It meets the **requirements of modern warfare** through

- **Reduced radar and infra-red signatures** through usage of radar-absorbing material and countermeasure dispensing system.
- Improved survivability through **crashworthy features.**
- LCH is equipped with **armoured-protection systems** and **night attack capability.**
- Piolt and co-pilot known as Weapon Systems Operator sit in tandem in a glass cockpit,
- **Weapon Systems Operators (WSO)** are protected by armoured panels from nuclear, biological and chemical (NBC) contingencies.

Image Credit: HAL

Importance of LCH Prachand:

- According to **Hindustan Aeronautics Limited (HAL)** advanced technology of Prachand can be used to destroy the enemy's air defence.
- According to the **Ministry of Defence** Light weight of Prachand ensures that it can be deployed for combat Search and Rescue, bunker busting operations, counter insurgency operations in the jungle and urban areas and support the ground forces.
- **Combat prowess of the armed forces will get a "big boost"** after induction of the LCH into the Air Force.
- LCH Prachand will provide a platform for the IAF and the Army to meet their **operational requirements**.
- **LCH helicopters can perform multidimensional roles** such as air defence and anti-tank roles in high-altitude, counter-insurgency and search and rescue operations.
- **Unique capabilities of LCH** ensures around-the-clock, all-weather combat capability due to agility, manoeuvrability, extended range and high altitude performance.
- **Check Chinese threat along the Line of Actual Control** as these helicopters along with Apache choppers will be deployed along the LAC.
- **Army aviation will gain dedicated attack helicopters in its flee**t that would augment its combat power. Current planning of the Army is to acquire 95 LCH out of which seven units(one unit composed of 10 helicopters) are to be deployed for a combat role in the mountains.
- **Customisation of this multi-role attack helicopter** for operations in desert terrains and high-altitude sectors meet the requirements of the Indian armed forces.
- **LCH can destroy air defence operations** of the enemy through firing a range of air-to-ground and air-to-air missiles.
- **Professional capability of LCH ensures quick operationalisation** as it is comparable to similar attack helicopters available around the world.
- **New chapter in defence production:** Indigenously built Light Combat Helicopter reflects India's capability in defence production. HAL is trying to achieve paek rate capacity of 30 helicopters per year to meet the requirements of defence forces.
- **Pave the way for the next phase of defence exports:** HAL has already obtained a no objection certificate from countries like Malaysia, Thailand, Vietnam, Angola, Egypt, Indonesia, Ecuador and Nigeria.

Conclusion: Earlier India used to rely on foreign-origin attack helicopters not just for its own combat operations but also for UN peacekeeping missions. Now, induction of indigenously built LCH helicopter shows the collective resolve of scientists, engineers and others who worked on it to make India strong and self-reliant in the defence sector.

Article:

1. Explained | The Indian-made LCH 'Prachand' and its significance.
2. Induction of indigenously built Light Combat Helicopter marks a new chapter: Air chief.
3. Light Combat Helicopter inducted into Indian Air Force: its features, weapons
4. Made-in-India attack helicopters inducted; special moment: PM Modi

Sharad

Nobel Prize in Chemistry

Source: The Hindu; The Indian Express

News: Chemists Carolyn R. Bertozzi and K. Barry Sharpless from the U.S.and Morten Meldal from Denmark received the Nobel Prize in chemistry for their research in click and bioorthogonal chemistry.

Complications in imitating naturally occurring compound

- Replicating reactions that involve bonds between carbon atoms is expensive and often leads to side reactions and loss of material.So,the need arises to develop synthetic strategies like click chemistry to fulfill the same purpose.
- Simpler reactions may avoid the loss of material as well as the unwanted side reactions due to strong intrinsic drive for the molecules to bond together.
- **Barry Sharpless invented the click chemistry** where instead of making carbon atoms react with each other he utilizes the smaller molecules with complete carbon frame for reactions.
- **According to The Nobel Foundation** these smaller molecules can further be linked using oxygen or nitrogen atoms as bridges.

About Click Chemistry

- Click chemistry is a branch of science invented by **Dr.K.Barry Sharpless** to explore the assembly of molecules.
- Click chemistry is a functional field where molecules snap together quickly and efficiently like a click.
- In click chemistry, molecules that wouldn't typically bind with one another are made to do so in an efficient and uncomplicated manner.
- According to Dr. Sharpless conditions for click chemistry reaction is that it should occur in the presence of oxygen and in water.
- **Dr.K.Barry Sharpless defined click chemistry as a** "set of powerful, highly reliable, and selective reactions for the rapid synthesis of useful new compounds and combinatorial libraries through heteroatom links".
- **Importance of click chemistry according to Dr. Sharpless:** Even if click chemistry fails to perfectly imitate naturally occurring compounds, it can help find molecules that fulfill the same purpose.

Timeline of Click chemistry:

- Dr. Sharpless is the originator of the concept of 'Click Chemistry' as he was the first scientist to work on click chemistry.
- Immediately, Dr. Meldal and Dr. Sharpless independent of each other presented the improved form of the azide-alkyne Huisgen cycloaddition reaction i.e. copper-catalysed azide-alkyne cycloaddition (CuAAC) reaction
- Dr. Bertozzi developed click reactions that work inside living organisms by demonstrating that these bioorthogonal reactions do not disrupt the normal chemistry of the cell.

Research of Dr. Morten Meldal

- During one of her research to find potential pharmaceutical substances. Dr.Morten Meldal and his team tried to react alkyne with an acyl halide with copper ions and palladium as catalysts
- **Analysis of the reaction:** Alkyne and the azide created a ring-shaped structure called triazole after reaction of alkyne with the "wrong" end of the acyl halide molecule.
- **Result of Dr. Meldal's reaction:** Catalyst copper ions controlled the reaction, and acyl halide mostly remained untouched.

CuAAC reaction

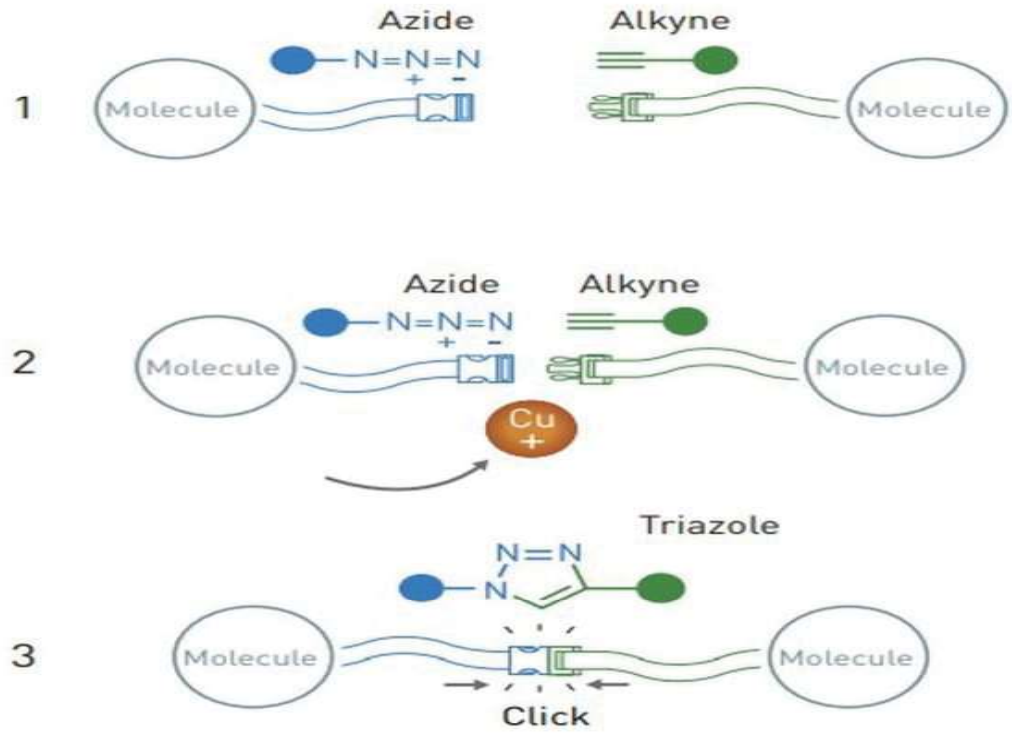

Image Credit: The Royal Swedish Academy Sciences

Contribution of Dr.K. Barry Sharpless

- In one of his research, Dr. Sharpless described the copper-catalysed reactions between azides and alkynes as an "ideal" click chemistry reaction. As the reaction worked well in water, satisfying basic criterion for click chemistry.
- Sharpless won the Nobel Prize for the second time. His first Nobel Prize was for creating Lego blocks (creating molecular building blocks) that could snap together quickly and efficiently.

Dr. Carolyn R. Bertozzi's addition to the research

- She began her research in the early 1990s, to understand functioning of the glycan. For this she started mapping a glycan that attracts immune cells to lymph nodes.

- She tried to map the glycans using the chemical handles if cells incorporate the modified sialic acid in different glycans.So in order to do that she explores the possibility of production of sialic acid(one of the sugars that make up glycans) with a type of chemical handle.
- **Method:** Attach a fluorescent molecule to the chemical handle, and the emitted light would reveal where the glycans were in the cell.To accomplish the above reaction chemical handle should not react with any other substance in the cell.Her quest for optimal chemical handle ended with an azide.
- In 2000, Dr. Bertozzi modified the Staudinger reaction and used it to connect a fluorescent molecule to the azide introduced to glycans in cells.
- If the alkyne is forced into a ring-shaped chemical structure then azides and alkynes can react in an almost explosive manner without copper as a catalyst. This reaction worked well in cells as the strain produces enough energy for the reaction to run smoothly.
- In 2004, Dr. Bertozzi demonstrated that copper-free click reaction, called the strain-promoted alkyne-azide cycloaddition (SPAAC) can be used to track glycans.
- Bertozzi expanded click chemistry and demonstrated how it might be used in living things. She discovered a mechanism to create a copper-free (copper is poisonous to living cells) click reaction known as the strain-promoted azide-alkyne cycloaddition and showed that it might be utilised to treat tumours.

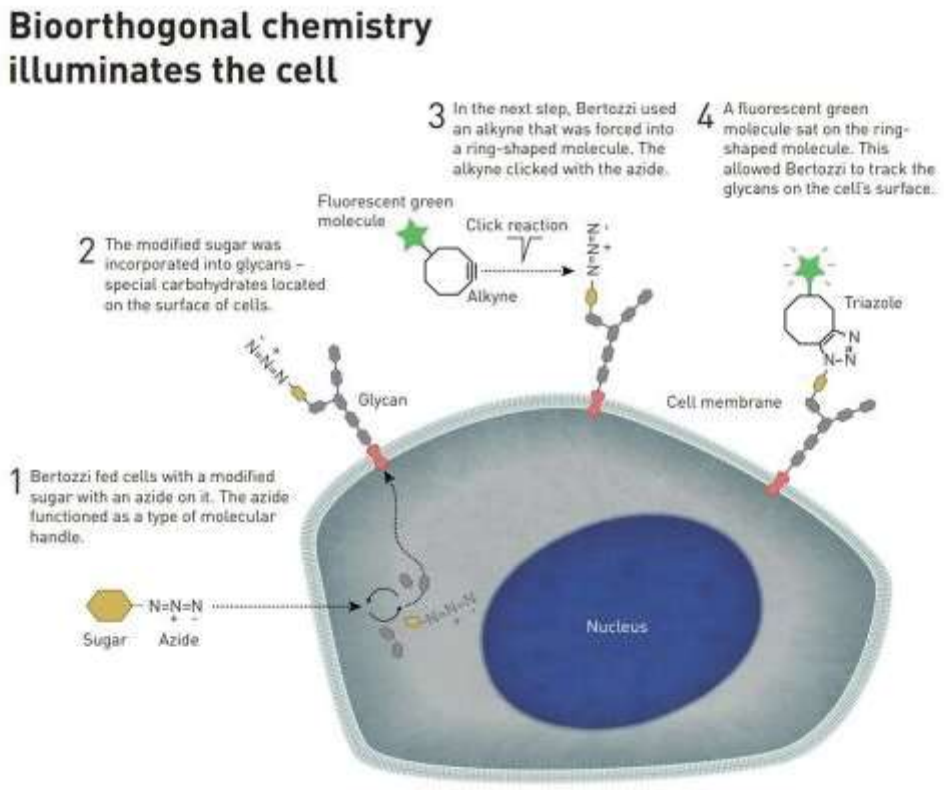

Image Credit: The Royal Swedish Academy of Sciences

Applications of Click Chemistry

- Applications in areas such as drug conjugation, materials science, etc because of high selectivity

and specificity of click chemistry reactions.

- Since bioorthogonal reactions do not interact with any other substances around them. So, they are extremely significant in medicinal biochemistry.
- **Creation of new pharmaceuticals by Dr. Bertozzi through bioorthogonal chemistry:**Through click reactions she worked on a new pharmaceutical by joining a glycan-specific antibody to enzymes that break down the glycans on the surface of the tumour cells.
- **Applications in medicinal and materials chemistry:** Research paper demonstration by John E. Moses and Adam D. Moorhouse shows that click chemistry can solve problems of purification and separation of impure products in the synthesis of dendrimers.
- Bertozzi's methods are helpful in the development of Cancer drugs as her approach has shown the promise of treating advanced cancer.

Key Chemistry Terms:

- **Alkyne:** An unsaturated hydrocarbon that has at least one triple bond between two carbon atoms.
- **Acyl halide:** A compound that has an acyl group – RCO- –bonded to a halogen.
- **Catalysts:** A substance that speeds up a chemical reaction but does not undergo any change itself.
- An azide group contains nitrogen at the opposite end.
- **Application of Triazoles:** Pharmaceutical industry,Agriculture and material science.
- **Glycans** are complex carbohydrates built from different types of sugar and are often found on the surface of proteins and cells.
- **Staudinger reaction:** A mild conversion of azide to amine.
- **Bioorthogonal reaction:** According to Dr. Bertozzi reaction between the chemical handle and the fluorescent molecule is bioorthogonal.
- **Dendrimers** are regularly-branched synthetic molecules having applications in medicinal and materials chemistry.

Article:

1. A synthetic click: On 2022 Chemistry Nobel

2. Nobel Prize 2022: Making chemistry click

3. Explained | The research in click and bioorthogonal chemistry that led to the 2022 Nobel Prize in the field.

Sharad

Nobel in Physics for quantum entanglement

Source: The Hindu; The Indian Express

News: Physicists Alain Aspect from France; John F. Clauser from the U.S. and Anton Zeilinger from Austria were selected for the 2022 Physics Nobel.

Image Credit: The Hindu

Contribution of these three physicists:

- This year's Nobel prize has been given for experimental work in quantum entanglement or in words of Einstein 'spooky action at a distance'.
- **According to the Academy of Sciences** these scientists have been awarded "for experiments with entangled photons, establishing the violation of Bell inequalities and pioneering quantum information science".
- These scientists established the fact that 'entanglement' in quantum particles are not due to any 'hidden' or unknown forces, but is real.
- **John Clauser and Alain Aspect** firmed up the concept of ' spooky action at a distance' or quantum entanglement through demonstration of more and more complex experiments. John Clauser and Alain Aspect by creating, processing and measuring Bell pairs established the fact that entanglement was indeed a true characteristic of quantum mechanics.
- **Anton Zeilinger** innovatively used entanglement and Bell pairs in quantum computation and quantum cryptography research and applications. He and his group performed quantum teleportation (In this information is conveyed from one place to another without actual transport of material)through the phenomenon of entanglement.

Quantum revolution:

- Classical mechanics is based on Newton's laws of motion. It helps to study the dynamics of a few bodies or particles interacting with each other and a system. However, classical mechanics fails to describe subatomic particles such as light quanta.
- Concepts of classical mechanics failed to visualize the movement of particles obeying quantum mechanics.
- Postulates of quantum mechanics were invoked by Max Planck, Albert Einstein, Erwin Schrodinger, Werner Heisenberg and Niels Bohr to explain problems associated with subatomic particles.

- One of the key difference between behaviour of quantum systems and classical bodies is the concept of entanglement.

Origin of the theory:

- **Quantum theory:** Quantum Theory allowed a particle to exist simultaneously at multiple locations, a phenomenon known as superposition. Once a particle was found, or observed, at one location, it ceased to exist at all other places.
- **Einstein** termed quantum entanglement as 'spooky action at a distance'. Einstein along with Boris Podolsky and Nathan Rosen came up with Schrodinger's cat thought experiment in 1935 where Schrodinger's cat can be alive and dead at the same instant. This experiment challenged the foundations of quantum mechanics with the notion that there might be "hidden variables" that determine the state of the particles that are separated in space and that there is no actual quirk in quantum physics that causes them to be entangled.
- **John Bell** showed mathematically through Bell's inequality what was required to be done to establish the phenomenon of entanglement. If Bell's inequality is maintained in the experiment, it would mean that Einstein was right and if Bell's inequality is violated, it would prove the predictions of Quantum Theory.
- Clauser's entanglement experiments in 1972 clearly violated Bell's inequality. Further, Aspect's experiments also violated Bell's inequality and removed all the loopholes of Clauser's experiment.
- **Anton Zeilinger opened up new technological possibilities by exploiting entanglement property:** He 'teleports' the quantum states of a particle to another location without a medium or without moving the particle anywhere.
- Experiments of Clauser, Aspect and Zeilinger demonstrated that entanglement was real and in line with Quantum Theory . There are no hidden forces that drive the entanglement as suggested by Einstein.

Concept of quantum entanglement:

- Quantum entanglement allows a pair of particles, like photons, to exist in a shared state where their properties are complementary.
- Due to a quirk of quantum mechanics, two or more particles exist in an 'entangled state' irrespective of distance, meaning what happens to one particle affects the others immediately or behaviour in one particle instantaneously produces reaction in another.
- Due to the complementary nature of a particle's properties, the properties of one particle tell the qualities of the other particle irrespective of distance as long as the entanglement is maintained.

Use of quantum mechanics:

- Quantum mechanical ideas have application in electronic devices such as transistors.
- Quantum properties of light are used to build the Lasers.
- Quantum technologies of the future such as quantum cryptography, and precise timekeeping in atomic clocks can be developed with the work of the three laureates.
- Quantum entanglement can be utilized in computing to make hack-free communications through

secure communications algorithms.

- It can help to actualize science fiction-like concepts of 'teleportation' through advancement in transformative technologies.
- **Researchers have demonstrated the entangled quantum states between photons on earth and those on a satellite:** Through optical fibres photons traversed tens of kilometres of optical fibres.
- Quantum entanglement allows for transmission of information at speeds faster than light.
- **Next generation of computers or quantum computers** can be built by exploiting entanglement properties of quantum particles to overcome insurmountable challenges.
- Quantum entanglement will help to make significant progress in the fields of quantum key distribution

Articles:

1. No longer bizarre: On 2022 Physics Nobel

2. Explained | What lies at the heart of the 2022 Physics Nobel?

3. No longer bizarre: On 2022 Physics Nobel

Sharad

Nobel Peace Prize & Nobel in Literature

Sources: The Hindu; The Indian Express

News: Norwegian Nobel Committee awarded the Nobel Peace Prize on October 7, 2022 to advocate Ales Bialiatski from Belarus for Human rights, Memorial (Russian Human rights organisation) and Center for Civil Liberties from Ukraine.

- The Norwegian Nobel Committee academy honored champions of human rights, democracy and peaceful co-existence in the neighboring countries Belarus, Russia and Ukraine.
- Last year (2021) Nobel Peace Prize was awarded to Dmitry Muratov and Maria Ressa journalists from Russia and Philippines for "their efforts to safeguard freedom of expression.

Image Credit: Indian Express

Key Contributions of Ales Bialiatski:

- In the mid-1980s, Belarus witnessed the emergence of the democracy movement. Ales Bialiatski was one of the initiators of this movement.
- Ales Bialiatski devoted his whole life for democracy promotion and peaceful development of Belarus.
- His organisation Viasna(Spring) that he founded in 1986 evolved into a broad- based organisation.
- Viasna(Spring)documented and protested against the authorities' use of torture against political prisoners.
- Since 2020, Ales Bialiatski has been detained without trial. But, despite tremendous personal hardship, Mr Bialiatski did not give up his fight for human rights and democracy in Belarus.

Key Contributions of Human rights organisation Memorial:

- Memorial was established in 1987 by human rights activists in the former Soviet Union on the notion that confronting past crimes is essential in preventing new ones.
- Memorial tries to ensure that the World should not forget the victims of the communist regime's oppression.
- Another aim of the organisation is to combat militarism and promote human rights and government based on rule of law.
- Memorial gathered verified evidence of abuses and war crimes committed against the Chechen population by Russian and pro-Russian forces during Chechen wars.
- The Academy while giving the award noted the contribution of Natalia Estemirova(Head of Memorial's

branch in Chechnya) who was killed in 2009 because of her work.

Key Contributions of the Center for Civil Liberties,Ukraine:

- Aim of the Center for Civil Liberties was strengthening democracy and human rights in Ukraine.
- It supported strengthening Ukrainian civil society and put pressure on the government to turn Ukraine into a full-fledged democracy.
- It played a pioneer role in holding guilty parties accountable for their crimes.
- Center documented Russian war crimes against the Ukrainian population during the Russian invasion in February 2022.
- After Russia's invasion of Ukraine in, the center has engaged in efforts to identify and document Russian war crimes.

Controversies surrounding Nobel Peace Prize:

- Politically contentious choice of some laureates as it often reflects the geopolitical choices of the west.
- Disagreement over word peace including the question of peace for whom.
- Universal apostle of peace i.e. Mahatma Gandhi was overlooked by the Committee.

Nobel Prize in Literature(2022):

Image Credit: The Hindu

- French author Annie Ernaux is awarded the Nobel Prize in literature.
- According to the Academy Nobel Prize in Literature(2022) is awarded to the French author Annie Ernaux "for the courage and clinical acuity with which she uncovers the roots, estrangements and collective restraints of personal memory."
- Further academy said that Ms. Ernaux believes in the liberating force of writing. Her work is uncompromising and written in plain language, scraped clean.
- Tanzanian-born UK-based writer Abdulrazak Gurnah received last year(2021)'s Nobel Prize in literature. His novels explore the impact of migration on individuals and societies.

Articles:

1.Peace, Prize, politics: On 2022 Peace Nobel

2.Nobel Peace Prize for 2022: A statement as Russia-Ukraine war rages

3.Belarus activist Ales Bialiatski, Russian and Ukrainian organisations get Nobel Peace Prize

Sharad

Snow leopard or 'ghost' cat

Source: The Hindu; The Indian Express

News: Arunachal Pradesh government is expecting the outcome of a snow leopard survey conducted in 2021 by its wildlife division in November.

Snow Leopard:

- **Native Place:** Alpine regions of Central Asia and mostly found in harsh cold climates.
- Snow Leopards survive harsh climates because of their thick fur.But, during winter months, they mostly descend to lower elevations.
- **Prey of Snow leopards:** Blue sheep, Mountain ibex and smaller prey such as hares, game birds and marmots. It has the capability to kill prey that is up to three times its own weight.
- **Habitat of Snow Leopards in India:** Higher Himalayan and trans-Himalayan landscape at an altitude between 3,000-5,400 metres.
- **Areas of Snow Leopards in India:** Jammu and Kashmir, Ladakh, Himachal Pradesh, Uttarakhand, Sikkim, and Arunachal Pradesh. Approximately,5% of the global snow leopard range is covered by these areas.
- **Snow-leopard range countries:** Afghanistan, Bhutan, China, Mongolia, Kazakhstan, Kyrgyzstan, Nepal, Tajikistan, Pakistan, Russia and Uzbekistan.
- **International Union for the Conservation of Nature (IUCN) status of Snow Leopard:** Vulnerable.
- **Main sources of threat for snow leopards:** Climate change, Unregulated tourism, Retribution killing, Poaching, Illegal trade, infrastructure development in the mountains, and Excessive livestock grazing.
- The Government of India launched the Snow Leopard Population Assessment in India (SPAI) to estimate the population of snow leopards in the Indian range on International Leopard Day(3rd May).
- Global Snow Leopard and Ecosystem Protection Program (GSLEP) launched PAWS (Population Assessment of the World's Snow Leopards) for "robust estimate" of the snow leopard population.

Snow Leopard Population Assessment in India (SPAI):

- **Aim:** Estimate snow leopards population in Indian ranges.
- SPAI was launched during the Global Snow Leopard and Ecosystem Protection Program meeting.
- **First Step of SPAI:** Assessment of snow leopard distribution based on occupation.
- **Second Step of SPAI:** Estimation of regional density through population sampling through review of already sampled areas.
- **Tools used in SPAI:** Data sharing portal,Threat mapping and app to identify individual leopards through photographs.
- SPAI is also part of India's(Population Assessment of the World's Snow Leopards) PAWS effort.

Issues associated in counting leopard:

- Remote, high altitude range of snow leopard.
- Elusive nature of snow leopards.
- Natural population density of snow leopard is low.
- Unclear distribution of snow leopard population makes complete population census of snow leopards unfeasible.

Namdapha National Park and Tiger Reserve:

- This National Park and Tiger Reserve is located in Arunachal Pradesh's Changlang district.
- Namdapha National Park and Tiger Reserve covers an area of approx 1, 985 sq.km with lush green vegetables and virgin forests.
- Namdapha National Park and Tiger Reserve touches the international border between India and Myanmar (Burma).
- The turbulent Noa-Dihing river flows through the sprawling tropical rain forest of Namdapha National Park.
- It is located at the junction of the Indian Sub-Continent Biogeography region and the Indo-China Biogeography Region,
- Assam Forest Regulation Act of 1891 defined Namdapha as a reserved forest.
- In 1972, it was declared as a wildlife sanctuary and finally in 1983 Namdapha was upgraded to a national park and also declared as a tiger reserve.
- Namdapha is home to over 1285 faunal species, out of which 96 are mammal species, 453 are bird species, 50 are reptiles, 25 are amphibians and 76 are fish species among others.
- Namdapha is home to three large cats i.e. tiger, leopard and clouded leopard.
- There is widespread belief that the national park is also the habitat of the snow leopard.

Articles:

1.A quest for the 'ghost' cat: Behind Arunachal's snow leopard survey.

2.Namdapha National Park: 3 Royal Bengal tigers spotted by camera trapping

3.Explained: Why India and world are counting snow leopards, and how

Sharad

Nobel in Economic Sciences

Source: The Hindu; The Indian Express

Image Credit: The Hindu

News: Ben Bernanke, Douglas Diamond and Philip Dybvig awarded the Nobel Prize 2022 for Economics 'for research on banks and financial crises'.Royal Swedish Academy of Sciences in its statement said that this year's Nobel laureates "have significantly improved our understanding of the role of banks in the economy, particularly during financial crises. An important finding in their research is why avoiding bank collapses is vital."

Key Contributions of Ben Bernanke, Douglas Diamond and Philip Dybvig:

- According to Ben Bernanke failing banks accounts for the lion's share of the economic downturn.
- Douglas Diamond and Philip Dybvig explain the reasons for bank's existence, their role in society and the collapse of banks due to rumors.
- Solution to bank vulnerability presented by Diamond and Dybvig is deposit insurance from the government. Depositors will no longer rush to bank in case of rumours about bank run as they knew that the state has guaranteed their money.
- **Nobel laureate Douglas Diamond shows that banks perform societally important functions.**1)Banks are intermediaries between savers and borrowers.2) Banks can properly assess borrowers' creditworthiness 3)Banks are in a good position to ensure that loans are used for good investments.

Ben Bernanke gave the reason for Great Depression:

- Before Bernanke, Bank Failures is seen as one of the "consequences" of the financial crisis. But Bernanke in his 1983 paper proved that bank failures were the "cause" of the financial crisis.
- His analysis of historical sources and statistical methods showed that failing banks account for the lion's share in the drop of GDP.
- He analyzed the Great Depression of the 1930s and came to the conclusion that bank runs turned the normal recession of 1929 into a full full-fledged banking crisis by 1930 leading to the greatest economic crisis in modern history.
- His wisdom that letting banks fail often worsens a financial crisis are backed by empirical studies.

Tools provided by Bernanke in preventing bank runs:

- Recovery of the economy depends on powerful measures implemented by the state to prevent additional bank panics.
- **Provisions of deposit insurance:** where some portions of one's deposits in a bank are insured.

Analysis of Douglas Diamond and Philip Dybvig:

- Banks have lost their sheen in the public eye after the **Global Financial Crisis of 2008**. People started seeing **banks as money-grabbing institutions** that exist to borrow profit from depositors as well as borrowers. But, it would be impossible to make any long-term investment without banks.
- Papers published by Diamond and Dybvig in 1983 showed that there are "fundamental conflicts between the needs of savers and investors".
- Liquidity needs of Savers as they always wanted access to some part of their savings for unexpected use. From Banks, they expect the ability to pull out money according to their need.
- Borrowers or Investors who took out loans for building homes or roads need money for a much longer time. So, these Borrowers will face issues when money can be demanded back at a short notice.
- **Solution provided by Diamond and Dybvig to solve this mismatch:** Construction of exactly bank-like institutions. Theoretical model developed by Diamond and Dybvig explains how banks create liquidity for savers, while borrowers can access long-term financing.
- Banks through the process of maturity transformation can resolve this conflict.
- Bernanke, Dybvig and Diamond's work had laid the foundation for modern bank regulations and through this management of financial crises.

Nobel Prize in 2021 for Economics went to David Card, Joshua Angrist and Guido Imbens

- David Card's research shows how the minimum wage, immigration and education affect the labor market.
- Joshua Angrist and Guido Imbens proposed methodology to study issues that don't easily fit traditional scientific methods.

Key terms:

- **Bank Runs:** Bank runs happen when depositors rush to withdraw their savings and if a large number of people do this simultaneously, the bank's reserves cannot cover all the withdrawals, and it is driven to bankruptcy.
- **Maturity transformation:** When a bank transforms long maturity assets into bank accounts with short maturity.Bank's assets or borrowing has long maturity, as it promises borrowers that they need not to pay back their loans early. On the other hand, the bank's liabilities or deposits have short maturity as depositors can access their money as per their needs.

Articles:

1.Banks' role in financial crises(Udit Misra)

2.Economics Nobel announced: The winners' work in how banks function

3.Economic Sciences Nobel for trio's research on banks and financial crises

Sharad