Light Combat Helicopter (LCH): Prachanda

Why in News?

Recently, the **Indian Air Force** formally **inducted the indigenously developed multi-role Light Combat Helicopter (LCH), Prachanda** which is suitable for operating in high-altitude battlefields.

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What is a Light Combat Helicopter?

- **About:**
  - The LCH is the **only attack helicopter in the world** which can land and take off at an altitude of 5,000 meters with a considerable load of weapons and fuel.

    - The **helicopter uses radar-absorbing material to lower radar signature** and has a significantly crash-proof structure and landing gear.
        - A pressurised cabin offers protection from Nuclear, Biological and Chemical (NBC) contingencies.
    - The **helicopter is equipped with a countermeasure dispensing system** that protects it from enemy radars or infrared seekers of enemy missiles.
    - LCH is powered by **two French-origin Shakti engines** manufactured by the HAL.
- **Genesis:**
    - It was during the **1999 Kargil war that the need was first felt for a homegrown lightweight assault helicopter** that could hold precision strikes in all Indian battlefield scenarios.
        - This meant a **craft that could operate in very hot deserts** and also in very cold high altitudes, in counter-insurgency scenarios to full-scale battle conditions.
    - India has been operating sub 3 ton category French-origin legacy helicopters, **Chetak and Cheetah,** made in India by the **Hindustan Aeronautics Limited (HAL).**
        - These single engine machines were, primarily, utility helicopters. Indian forces also operate the Lancer, an armed version of Cheetah.
    - In addition, the Indian Air Force currently operates the Russian origin Mi-17 and its variants Mi-17 IV and Mi-17 V5, with maximum take-off weight of 13 tonnes, which are to be phased out starting 2028.
    - The **government sanctioned the LCH project in October 2006** and HAL was tasked to develop it.
- **Significance:**
    - The LCH has the **capabilities of combat roles such as destruction of enemy air defence,** counter insurgency warfare, combat search and rescue, anti-tank, and counter surface force operations.

Source: IE

National Young Superintendents of Police Conference and Police Expo

Why in News?

Recently, **The Union Minister of State for Home Affairs** addressed the inaugural function of the **4th National Youth Superintendents of Police Conference and Police Expo.**

What are the Key Highlights of the Event?

- **About:**
    - **The Police Expo** focuses on latest technologies in areas, such as, Body Armour, Mine Protective Vehicles (MPVs), Less than Lethal Technologies, Advanced Weaponry, Latest Communication Equipment, Surveillance Equipment, Coastal Security, Drone & Anti-Drone Technologies, **Cyber Security**/Cyber Crime Management and Big Data & Predictive Analytics for effective delivery of Police Services to citizens.
- **Theme:**
    - Innovation and Research in Cybercrime Management, Drones and Counter Drones.
- **Key Areas of Discussion:**
    - **Indian Cyber Crime Coordination Center (I4C):**
        - **I4C** was approved in 2018 to **deal with the increasing cases of cybercrimes in a coordinated and effective manner.**
        - This coordination center has seven components, of which a significant component is

located at the **National Cyber Research and Innovation Center** (Bureau of Police Research and Development). **The other six components are:**
    - National Cyber Crime Threat Analytics Unit
    - National Cyber Crime Reporting Portal
    - National Cyber Crime Training Centre
    - Cyber Crime Ecosystem Management Unit
    - National Cyber Crime Forensic Laboratory Ecosystem
    - Platform for Joint Cyber Crime Investigation Team.
  - This state-of-the-art Centre is located in New Delhi.
- **Crime and Criminal Tracking Network and System (CCTNS)**:
  - **Background:**
    - **Crime and Criminal Tracking Network & Systems (CCTNS)** is a plan scheme conceived in the light of experience of a non-plan scheme namely - **Common Integrated Police Application (CIPA).**
  - **Objectives:**
    - Make the Police functioning citizen friendly and more transparent by automating the functioning of Police Stations.
    - Improve delivery of citizen-centric services through effective usage of Information Communication Technology.
    - Provide the Investigating Officers of the Civil Police with tools, technology and information to facilitate investigation of crime and detection of criminals.
  - **Status:**
    - It has been implemented in all 16,347 police stations across the country and in 99% police stations, 100 percent FIRs are being registered directly in CCTNS.
- **Usage of Drones:**
  - **Drones** can be useful in combat operations, surveillance, communication in remote areas for internal security, border security and security in remote areas.
  - **Drones** can also be used for transportation of medicines, food and essential commodities and for search and rescue operations in areas affected by natural calamities and disasters.
  - Digital mapping of property is being done with the help of drones, and in the near future, new avenues of employment can be generated by setting up soil testing laboratories in villages with the help of drone services.
  - **Drones** can also help farmers and fishermen in timely delivery of their produce with minimum damage and it will also be easier to spray pesticides on crops with minimum efforts.

What are India's Initiatives for Cyber Crime & Drones?

- Bharat Drone Mahotsav
- **Drone Rules 2021**
- **Drone Shakti Scheme**
- **Indian National Security Council**
- **Computer Emergency Response Team (CERT-In)**
- **Cyber Swachhta Kendra**
- **Cyber Surakshit Bharat**

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Q1. Consider the following activities: (2020)

1. Spraying pesticides on a crop field
2. Inspecting the craters of active volcanoes
3. Collecting breath samples from spouting whales for DNA analysis

At the present level of technology, which of the above activities can be successfully carried out by using drones?

(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

Ans: (d)

Exp:

- Unmanned Aerial Vehicles (UAV) or drones are aircrafts that can be navigated without a human pilot on board. Drones can be navigated via control from the ground, using a GPS tracking system.
- Initially, drones have been developed mostly for military applications. However, its use has expanded to scientific, recreational, commercial and other applications including peacekeeping and surveillance, product delivery, aerial photography, agriculture, etc.
- They are now increasingly used to spray pesticides in agricultural fields to protect standing crops from pests. Hence, statement 1 is correct.
- Scientists have also been using drones to study active volcanoes. The drone can both collect breath samples and take high-resolution photos of the whales from the air to assess general health conditions. Hence, statements 2 and 3 are correct.
- Therefore, option (d) is the correct answer.

Q2. In India, under cyber insurance for individuals, which of the following benefits are generally covered, in addition to payment for the loss of funds and other benefits? (2020)

1. Cost of restoration of the computer system in case of malware disrupting access to one's computer.
2. Cost of a new computer if some miscreant wilfully damages it, if proved so.
3. Cost of hiring a specialized consultant to minimize the loss in case of cyber extortion.
4. Cost of defence in the Court of Law if any third party files a suit.

Select the correct answer using the code given below:

(a) 1, 2 and 4 only
(b) 1, 3 and 4 only
(c) 2 and 3 only
(d) 1, 2, 3 and 4

Ans: (b)

Exp:

- Cyber Insurance is designed to guard businesses from the potential effects of cyber-attacks. It helps an organisation mitigate risk exposure by offsetting costs, after a cyber-attack/breach has happened. In simple terms, cyber insurance is designed to cover the fees, expenses and legal costs associated with cyber breaches.
- Coverage Includes
    - Response to breach events (notification, call centre service, breach resolution, mitigation services, public relation and crisis management),
    - Investigation & fines including lawyers, professional fees, administration cost etc, hence, 4 is correct
    - Expenses such as forensic, IT audit, crisis management, legal costs, hence, 3 is correct.
    - Privacy & data liability,
    - Loss of personal identifiable information,
    - Loss of corporate confidential info,
    - Network liability such as DDoS Attacks,
    - Multimedia covers including copyright issues,
    - Business Interpretation,
    - Income loss, business interruption cost, system damage and restoration cost, any extra expenses, hence 1 is correct.

    - Cyber theft,
    - Fund transfer frauds,
    - E-theft loss,
    - E-communication loss,
    - Cyber extortion.
- Therefore, option (b) is the correct answer.

Q3. The terms 'WannaCry, Petya and EternalBlue' sometimes mentioned in the news recently are related to (2018)

(a) Exoplanets
(b) Cryptocurrency
(c) Cyber attacks
(d) Mini satellites

Ans: (c)

Exp:

- Ransomware is a form of malicious software (or malware). Once it takes over the computer, it threatens user to harm, usually by denying access to data. The attacker demands a ransom from the victim, promising to restore access to the data upon payment. WannaCry, Petya and EternalBlue are few of the ransom ware, which created havoc by demanding the victim ransom payment in bit coin (crypto currency).
- Cryptocurrency is a digital currency in which encryption techniques are used to regulate the generation of units of currency and verify the transfer of funds, operating independently of a central bank.
- Therefore, option (c) is the correct answer.

Source: PIB

India lags in Biomass Co-firing Targets

For Prelims: Biomass and its Benefits, Decarbonization, Green House Gas.

For Mains: Biomass Co-Firing, Significance and Challenges.

Why in News?

The Ministry of Power is considering cutting coal supply to plants, which do not comply with biomass cofiring Norms.

- The Power Ministry in October 2021 had decreed that all thermal power plants ensure 5% compliance by October 2022.
- In 2020-21, only eight power plants **had co-fired biomass pellets,** and this number had risen to 39 recently.

What is Biomass Co-firing?

- **About:**
  - Biomass co-firing is the practice of substituting a part of the fuel with biomass at **coal thermal plants.**
    - Coal and biomass are combusted together in boilers that have been designed to burn coal. For this purpose, the existing coal power plant has to be partly reconstructed and retrofitted.
    - Co-firing is an option to convert biomass to electricity, in an efficient and clean way, and to reduce **GHG (Green house Gases) emissions** of the power plant.
  - Biomass co-firing is a globally accepted cost-effective method for **decarbonising** a coal fleets.
  - India is a country where biomass is usually burnt on the field which reflects apathy towards resolving the problem of clean coal using a very simple solution that is readily available.
- **Significance:**
  - Biomass co-firing is an effective way to curb emissions from open burning of crop residue, it also decarbonised the process of electricity generation using coal.
    - Substituting 5-7 % of coal with biomass in coal-based power plants can save 38 million tonnes of carbon dioxide emissions.
  - It can help cut emissions from combustion of fossil fuels, **address** India's burgeoning problem of **farm stubble burning** to some extent, reduce waste burden while also creating jobs in rural areas.
  - India has large biomass availability as well as rapid growth in coal-fired capacity.
- **Challenges:**
  - The existing infrastructure is not robust enough to substitute **5-7% of coal with biomass in coal-based power plants, which indeed** can save 38 million Tonnes of carbon dioxide emissions.
  - **Around 95,000-96,000 tonnes** of biomass pellets are required per day for co-firing, but India's pellet manufacturing capacity is 7,000 tonnes per day at present despite a surplus 228 million tonnes of agricultural residue available in the country.
    - This huge gap is due to the seasonal availability and unreliable supply of biomass pellets to the utility.
  - It is challenging to store biomass pellets for long durations at the plant sites since they absorb moisture from air quickly, rendering them useless for co-firing.
  - Only pellets with **up to 14% of moisture can be used for combustion** along with coal.

What is Biomass?

- **About:**
  - Biomass is plant or animal material used as fuel to produce electricity or heat. Examples are wood, energy crops and waste from forests, yards, or farms.
  - Biomass has always been an important energy source for the country considering the benefits it offers.
- **Benefits:**
  - It is renewable, widely available, carbon-neutral and has the potential to provide significant employment in the rural areas.
  - It is also capable of providing firm energy. About 32% of the total primary energy use in the country is still derived from biomass and more than 70% of the country's population depends upon it for its energy needs.
- **Biomass Power & Cogeneration Programme:**
  - **About:**
    - Initiated by the Ministry of New and Renewable Energy.
    - For efficient utilization of biomass, bagasse-based cogeneration in sugar mills and biomass power generation have been taken up under the programme.
    - Biomass materials used for power generation include Rice husk, straw, cotton stalk, coconut shells, soya husk, de-oiled cakes, coffee waste, jute wastes, groundnut shells, saw dust etc.
  - **Objective:**
    - Promoting technologies for optimum use of the country's biomass resources for grid power generation.

What are the other Related Initiatives?

- **National Mission on use of Biomass in Coal Based Thermal Power Plants**
- **Carbon Capture and Storage**
- Coal Beneficiation

Way Forward

- Platforms need to be established to ensure farmers have an intrinsic role in this business model of pellet manufacturing and co-firing in power plants.
- To exploit co-firing potential without adverse environmental impact, emerging economies need technology and policy preparation.
- Sustainability indicators for bioenergy, including protection of soil and water resources, biodiversity, land allocation and tenure, and food prices, need to be integrated into policy measures.

UPSC Civil Services Examination Previous Year Question (PYQ)

Q. Consider the following: (2019)

1. Carbon monoxide
2. Methane
3. Ozone
4. Sulphur dioxide

Which of the above are released into atmosphere due to the burning of crop/biomass residue?

(a) 1 and 2 only
(b) 2, 3 and 4 only
(c) 1 and 4 only
(d) 1, 2, 3 and 4

Ans: (d)

Exp:

- Biomass is organic material that comes from plants and animals, and it is a renewable source of energy. Biomass contains stored energy from the Sun. Plants absorb the Sun's energy in a process called photosynthesis. When biomass is burned, the chemical energy in biomass is released as heat.
- Crop residue and biomass burning (forest fires) is considered as a major source of Carbon Dioxide (CO_2), Carbon Monoxide (CO), Methane (CH_4), volatile organic compounds (VOC), and Nitrogen Oxides (NOX). Burning of rice crop residue releases Suspended Particulate Matter, SO_2, NO_2 and O_3 in the atmosphere.
- **Therefore, option (d) is the correct answer.**

Source: TH