

NEWS TODAY

Willow, Google's quantum computing chip launched

About Willow Chip

- It operates using **superconducting transmon qubits**—tiny electrical circuits exhibiting quantum behaviour at extremely low temperatures.
- The **chip is capable of solving complex computations under 5 minutes** that otherwise would have taken the world's fastest supercomputers 10 septillion (10^{25}) years to complete.

About Quantum computing:

- It **uses the principles of quantum mechanics** to solve complex problems faster than traditional/ classical computers.
 - ⊕ **Traditional computers** use bits to process information as either 0s or 1s, whereas **quantum computers use qubits**, which can represent both 0 and 1 simultaneously.
- **Principles of quantum mechanics involved are:**
 - ⊕ **Superposition:** State in which a **quantum particle can represent** not just one possibility, but a **combination of multiple possibilities**.
 - ⊕ **Entanglement:** Process in which **multiple quantum particles become correlated more strongly than regular probability allows**.
 - ⊕ **Others:** Decoherence, and Interference.

Application of quantum computing: Artificial intelligence/ Machine Learning, cybersecurity, financial modelling, drug development, weather forecasting, traffic management etc.

Challenges of quantum computing:

- **Quantum errors** due to noise, decoherence, etc.
- **Scalability** due to requirement of specialized techniques and materials,
- **Qubit's short life span,**
- **Ineffective security protocols,**
- **Shortage of skilled manpower** etc.

India's initiative for quantum computing

- **National Quantum Mission:** To scale up scientific and industrial R&D and create a vibrant & innovative ecosystem in Quantum Technology (QT).
- **Quantum Enabled Science & Technology (QuEST):** A research program to build quantum capabilities.
- **Quantum Frontier mission** of Prime Minister's Science, Technology, and Innovation Advisory Council (PM-STIAC).

World Malaria Report 2024 released by World Health Organization (WHO)

Key Findings:

- Globally, Malaria cases rose to **263 million** in 2023, with an incidence of **60.4 per 1000 population at risk**, up from **58.6 in 2022**.
- The **WHO African Region** accounted for **94% of global cases**.
- **Findings related to India:**
 - ⊕ **Decline in Malaria Cases:** Reduced by **69%**, from **6.4 million in 2017 to 2 million in 2023**.
 - ⊕ **Decline in Malaria deaths:** declined by **68%**, from **11,100 in 2017 to 3,500 in 2023**.
 - ⊕ In 2024, **India officially exited the High Burden to High Impact (HBHI) group**.

About Malaria

- It is a **life-threatening disease** caused by **Plasmodium parasites**, transmitted to humans through the bites of infected **female Anopheles mosquitoes**.
- **Geographical prevalence:** Mostly found in **tropical countries**.
- **Symptoms:** Fever, chills and headache, fatigue etc.
- **Five Plasmodium species cause malaria in humans:** *P. falciparum*, *P. vivax*, *P. malariae*, *P. ovale*, *P. knowlesi*.
 - ⊕ ***P. falciparum* and *P. Vivax*** pose the greatest threat.
- **Malaria Vaccines:** **RTS,S/AS01 vaccine** (WHO approved first vaccine in 2021), **R21/Matrix-M** (WHO approved second vaccine in 2023).

Initiatives

- **WHO Global technical strategy for malaria 2016–2030**, updated in 2021, provides a technical framework for all malaria-endemic countries.
- **National Strategic Plan: Malaria Elimination 2023-27**

Factors increasing malaria vulnerability

- **Biological vulnerability:** pertains to physiological characteristics, such as sex characteristics, age, immune response and other genetic factors.
- **Environmental Factors:** For instance climate variability and land-use changes exacerbate exposure.
- **Social and Economic Factors:** Vulnerabilities arise from socioeconomic status, gender inequalities, disability, ethnicity, and migrant status.
- **Structural Challenges:** Conflict, migration, and disruptions in healthcare access increase malaria risk.

University Grants Commission (UGC) issues Draft guidelines for Recognition of Prior Learning (RPL) in Higher Education

Guideline is aligned with the goal of the **National Education Policy (NEP) 2020**.

➤ Also, these are aligned with the **National Credit Framework (NCrF)**.

⊕ NCrF supports RPL by facilitating the creditisation of all learning forms – academic, vocational, and experiential,

About Recognition of Prior Learning (RPL)

➤ It is a formal mechanism used to evaluate a person's existing knowledge, skills, and experience gained through formal, non-formal, or informal learning.

➤ **Purpose:** Integrates informal and non-formal learning into the formal education system via assessments and certifications.

⊕ RPL acknowledges diverse learning forms by assessing and validating competencies and experiences, regardless of how they were acquired.

➤ It is also promoted under the **Pradhan Mantri Kaushal Vikas Yojana (PMKVY)**, under the Ministry of **Skill Development and Entrepreneurship (MSDE)**.

Why is there a need to promote RPL in Higher Education?

➤ **Facilitate Workforce Transition:** Assist in transitioning the workforce from informal work settings to the formal sector by recognizing and validating their skills and knowledge.

⊕ More than 90% of India's workforce is employed in the informal sector.

➤ **Address Industry Needs:** Meet specific industry or sectoral requirements by recognizing prior learning, thereby enhancing employability.

➤ **Other:** Promotes continuous learning to adapt to evolving career demands, etc.



Department of Biotechnology (DBT), along with the Centre for Stem Cell Research (CSCR) develops 1st human gene therapy for Haemophilia A

This **Gene therapy** used a **lentiviral vector** to introduce a normal copy of the **Factor VIII gene** into autologous **hematopoietic stem cells (HSCs)** to treat **Haemophilia A** (refer to box).

➤ **Lentiviral vectors** are a type of viral vector that can be used to transfer genetic material.

➤ **HSCs** are multipotent primitive cells that can develop into all types of blood cells.

About Gene therapy

➤ **Gene therapy** is a technique that uses a gene(s) to treat, prevent or cure a disease or medical disorder.

⊕ It works by **replacing faulty genes, deactivating harmful ones, or introducing new genes** to improve or restore health.

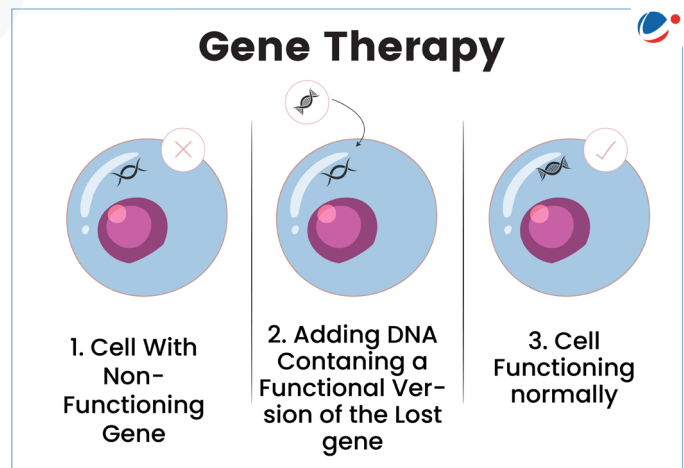
⊕ It uses products/methods such as **Plasmid DNA** (Genetically engineered Circular DNA molecules), Human gene editing technology, etc.

Types of Gene Therapy

⊕ **Germline gene therapy:** In it, the Germline Cell (egg or sperm) are modified by the introduction of functional genes.

⊕ **Somatic cell gene therapy:** In this, therapeutic gene are transferred to a patient's somatic cells (cells other than germline cells).

➤ **Application:** both inherited genetic diseases (e.g., sickle cell disease) and acquired disorders (e.g., leukemia) could be treated.



About Haemophilia

➤ It is a rare condition that affects the blood's ability to **clot**.

⊕ India bears the world's second-largest burden of haemophilia.

➤ **Haemophilia A** is caused by the deficiency of clotting **Factor VIII**.

India Skills Report 2025 released by Wheebox

As global demand for talent continues to rise, the theme of this year's Report, "Global Skills Mobility - India's Decade," highlights how India is uniquely positioned to meet the world's workforce needs.

Key findings:

- **Over 50% of Indian graduates** are now employable, which is an increase from 33% a decade ago.
 - ⊕ **Maharashtra leads in employability**, followed by Delhi, Karnataka, and Andhra Pradesh.
- **Cross-border talent mobility** could add **USD 500 billion** to the global economy by 2030, with India playing a central role in bridging these gaps.

Global Talent Ecosystem: Emerging Opportunities and Workforce Transformation

- **Europe:** It's facing an aging population and skill shortages across critical sectors, driving demand for international talent.
- **Gulf:** Gulf Cooperation Council (GCC) nations are witnessing accelerated demand in construction, healthcare, and IT.
- **Changing nature of jobs:** 25% of all jobs will undergo significant changes within the next five years, necessitating a workforce equipped with adaptable, future-ready skills.

India's Potential in bridging the demand

- **India's workforce—65% under 35—**provides a demographic dividend of **10-12 million annual job market entrants**.
- **India's IT industry: Valued at USD 245 billion in 2023** is in the forefront of providing talent for digital transformation across the world.
- **Rise of digital nomadism and hybrid work models** has unlocked opportunities for Indian talent to contribute globally without geographical constraints.



James Webb Space Telescope (JWST) confirms the universe is expanding at an unexpected rate

Data from NASA's JSWT confirms the Hubble Space Telescope's earlier finding that the rate of the universe's expansion is faster by about 8%.

Universe's Expansion Rates:

- **Hubble's Law** — also known as the **Hubble Constant** — says that universe is expanding at a rate of **67-68 kilometers per second per megaparsec** (a megaparsec is 3.26 million light-years).
- However, **telescope observations** give a higher value of **70 to 76 kilometers per second per megaparsec**.
 - ⊕ **This discrepancy** between the **telescope observed expansion rate** of the universe and the **Hubble Constant** is called the **'Hubble Tension'**.

Probable reasons for expansion:

- **Dark matter:** Comprise ~ **27% of the universe**, is a **hypothesised form of matter that is invisible but is inferred to exist based on its gravitational effects** on ordinary matter like stars, planets, moons, etc.
 - ⊕ Ordinary matter accounts for **roughly 5% of the universe**.
- **Dark energy:** It's a hypothetical form of energy proposed by physicists to explain why the universe is not just expanding but is doing so at an accelerating rate.
 - ⊕ **It comprises ~69% of the Universe**.
 - ⊕ It's an **anti-gravity" force** that stretches the very fabric of spacetime.

Key proofs of Universe's expansion:

- **Redshift of galaxies:** **light from distant galaxies** is redshifted, meaning their **wavelengths are stretched**, indicating they are moving away from us.
- **Cosmic Microwave Background (CMB):** **Radiation left over from the Big Bang** that fills the entire universe, and detected in all directions.
- **Others:** Supernovae observations, gravitational waves observations etc.

Also In News



Marbled duck

Marbled duck spotted at Sultanpur National Park after 30 years.

About Marbled duck

- Marbled teals are **medium-sized ducks**.
- A species found in **Southern Europe, Northwest Africa, the Middle East, Russia, India, and China**.
- **IUCN Status:** Near Threatened
- **Sultanpur National Park**
 - Located in **Gurgaon, Haryana**
 - Several **migratory bird species** arrive here in search of feeding grounds and to spend the winter.
 - Notified as a **Ramsar site**, a wetland of international importance in 2021.
 - **Flora:** **Mixed forests of acacia, jamun, and neem trees, as well as grasslands.**
 - **Fauna:** Famous for birds, like **bar-headed goose, Indian spotted eagle, etc.**



Bluetooth Low Energy Gateway

State of the **Art Bluetooth Low Energy Gateway and Node System** launched at IIT Ropar.

About Bluetooth Low Energy Gateway

- The system connects **Bluetooth-enabled sensors to cloud platforms**, enabling seamless data transmission, real-time environmental monitoring, and advanced analytics across diverse sectors.
- **Key features include:**
 - ⊕ **Robust Connectivity:** Offers 4G, WiFi, and LAN compatibility for flexible networking.
 - ⊕ **Long-Range Communication:** Supports data transmission up to 1 km in line-of-sight (LOS) scenarios.
- **Application:** Precision farming, Logistics, Monitoring work in Smart cities, Industrial sites etc.

Cess and Surcharge

Recently, the Chairman of the 16th Finance Commission highlighted concerns related to cess and surcharge.

- Articles 270 and 271 of the Indian constitution deal with the Cess and Surcharges.

About Cess and Surcharge

- Cess: Earmarked for specific purposes** but does not entitle the payer to direct benefits. They are typically imposed in addition to existing taxes and may be fixed or calculated ad valorem (percentage-based).
 - Funds are credited to the **Consolidated Fund of India** and withdrawn only with parliamentary approval.
- Surcharge:** It is an additional tax imposed on existing duties and taxes, essentially a tax on tax.
 - Unlike a cess, a surcharge does not require a specific purpose at the time of levy. The Union has discretion over the use of proceeds.
- Both Funds are credited to the **Consolidated Fund of India**.
- They are generally kept out from net proceeds, unlike other taxes under the divisible pool for sharing with States.

Section 498A of IPC

Supreme Court criticises 'growing misuse' of Indian Penal Code (IPC) section 498A against husbands and their kin for 'personal vendetta'.

- IPC has been replaced by the Bharatiya Nyaya Sanhita (BNS).
- Section 498A of IPC**
 - Deals with the Husband or relative of the husband of a woman subjecting her to cruelty.
 - Punishment:** Imprisonment for a term which may extend to three years and shall also be liable to fine.
 - In BNS, it is covered under section 85.

National Panchayat Awards 2024

Recently, 45 Panchayats were awarded with National Panchayat Awards 2024 for their contributions to sustainable and inclusive development in rural India.

About National Panchayat Awards 2024

- Launched by the Ministry of Panchayati Raj in alignment with 9 Localization of Sustainable Development Goals (LSDGs) themes aggregating 17 SDGs.
 - 9 LSDGs themes include Poverty free and enhanced livelihoods Panchayat, child friendly panchayats, women friendly panchayat, water-friendly panchayat etc.
- Objectives:** To assess the performance of Panchayats in attainment of SDGs, Promotion of competitive spirit among them etc.

Global Report on Trafficking in Persons 2024

Global Report on Trafficking in Persons 2024 has been released by the United Nations Office on Drugs and Crime (UNODC).

Key Findings

- In 2022, the number of known victims worldwide rose to 25% above 2019's pre-pandemic levels
- Women and girls account for the majority of victims (61% in 2022).

About UNODC (1997)

- It is a UN agency that leads global efforts against illicit drugs, organized crime, and terrorism.
- HQ: Vienna

Pradhan Mantri Bhartiya Jan Aushadhi Kendras (PMBJK)

The Union Government has enabled Primary Agricultural Credit Societies (PACS) to operate Pradhan Mantri Bhartiya Jan Aushadhi Kendras (PMBJK).

About PMBJK

- It aims to provide high-quality generic medicines at affordable prices.
- It is launched under Pradhan Mantri Bhartiya Janaushadhi Pariyojana (PMBJP).
 - PMBJP was launched by the Department of Pharmaceuticals, Ministry of Chemicals & Fertilizers in 2008.
- These outlets ensure essential healthcare is accessible to all, especially economically disadvantaged individuals.

La Nina

Recently, World Meteorological Organization (WMO) stated that weak and short La Niña conditions could emerge in December-to-February period.

About La Nina

- It is one of the three El Nino Southern Oscillation (ENSO) phases.
- It refers to the periodic cooling of ocean surface temperatures in the central and east-central equatorial Pacific.
 - Typically, it occurs every 3 to 5 years or so.
 - It positively impacts the Indian Monsoon.
- During La Nina:**
 - Trade winds become stronger than usual, pushing more warm water toward Asia.
 - Off the west coast of the Americas, upwelling increases, bringing cold, nutrient-rich water to the surface.
- It has global impacts on weather, wildfires, ecosystems, economies etc.

Personality in News

Subramania Bharati (1882-1921)

Mahakavi Subramania Bharti remembered on his 143rd birth anniversary.

About Subramania Bharti:

- A great Tamil poet and freedom fighter, regarded as the father of the modern Tamil literary style.
- He was Involved in a faction of the Indian National Congress (INC) party that favoured armed resistance against the British raj.
- He began his career as a journalist in "Swadesamitran"(1882)

Key contributions

- He championed the empowerment of youth and women and had immense faith in science and innovation.
- Notable works:** Kannan pattu, Panchali sapatham, Kuyil pattu etc.

Values: Patriotism, Social reformer, Gender equity, Leadership, etc.

