

HISTORY, CULTURE OF INDIA, AND INDIAN NATIONAL MOVEMENT

- ❁ Indus Valley Civilisation
- ❁ Vedic Culture in North India and Megalithic Culture in South India
- ❁ Early Tamil Society and Culture
- ❁ Ancient Cities of Tamilagam
- ❁ Rise of Territorial Kingdoms and New Religious Sects
- ❁ Jainism, Buddhism and Ajivika Philosophies in Tamil Nadu
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INDUS VALLEY CIVILISATION

Discovered through excavations in 1921 at Harappa and subsequently at Mohenjo-daro, the Indus Valley Civilisation (IVC), also known as the Harappan Civilisation, represents the Bronze Age's most extensive urban culture, surpassing its contemporaries in Egypt and Mesopotamia in geographical spread. Flourishing in its mature phase from circa 2600 to 1900 BCE, it was strategically situated not merely along the Indus River but also along the now-dry Ghaggar-Hakra (Sarasvati) river system, challenging the notion of a single-river dependent culture. Characterized by remarkable standardization, the IVC featured grid-planned cities like Dholavira and Lothal, sophisticated drainage systems, and uniform brick sizes and weights, suggesting a complex, centralized authority possibly operating without tangible evidence of a monarchy or military.

Economically, it was an agro-commercial society that pioneered cotton cultivation and engaged in extensive maritime trade networks with Mesopotamia, with recent evidence identifying fortified roadside rest stops (caravanserais) that served as logistical hubs two millennia before the Silk Route. The culture is distinguished by its undeciphered pictographic script, advanced metallurgy (including the "lost wax" technique for bronze casting), and unique stone drill technology using a synthetic material called "Ernestite" for bead-making. The civilization's decline, beginning around 1900 BCE, was likely a gradual process of de-urbanization driven by ecological shifts, such as the drying of major rivers, rather than a sudden collapse.

Settlement of people

Initially, people lived in groups. Then they formed communities out of these groups. Then evolved the societies which in due course became civilisations.

People preferred to settle near the rivers because :

- ▶ The soil is fertile.
- ▶ Fresh water is available for drinking, watering livestock and irrigation.
- ▶ Easy movement of people and goods is possible.

Harappa

- ▶ The ruins of Harappa were first described by the British East India Company soldier and explorer Charles Masson in his book.
- ▶ In 1856 when engineers laid a railway line connecting Lahore to Karachi, they discovered more burnt bricks. Without understanding their significance, they used the bricks for laying the rail road.
- ▶ In the 1920s archaeologists began to excavate the cities of Harappa and Mohenjo-Daro. They unearthed the remains of these long-forgotten cities. In 1924 the Director General of ASI, Sir John Marshall, found many common features between Harappa and Mohenjo-Daro. He concluded that they were part of a large civilisation. Some slight differences are found in the earthenwares of Harappa and of Mohenjo-Daro. This made the researchers conclude that Harappa was older than Mohenjo-Daro.

The Archaeological Survey of India (ASI) was started in 1861 with Alexander Cunningham as Surveyor General. Its headquarters is located in New Delhi.

Sites on Indian borders

Archaeologists found major Harappan sites near Indian borders. They are : Manda, Rakhigarhi, Harappa, Mitathai, Kalibangan, Ganveriwala, Mohenjo-Daro, Kot Diji, Amri, Dholavira, Lothal.

Time Span of Indus Civilisation

Geographical range	South Asia
Period	Bronze Age
Time	3300 to 1900 BCE (determined by using the radiocarbon dating method)
Area	13 lakh sq.km
Cities	6 big cities
Villages	More than 200

Urban Civilisation

Harappan civilisation is said to be urban because of the following reasons.

- ▶ Well-conceived town planning
- ▶ Astonishing masonry and architecture
- ▶ Priority for hygiene and public health
- ▶ Standardised weights and measures
- ▶ Solid agricultural and artisanal base

Unique Features of Harappan Civilisation

Town planning is a unique feature of the Indus Civilisation. The Harappan city had two planned areas.

Mehergarh – the Precursor to Indus Civilisation

Mehergarh is a Neolithic site. It is located near the Bolan Basin of Balochistan in Pakistan. It is one of the earliest sites known. It shows evidence of farming and herding done by man in very early times. Archaeological evidence suggests that Neolithic culture existed in Mehergarh as early as 7000 BCE.

Streets and Houses

- ▶ The streets are observed to have a grid pattern. They were straight running from north to south and east to west and intersected each other at right angles.
- ▶ The roads were wide with rounded corners.
- ▶ Houses were built on both sides of the street. The houses were either one or two storeys.
- ▶ Most of the houses had many rooms, a courtyard and a well. Each house had toilets and bathrooms.
- ▶ The houses were built using baked bricks and mortar. Sun-dried bricks were also used. Most of the bricks were of uniform size. Roofs were flat.
- ▶ There is no conclusive evidence of the presence of palaces or places of worship.

Burnt bricks which are used in construction are strong, hard, durable, resistant to fire and will not dissolve in water or rain.

Drainage System

- ▶ Many of these cities had covered drains. The drains were covered with slabs or bricks.
- ▶ Each drain had a gentle slope so that water could flow.
- ▶ Holes were provided at regular intervals to clear the drains.
- ▶ House drains passed below many lanes before finally emptying into the main drains.
- ▶ Every house had its own soak pit, which collected all the sediments and allowed only the water to flow into the street drain.

Bronze Age : It is a historical period characterised by the use of articles made of bronze.

The Great Bath

- ▶ The great bath was a large, rectangular tank in a courtyard. It may be the earliest example of a water-proof structure. The bath was lined with bricks, coated with plaster and made water-tight using layers of natural bitumen.
- ▶ There were steps on the north and south leading into the tank. There were rooms on three sides.
- ▶ Water was drawn from the well located in the courtyard and drained out after use.

The Great Granary

- ▶ The granary was a massive building with a solid brick foundation.
- ▶ Granaries were used to store food grain.
- ▶ The remains of wheat, barley, millets, sesame and pulses have been found there.

A granary with walls made of mud bricks, which are still in a good condition, has been discovered in Rakhigarhi, a village in Haryana, belonging to Mature Harappan Phase.

The Assembly Hall

The Assembly Hall was another huge public building at Mohenjo-Daro. It was a multi-pillared hall (20 pillars in 4 rows to support the roof).

Trade and Transport

- ▶ Harappans were great traders.
- ▶ Standardised weights and measures were used by them. They used sticks with marks to measure length.
- ▶ They used carts with spokeless solid wheels.
- ▶ There is evidence for extensive maritime trade with Mesopotamia. Indus Seals have been found as far as Mesopotamia (Sumer) which are modern-day Iraq, Kuwait and parts of Syria.
- ▶ King Naram-Sin of Akkadian Empire (Sumerian) has written about buying jewellery from the land of Melukha (a region of the Indus Valley).
- ▶ Cylindrical seals similar to those found in Persian Gulf and Mesopotamia have also been found in the Indus area. This shows the trade links between these two areas.
- ▶ A naval dockyard has been discovered in Lothal in Gujarat. It shows the maritime activities of the Indus people.

Dockyard at Lothal

Lothal is situated on the banks of a tributary of Sabarmati river in Gujarat.

Leader in Mohenjo-Daro

- ▶ A sculpture of a seated male has been unearthed in a building, with a head band on the forehead and a smaller ornament on the right upper arm.
- ▶ His hair is carefully combed, and beard finely trimmed.
- ▶ Two holes beneath the ears suggest that the head ornament might have been attached till the ear.
- ▶ The left shoulder is covered with a shawl-like garment decorated with designs of flowers and rings.
- ▶ This shawl pattern is used by people even today in those areas.

- KVT Complex (Korkai-Vanji-Thondi) spread over Afghanistan and Pakistan has many places, names of those were mentioned in Sangam literature.
- Korkai, Vanji, Tondi, Matrai, Urai and Kudalgarh are the names of places in Pakistan.
- Gurkay and Pumpuhar in Afghanistan are related to the cities and ports mentioned in the Sangam Age. The names of the rivers Kawri and Poruns in Afghanistan and the rivers Kaweri Wala and Phornai in Pakistan also occur in the Sangam literature.

Technology

- ▶ Indus people had developed a system of standardised weights and measures.
- ▶ Ivory scale found in Lothal in Gujarat is 1704mm (the smallest division ever recorded on a scale of other contemporary civilisations).

The word 'civilisation' comes from the ancient Latin word *civis*, which means 'city'.

The hidden treasures of the Indus Civilisation

Inscriptions (written in a script of those times) can provide us information about customs, practices and other aspects of any place or time. So far, the Indus script has not been deciphered.

Apparel

- ▶ Cotton fabrics were in common use.
- ▶ Clay spindles unearthed suggest that yarn was spun.
- ▶ Wool was also used.
- ▶ Settlements were built on giant platforms and elevated grounds.
- ▶ The Indus Civilisation seems to have been a peaceful one. Few weapons were found and there is no evidence of an army.
- ▶ They displayed their status with garments and precious jewellery.
- ▶ They had an advanced civic sense.

- Iron was unknown to people of Indus.
- Indus people used the red quartz stone called Carnelian to design jewellery.
- Copper was the first metal discovered and used by humans.

GEOGRAPHY OF INDIA



THE UNIVERSE AND SOLAR SYSTEM



INDIA - GEOGRAPHICAL LOCATION, PHYSICAL UNITS



RIVER SYSTEM



CLIMATE AND NATURAL VEGETATION OF INDIA



SOIL AND AGRICULTURE



MINERALS



INDUSTRIES



TRANSPORT



POPULATION DENSITY AND DISTRIBUTION



CULTURAL GEOGRAPHY



ENVIRONMENTAL ISSUES



CLIMATE CHANGE



BIODIVERSITY OF TAMIL NADU



DISASTER MANAGEMENT



GEOGRAPHICAL LANDMARKS

THE UNIVERSE AND SOLAR SYSTEM

Introduction

- Numerous stars and celestial bodies came into existence by a massive explosion called Big Bang. These celestial bodies together are called the Universe. It is also referred to as the Cosmos. The stars that we see are so far away and appear to be small, but they are really huge in size.

The study of the Universe is called Cosmology. The term **Cosmos** is derived from the Greek word 'Kosmos'.

Universe

- The Universe is a vast expanse of space. Most astronomers believe that the Universe came into existence after the Big Bang explosion that took place about 15 billion years ago. The universe consists of billions of galaxies, stars, planets, comets, asteroids, meteoroids and natural satellites. These are collectively called as celestial bodies, which are located far away from each other. **A Light year is the unit used to measure the distance between the celestial bodies.**

A light-year is the distance traversed by light in a year at a velocity of 300,000 km per second. Sound travels at a speed of 330 m per second.

Theories about Earth's origin

- One of the earliest theories about earth's origin was put forward by **Immanuel Kant** and it was known as **Nebular hypothesis**. His theory stated that planets were formed out of cloud materials associated with youthful Sun, which was slowly rotating.
- **Mathematician Laplace** revised the Nebular hypothesis in 1796 and stated that planets had condensed from primitive solar atmosphere, which originally extended far beyond the limits of the present day system. As this cloud gradually contracted under the effects of gravity, it first formed the rings and then amalgamated into planets.
- Afterwards, **Lyttleton** propounded the accretion theory of the earth's formation. According to this theory, approximately 4.6 billion years ago, the solar system was a cloud of dust and gas known as a solar **nebula**.
- As the solar nebula began to spin, due to gravity the materials collapsed on itself and it formed the sun as the centre of the solar system.

Formation of solar system

When the Sun formed, the remaining material began to clump up. Small particles drew together bound by the force of gravity into larger particles.

The solar wind swept away lighter elements. Such as hydrogen and helium from the closer regions. It left only heavy rocky materials to create planets like earth. In this way, planets, moons, asteroids, comets, etc were created.

- The brightest star in our night sky is **Sirius**.
- 1.3 million Earths fit inside the Sun.

Modern theories about the origin of universe

- The most popular theory regarding the origin of universe is the **Big Bang theory** and it is also called as **expanding universe hypothesis**.
- In 1927, **Abbe Georges Lemaitre**, a Belgian astronomer was the first to propose, a theory on the origin of universe.
- Afterwards, **Edwin Hubble** propounded the Big Bang theory. According to his theory, the universe was formed about 13.75 billion years ago like a rapidly expanding balloon swelled from the size smaller than an electron to nearly its current size within a fraction of second.
- Matter from the universe was thrown out with great force in all directions and started expanding outwards. From the matter, many groups of stars were formed which is known as "Galaxies".

Voyager 2 travelling at the speed of more than 62,764.416 km/h will take more than 2,96,000 years to pass Sirius – the brightest star on our sky.

Galaxy

A galaxy is a system of billion of stars, stellar remnants, interstellar gas, dust and dark matter. The word galaxy was derived from the Greek word Galaxias (literally milky). The milky way is the galaxy that contains our solar system.

Three major forms of Galaxy :

- Spiral galaxy
- Elliptical galaxy
- Irregular galaxy

Spiral galaxies	It consists of a flat and rotating disk of stars, gases and dust. It has a central concentration of stars, known as "Bulge". Ex : The milky way and Andromeda.
Elliptical galaxies	It contains older stars with fewer gases. Ex : Messier89
Irregular galaxies	They are youthful galaxies with more dust and gases. This can make them very bright. Ex : Large Magellanic Cloud.

- According to Astronomers, The stars, planets and galaxies can make up only 4 percent of the universe. The remaining 96% substance of the universe cannot be seen.
- The age of the universe and the strength of the dark energy was measured by a technique called **gravitational lensing**.
- Scientists used this method to measure the distances that light travelled from a bright, active galaxy to the earth and some details of its expansion.

Star

- A star is a type of astronomical object which has its own light and heat.
- It is formed when enough dust and gas clump together because of the gravitational forces. It changes its forms during its lifetime such as red giant, white dwarf, neutron star and black hole.
- The nearest star to the earth is Sun. Sirius star is brighter than Sun. "Proxima Centauri" is the closest star to the sun.

Saul Perlmutter, Brian Schmidt and Adam Riess won the Nobel prize for physics in 2011 for their discovery that the universe is just expanding and picking up speed.

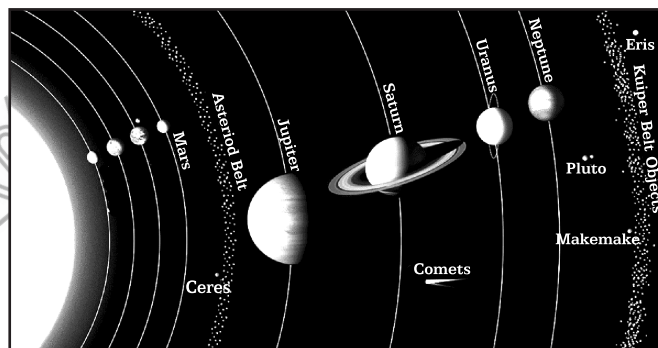
Constellation

- Constellation is a group of stars that forms a particular shape in the sky. Earlier, Ptolemy in his book Almagest, listed 48 constellations.
- In 1929, International astronomical union adopted official constellation boundaries that defined 88 official constellations, it exists even today.
- **Ursa major** constellation is a major type of constellation that can be seen in northern hemisphere.
- **Ursa major** means Great Bear in Latin.
- **Ursa minor**, known as lesser bear or little bear is a constellation in the northern sky. Ursa minor is traditionally important for navigation because of 'Polaris' being the North Star.

The Solar system

- There are billions of solar systems in Milky Way galaxy. There can be a single star (or) multi star to every solar system. If it is multi starred, then it is called Binary Star systems.
- Our solar system consists of a star, eight planets, moons, asteroids, comets and meteoroids. The eight planets namely Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune revolve around the sun in an elliptical orbit.
- Our solar system is located in an outer spiral arm of the vast Milky way galaxy. It orbits the centre of the Milky way galaxy at about 828,000 km/h.
- It takes about 230 million years to complete one orbit around the galactic centre. It is believed to have been formed 4.6 billion years ago.

- There are more than 163 known satellites in our solar systems and many to be discovered yet. Amongst eight planets, Mercury and Venus are planets with no satellites, while Jupiter and Saturn have the highest number of satellites in our solar system.



Solar System

The distance between the Sun and the Earth is about 150 million kilometre. A flight flying at a speed of 800 km per hour from the Earth would take 21 years to reach the Sun.

Kuiper belt

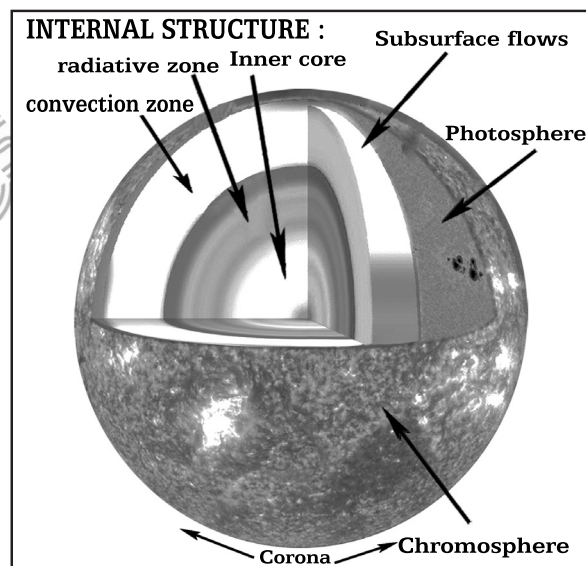
Our solar system also include Kuiper belt that lies past Neptune's orbit. These are sparsely occupied ring of icy bodies.

Oort Cloud

It is a giant spherical shell that surrounds our solar system. This cloud is made up of icy pieces of space debris. It orbits our Sun at the distance of 1.6 light years away. This shell of material is thick, extending from 5000 astronomical units to 1,00,000 astronomical units.

Our solar system is moving with an average velocity of 8,28,000 kilometres per hour. It takes about 230 million years to make one complete orbit around the milky way.

The Sun



Structure of the Sun

INDIAN POLITY

- ◆ Constitution of India
- ◆ Preamble
- ◆ Salient Features of Indian Constitution
- ◆ Union and its Territories
- ◆ Citizenship
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CONSTITUTION OF INDIA

CONSTITUTIONAL DEVELOPMENT IN INDIA

- ✍ The constitution consists of a set of fundamental principles based on which the state organisation is governed. It is the supreme law of the land.
- ✍ The need for the constitution came along with the dawn of independence. For this purpose the Constituent Assembly was formed in 1946 and on January 26, 1950 the Constitution came into force.
- ✍ The idea of Constituent Assembly for India was put forward for the first time by M.N. Roy in 1934. M.N. Roy was a pioneer of Communist movement in India.

Prem Behari Narain Raizada was the calligrapher of the Indian Constitution. The original constitution was handwritten by him in a flowing italic style.

BACKGROUND:

The company rule (1773-1857)

There are certain Acts that had been formulated by the British Government to regulate and control the affairs of East India Company in British India. They formed the basis for our constitution.

Regulating Act of 1773

- ✍ It designated the Governor of Bengal as the Governor General of Bengal. The first Governor-General was Lord Warren Hastings.
- ✍ It established a Supreme Court in Calcutta (1774) which comprised a Chief Justice and three other judges.
- ✍ It laid the foundation for Central administration in India.

Amending act of 1781 : (Act of settlement)

- ✍ To rectify the defects of the Regulating Act of 1773, the British Parliament passed the Amending Act of 1781. It is also known as Act of Settlement.

Pitt's India Act of 1784

- ✍ It established a system of dual government.
- ✍ It established a new body called 'Board of control' to manage the political affairs of the company and the existing court of directors to manage the commercial affairs.

Charter Act of 1813

- ✍ The Company's entire commercial trade monopoly ended, except the tea trade and the trade with China.
- ✍ Allotted ₹ 1 lakh to promote education in India.

Charter Act of 1833

- ✍ The Charter Act of 1833 attempted to introduce a system of open competition for selection of civil servants, and stated that the Indians should not be debarred from holding any place, office and employment under the Company. However, this provision was negated after opposition from the Court of Directors.

- ✍ This act was final step towards centralisation.
- ✍ It made Governor-General of Bengal as the Governor General of India and vested in him all civil and military powers.
- ✍ Lord William Bentick was the first Governor-General of India.
- ✍ It ended the activities of East India company as a commercial body and changed it into a purely administrative body.
- ✍ A Law commission under Lord Macaulay was formed to codify the laws.

Charter Act of 1853

- ✍ It established a separate Governor-General's Legislative Council which came to be known as Indian Legislative Council.
- ✍ It introduced the local representation in the Indian Legislative Council.
- ✍ It introduced an open competition system of selection and recruitment of civil servants. The covenanted civil service was thus thrown open to the Indians also. Accordingly, the Macaulay Committee (the Committee on the Indian Civil Service) was appointed in 1854.

The Crown Rule (1858-1947)

The Revolt of 1857 brought about important changes in the British administration in India. The rule of the East India Company came to an end. The administration of India came under the direct control of the British Crown. These changes were announced in the Government of India Act of 1858. The 'Proclamation of Queen Victoria' assured the Indians a benevolent administration. Thereafter, important developments had taken place in constitutional history of India as a result of the Indian National Movement.

Government of India Act of 1858

The Government of India Act of 1858 was passed by the Parliament of England and received royal assent on 2nd August 1858. Following are the main provisions of the Act :

- ✍ East India Company's rule came to an end and the Indian administration came under the direct control of the Crown.
- ✍ In England, the Court of Directors and Board of Control were abolished. In their place the Secretary of State for India and India Council were established. The Secretary of State would be a member of the British cabinet. Sir Charles Wood was made the first Secretary of State for India. The Council consisting of 15 members would assist him.
- ✍ The Governor General of India was also made the Viceroy of India. The first Viceroy of India was Lord Canning.
- ✍ All the previous treaties were accepted and honoured by the Act.

Queen Victoria's Proclamation

On 1 November 1858 the Proclamation of Queen Victoria was unveiled by Lord Canning at Allahabad. This royal Proclamation was translated into Indian languages and publicly read in many important places. It announced the end of Company's rule in India and the Queen's assumption of the Government of India. It endorsed the treaty made by the Company with Indian princes and promised to respect their rights, dignity and honour. It assured the Indian people equal and impartial protection of law and freedom of religion and social practices. The Proclamation of Queen Victoria gave a practical shape to the Act of 1858.

Indian Councils Act of 1861

- ✍ The Indian Councils Act of 1861 increased the number of members in the Governor-General's executive Council from 4 to 5. Further the Governor-General's Executive Council was enlarged into a Central Legislative Council. Six to twelve "additional members" were to be nominated by the Governor-General. Not less than half of these members were to be non-officials. Thus a provision was made for the inclusion of Indians in the Legislative Council. The functions of these members were strictly limited to making legislation and they were forbidden from interfering in the matters of the Executive Council. They did not possess powers of administration and finance.
- ✍ Legislative Councils were also established in the provinces. The number of additional members in the provinces was fixed between four and eight. So, this Act was an important constitutional development and the people of India came to be involved in the law making process. The mechanism of Indian legislation developed slowly and was reinforced further by the Acts of 1892 and 1909.

Indian Councils Act of 1892

The Indian Councils Act of 1892 was the first achievement of the Indian National Congress. It had increased the number of "additional members" in the Central Legislative Council. They were to be not less than 10 and not more than 16. It had also increased the proportion of non-officials – 6 officials and 10 non-officials. The members were allowed to discuss the budget and criticize the financial policy of the government. In the provinces the number of additional members also was increased with additional powers.

Indian Councils Act of 1909

This Act is also known as Morley-Minto Reforms (Lord Morley was the then Secretary of State for India and Lord Minto was the then Viceroy of India).

The features of this Act were as follows:

- ✍ It considerably increased the size of the legislative councils, both Central and provincial. The number of members in the Central legislative council was raised from 16 to 60. The number of members in the provincial legislative councils was not uniform.

- ✍ It retained official majority in the Central legislative council, but allowed the provincial legislative councils to have nonofficial majority.
- ✍ It enlarged the deliberative functions of the legislative councils at both the levels. For example, members were allowed to ask supplementary questions, move resolutions on the budget and so on.
- ✍ It provided (for the first time) for the association of Indians with the executive councils of the Viceroy and Governors. Satyendra Prasad Sinha became the first Indian to join the Viceroy's executive council. He was appointed as the Law Member.
- ✍ It introduced a system of communal representation for Muslims by accepting the concept of 'separate electorate'. Under this, the Muslim members were to be elected only by Muslim voters. Thus, the Act 'legalised communalism' and Lord Minto came to be known as the Father of Communal Electorate.
- ✍ It also provided for the separate representation of presidency corporations, chambers of commerce, universities and zamindars.

Government of India Act of 1919

On August 20, 1917, the British Government declared, for the first time, that its objective was the gradual introduction of responsible Government in India.

The Government of India Act of 1919 was thus enacted, which came into force in 1921. This Act is also known as Montagu-Chelmsford Reforms (Montagu was the Secretary of State for India and Lord Chelmsford was the Viceroy of India).

The features of this Act were as follows:

- ✍ It relaxed the central control over the provinces by demarcating and separating the central and provincial subjects. The central and provincial legislatures were authorised to make laws on their respective list of subjects. However, the structure of government continued to be centralised and unitary.
- ✍ It further divided the provincial subjects into two parts—transferred and reserved. The transferred subjects were to be administered by the Governor with the aid of Ministers responsible to the legislative council. The reserved subjects, on the other hand, were to be administered by the Governor and his executive council without being responsible to the legislative council. This dual scheme of governance was known as 'dyarchy'—a term derived from the Greek word diarche which means double rule. However, this experiment was largely unsuccessful.
- ✍ It introduced, for the first time, bicameralism and direct elections in the country. Thus, the Indian legislative council was replaced by a bicameral legislature consisting of an Upper House (Council of State) and a Lower House (Legislative Assembly). The majority of members of both the Houses were chosen by direct election.
- ✍ It required that the three of the six members of the Viceroy's executive Council (other than the Commander-in-Chief) were to be Indians.

INDIAN ECONOMY AND DEVELOPMENT ADMINISTRATION IN TAMIL NADU

♣ Nature of Indian Economy

♣ Five-Year Plan Models -
An Assessment

♣ Planning Commission and Niti
Aayog

♣ Fiscal Policy

♣ Banking

♣ Monetary Economics

♣ Finance Commission

♣ Land Reforms and Agriculture

♣ Application of Science and
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♣ Rural Development and Welfare

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♣ E-Governance in Tamil Nadu

♣ Some Important Policies and
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♣ Some Important State
Government Schemes

NATURE OF INDIAN ECONOMY

Nature of Indian Economy

Indian economy is the fourth largest economy in the world (nominal GDP). Being one of the top listed countries, in terms of industrialization and economic growth, India's national GDP has witnessed a growth rate of 7.6% in the 2025–2026 financial year. Nominal GDP is estimated to grow at 8.0% in FY 2025-26. Even though the rate of growth has been sustainable and comparatively stable, there are still signs of backwardness.

Features of a Developed Economy :

1. High National Income, 2. High Per Capita Income,
3. High Standard of Living, 4. Full Employment of Resources,
5. Dominance of Industrial Sector, 6. High Level of Technology,
7. High Industrialization, 8. High Consumption Level,
9. High Level of Urbanisation, 10. Smooth Economic Growth,
11. Social Equity, Gender Equality and Low Levels of Poverty,
12. Political Stability and Good Governance

Features of Indian Economy

India has a mixed economy	Indian economy is a typical example of mixed economy. This means both private and public sectors co-exist and function smoothly. On one side, some of the fundamental and heavy industrial units are being operated under the public sector, while, due to the liberalization of the economy, the private sector has gained importance. This makes it a perfect model for public – private partnership.
An emerging market	India has emerged as vibrant economy sustaining stable GDP growth rate even in the midst of global downtrend. This has attracted significant foreign capital through FDI and FII. India has a high potential for prospective growth. This also makes it an emerging market for the world.
Agriculture plays the key role	Agriculture being the maximum pursued occupation in India, it plays an important role in economy as well. Around 50% of the people in India depend upon agriculture for their livelihood. In fact, approx. 18% of our GDP today is contributed by the agricultural sector. Green revolution, ever green revolution and inventions in bio-technology have made India as a self sufficient and also surplus production country. The export of agricultural products such as fruits, vegetables, spices, vegetable oils, tobacco, animal skin, etc. also added to forex earning through international trading.
Emerging Economy	Emerging as a top economic giant among the world economy, India bags the fifth position in terms of nominal Gross Domestic Product (GDP) and third in terms of Purchasing Power Parity (PPP). As a result of rapid economic growth Indian economy has a place among the G20 countries.
Fast Growing Economy	India, the world's fourth-largest economy, has emerged as the fastest-growing major economy and is on track to become the world's third-largest economy with a projected GDP of \$7.3 trillion by 2030. India is projected to be world's fastest growing major economy (6.3% to 6.8% in 2025-26).
Fast growing Service Sector	The service sector, contributes a lion's share to the GDP of India. There has been a high rise growth in the technical sectors like Information Technology, BPO etc. These sectors have contributed immensely to the growth of the economy. These emerging service sectors have helped the country go global and helped in spreading its branches around the world.
Large Domestic Consumption	With the faster growth rate in the economy the standard of living has improved a lot. This in turn has resulted in rapid increase in domestic consumption in the country. The standard of living has considerably improved and life style has changed.
Rapid growth of Urban areas	Urbanization is a key ingredient of the growth of any economy. There has been a rapid growth of urban areas in India after independence. Improved connectivity in transport and communication, education and health have speeded up the pace of urbanization.
Stable macro economy	The Indian economy has been projected and considered as one of the most stable economies of the world. The 2014-15 Economic survey represents the Indian economy to be a "heaven of macroeconomic stability, resilience and optimism.
Demographic dividend	The human capital of India is young. This means that India is a pride owner of the maximum percentage of youth. The young population is not only motivated but skilled and trained enough to maximize the growth. Thus human capital plays a key role in maximizing the growth prospects in the country. Also, this has invited foreign investments to the country and outsourcing opportunities too.

Weakness of Indian Economy

Large Population	India stands second in terms of size of population next to China and our country is likely to overtake china in near future. Population growth rate of India is very high and this is always a hurdle to sustainable growth rate. The population growth rate in India is as high as 1.7 per thousand.
Inequality and poverty	There exists a huge economic disparity in the Indian economy. The proportion of income and assets owned by top 10% of Indians goes on increasing. This has led to an increase in the poverty level in the society and still a higher percentage of individuals are living Below Poverty Line (BPL). As a result of unequal distribution of income, the rich becomes richer and poor becomes poorer.
Increasing Prices of Essential Goods	Even though there has been a constant growth in the GDP and growth opportunities in the Indian economy, there have been steady increase in the price of essential goods. The continuous rise in prices erodes the purchasing power and adversely affects the poor people, whose income is not protected.
Weak Infrastructure	Even though there has been a gradual improvement in the infrastructural development in the past few decades, there is still a scarcity of the basic infrastructure like power, transport, storage etc.
Inadequate Employment generation	With growing youth population, there is a huge need of the employment opportunities. The growth in production is not accompanied by creation of job. Sometimes, the Indian economy is characterized by 'jobless growth'.
Outdated technology	The level of technology in agriculture and small scale industries is still outdated and obsolete.

Demographic trends in India

Scientific study of the characteristics of population is known as Demography. The various aspects of demographic trends in India are :

1. Size of population
2. Rate of growth
3. Birth and death rates
4. Density of population
5. Sex-ratio
6. Life-expectancy at birth
7. Literacy ratio

a. Size of Population

Census Year	Population (in crores)	Average annual growth rate
1901	23.84	—
1911	25.21	0.56
1921	25.13	– 0.03
1931	27.90	1.04
1941	31.87	1.33
1951	36.11	1.25
1961	43.92	1.96
1971	54.81	2.20
1981	68.33	2.22
1991	84.33	2.16
2001	102.70	1.97
2011	121.02	1.66

As per the United Nation database, India's current 1.41 billion population surpassed China in 2023. It is

also expected to hit 1.5 billion by 2030 and 1.78 billion by 2050.

India has only about 2.4% of the world's geographical area and contributes less than 1.2% of the world's income, but accommodates about 17.5% of the world's population. In other words, every 6th person in the world is an Indian. Infact, the combined population of just two states namely, Uttarpradesh and Maharashtra is more than the population of United States of America, the third most populous country of the world. Some of the states in India have larger population than many countries in the world.

The negative growth during 1911-21 was due to rapid and frequent occurrence of epidemics like cholera, plague and influenza and also famines. The year 1921 is known as the '**Year of Great Divide**' for India's population as population starts increasing.

During 1951, population growth rate has come down from 1.33% to 1.25%. Hence it is known as '**Year of Small divide**'.

In 1961, population of India started increasing at the rate of 1.96% i.e, 2%. Hence 1961 is known as '**Year of Population Explosion**'. In the year 2001, the Population of India crossed one billion (100 crore) mark.

The 2011 census reveals growth of youth population which is described as 'demographic transition'.

b. Birth rate and death rate

★ **Crude Birth rate** : It refers to the number of births per thousand of population.

★ **Crude Death rate** : It refers to the number of deaths per thousand of population

★ Crude birth and death rates of India during various years

GENERAL SCIENCE

Scientific Knowledge and Scientific Temper

Power of Reasoning

Rote Learning vs Conceptual Learning

Science as a Tool to Understand the Past, Present, and Future

PHYSICS

- » Nature of Universe
- » Measurement of Physical Quantities
- » General Scientific Laws
- » Everyday Application of the Science
- » Nuclear Physics in our Daily Life

CHEMISTRY

- » Elements and Compounds
- » Acids, Bases and Salts
- » Periodic Classification of Elements
- » Carbon and its Compounds
- » Chemistry in Everyday Life
- » Metallurgy

BIOLOGY

- » Main Concepts of Life Science
- » Classification of Living Organisms
- » Evolution
- » Genetics and Heredity
- » Physiology
- » Nutrition, Health and Human Diseases
- » Environment and Ecology

GENERAL SCIENCE

Scientific Knowledge and Scientific Temper

Introduction

- **Scientific Knowledge:** Refers to the systematic understanding of the natural and social world through observation, experimentation, and logical reasoning. It is based on empirical evidence and is constantly evolving.
- **Scientific Temper:** A mindset or attitude that emphasizes rationality, logic, and evidence-based thinking. It involves questioning, critical thinking, and a willingness to change beliefs based on new evidence.

Scientific Knowledge

- **Definition:** The body of knowledge obtained through scientific methods, which includes facts, theories, laws, and principles.
- **Characteristics:**
 - **Empirical:** Based on observable and measurable evidence.
 - **Systematic:** Follows a structured and methodical approach.
 - **Objective:** Aims to be free from personal biases.
 - **Cumulative:** Builds upon previous knowledge.
 - **Falsifiable:** Can be tested and potentially disproven.
- **Components:**
 - **Facts:** Observable phenomena.
 - **Hypotheses:** Proposed explanations for phenomena.
 - **Theories:** Well-substantiated explanations of aspects of the natural world.
 - **Laws:** Statements that describe consistent patterns in nature.

The Scientific Method

Scientific knowledge is obtained through a structured approach known as the scientific method, which consists of:

1. Observation – Identifying a phenomenon or problem.
2. Formulating a Question – Asking "why" or "how" the phenomenon occurs.
3. Developing a Hypothesis – Making an educated guess based on existing knowledge.
4. Conducting Experiments – Testing the hypothesis through controlled experiments.
5. Analyzing Data – Interpreting experimental results.
6. Drawing Conclusions – Confirming or rejecting the hypothesis.
7. Formulating Theories or Laws – Establishing principles that explain the phenomenon.

Examples of Scientific Knowledge

- The Law of Gravitation by Newton explains how objects attract each other.

- The Germ Theory of Disease by Pasteur and Koch describes how microorganisms cause diseases.
- The Theory of Evolution by Darwin explains the process of natural selection.
- The Periodic Table classifies chemical elements based on properties.

Importance of Scientific Knowledge

Scientific knowledge has transformed society in multiple ways:

- **Technological Advancement** – Innovations like electricity, the internet, and artificial intelligence.
- **Medical Breakthroughs** – Vaccines, antibiotics, and surgical techniques save lives.
- **Environmental Conservation** – Understanding climate change, renewable energy, and biodiversity.
- **Space Exploration** – Discoveries about planets, black holes, and space travel.
- **Economic Growth** – Science-based industries such as pharmaceuticals, IT, and agriculture boost economies.

Scientific Temper

Definition

Scientific temper refers to a rational mindset that promotes questioning, reasoning, and evidence-based decision-making. It discourages superstition, blind faith, and irrational beliefs.

The term Scientific Temper was first introduced by Jawaharlal Nehru in his book "The Discovery of India", where he emphasized the role of science in shaping modern India.

Characteristics of Scientific Temper

- Rational Thinking – Accepting ideas based on logic, not myths.
- Curiosity – A continuous desire to learn and explore.
- Skepticism – Not believing in claims without sufficient evidence.
- Open-Mindedness – Willingness to accept new facts and ideas.
- Questioning Attitude – Challenging traditional beliefs that lack scientific proof.
- Ethical and Objective Approach – Making decisions based on facts rather than emotions.

Role of Scientific Temper in Society

- Eliminates Superstitions – Encourages people to question myths and blind faith.
- Encourages Logical Thinking – Helps in making informed decisions in daily life.
- Promotes Social Reform – Challenges social evils like caste discrimination and gender bias.
- Strengthens Democracy – Helps citizens make rational choices in elections and governance.
- Aids in Economic and Technological Development – Leads to innovation and progress.

Examples of Scientific Temper in Daily Life

- Choosing modern medicine over faith healing or black magic.
- Using fact-checking to verify information before sharing it on social media.
- Relying on scientific farming methods rather than astrological predictions for agriculture.
- Understanding that eclipses are celestial events and not bad omens.

Constitutional and Legal Provisions for Scientific Temper in India

1. Article 51A(h) of the Indian Constitution – It is a Fundamental Duty of every citizen to develop scientific temper, humanism, and the spirit of inquiry.
2. Right to Education (Article 21A) – Provides access to scientific education for all children.
3. Drugs and Magic Remedies Act (1954) – Bans misleading advertisements promoting magical cures.
4. Consumer Protection Act (2019) – Protects consumers from fraudulent claims in medicine and technology.
5. National Science and Technology Policy – Encourages research and technological innovation in India.

Relationship Between Scientific Knowledge and Scientific Temper

- **Interdependence:** Scientific temper is essential for the development of scientific knowledge, and scientific knowledge reinforces scientific temper.
- **Mutual Reinforcement:** Scientific temper drives the pursuit of scientific knowledge, and the acquisition of scientific knowledge enhances scientific temper.
- **Role in Society:** Together, they contribute to the progress of society by promoting rational thinking, technological advancement, and evidence-based policies.

Challenges to Scientific Temper in India

Despite constitutional provisions, scientific temper faces several challenges:

1. Superstitions and Blind Beliefs – Practices like astrology, black magic, and miracle cures persist.
2. Misinformation and Fake News – Social media spreads unverified and false information.
3. Lack of Awareness and Education – Many people do not receive proper science education.
4. Reluctance to Change – Traditional beliefs and customs prevent the acceptance of scientific ideas.
5. Political and Religious Influence – Some groups promote anti-scientific narratives for personal gain.

Ways to Promote Scientific Temper

- Strengthening Science Education – Making science education more practical and interactive in schools.
- Encouraging Critical Thinking – Teaching students how to analyze and question information.
- Media Awareness – Promoting responsible journalism that highlights scientific facts.
- Government Initiatives – Organizing science fairs, research programs, and public awareness campaigns.
- Involvement of Scientists – Encouraging scientists to engage with the public and explain complex concepts.

Scientific knowledge and scientific temper are the backbones of a progressive, rational, and developed society. While scientific knowledge provides facts and innovations, scientific temper ensures that these advancements are applied logically and ethically.

Encouraging scientific temper will help India eliminate superstitions, adopt modern technologies, and ensure sustainable development. Thus, developing a scientifically aware and rational society is essential for India's future.

Power of Reasoning

Introduction

The Power of Reasoning refers to the ability to think logically, analyze situations, and draw conclusions based on facts and evidence rather than emotions or blind faith. It is an essential cognitive skill that helps individuals make rational decisions, solve problems, and understand complex concepts.

Reasoning plays a crucial role in science, philosophy, law, and daily life by enabling people to distinguish between truth and falsehood, detect fallacies, and develop critical thinking.

Meaning and Definition of Reasoning

- Reasoning is the mental process of drawing conclusions from premises or facts using logic.
- It involves evaluating evidence, identifying patterns, and applying logical principles.
- Example: If all humans are mortal and Socrates is a human, then Socrates is mortal (a logical deduction).

Definitions by Scholars

- Aristotle – "Reasoning is an instrument of knowledge that helps in discovering truth."
- John Dewey – "Reasoning is the process of thinking in which thought proceeds in a linear, logical manner."

Types of Reasoning

1. Deductive Reasoning

- Involves drawing specific conclusions from general principles.
- Example:
 - Premise 1: All mammals have lungs.
 - Premise 2: A whale is a mammal.
 - Conclusion: A whale has lungs.

Characteristics:

- Moves from general to specific.
- If the premises are true, the conclusion must be true.

2. Inductive Reasoning

- Involves drawing general conclusions from specific observations.
- Example:
 - Observation: The sun has risen in the east every day.
 - Conclusion: The sun always rises in the east.

Characteristics:

- Moves from specific to general.
- The conclusion is probable but not always certain.

3. Abductive Reasoning

- Involves making the best possible explanation based on incomplete evidence.
- Example: If a person is sneezing, coughing, and has a fever, we may infer they have the flu.

Characteristics:

- Commonly used in detective work and medical diagnosis.
- Based on inference and probability.

4. Analogical Reasoning

- Comparing two different things based on similarities.
- Example: The structure of an atom is like a solar system (electrons revolve around the nucleus like planets orbit the sun).

Characteristics:

- Helps in understanding complex ideas.
- Used in legal arguments and scientific models.

5. Logical Reasoning

- The process of using formal rules of logic to reach conclusions.
- Example:
 - Statement: If it rains, the ground will be wet.
 - Observation: It rained.
 - Conclusion: The ground is wet.

Components of Reasoning

- **Logic:** The framework for constructing valid arguments.
 - **Propositional Logic:** Deals with simple declarative propositions.
 - **Predicate Logic:** Involves predicates and quantifiers.
- **Critical Thinking:** The objective analysis and evaluation of facts to form a judgment.
 - **Skills:** Analysis, interpretation, inference, explanation, evaluation.
- **Problem-Solving:** The process of finding solutions to difficult or complex issues.
 - **Steps:** Identify the problem, generate possible solutions, evaluate and select the best solution, implement and assess the solution.

Cognitive Processes Involved in Reasoning

- **Perception:** The process of recognizing and interpreting sensory information.
- **Memory:** The retention and recall of information.
- **Attention:** The focus of cognitive resources on specific stimuli.
- **Language:** The use of symbols and rules to communicate and reason.

Factors Affecting Reasoning

- **Cognitive Biases:** Systematic patterns of deviation from norm or rationality in judgment.
 - **Examples:** Confirmation bias, availability heuristic, anchoring bias.
- **Emotions:** Can both positively and negatively influence reasoning.
- **Knowledge and Experience:** Greater knowledge and experience can enhance reasoning abilities.
- **Cultural Influences:** Cultural background can shape reasoning styles and preferences.

Importance of Reasoning

1. Enhances Critical Thinking

- Helps individuals analyze information logically rather than accepting things blindly.
- Encourages questioning and skepticism.

2. Aids in Decision-Making

- Enables people to weigh pros and cons before making choices.
- Used in business, law, politics, and everyday life.

3. Essential for Scientific Discovery

- Scientists use reasoning to form hypotheses, conduct experiments, and validate theories.
- Example: Isaac Newton reasoned that an invisible force (gravity) causes apples to fall.

4. Strengthens Problem-Solving Skills

- Helps in solving puzzles, mathematical problems, and strategic challenges.
- Used in programming, engineering, and artificial intelligence.

5. Helps in Legal and Ethical Judgments

- Courts use logical reasoning to interpret laws and deliver justice.
- Ethical reasoning helps in moral decision-making.

Applications of Reasoning in Daily Life

1. Medical Diagnosis – Doctors use reasoning to identify diseases based on symptoms.
2. Crime Investigation – Detectives use logical reasoning to solve cases.
3. Education – Helps students understand subjects like mathematics, science, and philosophy.
4. Politics – Used to form policies and arguments in debates.
5. Technology Development – Engineers use reasoning to innovate new technologies.