

History of India

Ancient India

Pre-Historic Period

Palaeolithic Period in this period, man barely managed to gather his food and lived on hunting. Palaeolithic period is divided into three phases.

They are

- I. Lower Palaeolithic
- II. Middle Paleolithic
- III. Upper Paleolithic

- **Mesolithic Period** Domestication of animals (dogs) began and characteristic tools used were called microliths.
- **Neolithic Period** Neolithic People knew about making fire. An important site of this age is Burzahom, which means 'the place of birch'.
- **Chalcolithic Period** Use of copper and stone made tools. According to radiocarbon dating, Indus Valley Civilization spread from the year 2500-1750 BC.

Indus Valley Civilization

- **Town Planning** Systematic town planning was based on grid system; burnt bricks made houses; well managed drainage system; fortified citadel; highly urbanized; absence of iron implements. The towns were divided into 2 parts; Upper Part or Citadel and Lower Part.
- **Boundaries** North-Manda (J&K); South- Daimabad (Maharashtra); East- Alamgirput; West-Sutkagendor.

Site	Discovery/Finding
Harappa	Situated on river Ravi in Montgomery district of Punjab (Pakistan). It was excavated by Daya Ram Sahni in 1921-23.
Mohenjodaro (Mound of Dead)	Situated on River Indus in Larkana district of Sind (Pak). It was excavated by RD Bannerji in 1922. The main building includes the Great Bath, the Great Granary, the Collegiate Building and the Assembly Hall.
Kalibangan (Black Bangles) (Rajasthan)	Discovered by BB Lal (1953); situated on Ghaggar river, a ploughed field; a wooden furrow; seven fire-altars; bones of camel; and evidence of two types of burials namely-circular grave and rectangular grave.
Lothal (Gujarat)	Discovered by SR Rao (1954); situated on river Bhagava A

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General science

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Physics

Physics is the study of nature and its laws. The word physics has been derived from a Greek word physics which means nature. Physics is one of the oldest academic disciplines, perhaps the oldest through its inclusion of astronomy.

Units

Measurement of any physical quantity involves comparison with a certain basic arbitrarily chosen and widely accepted reference standard called unit.

Quantity	Unit(SI)
Length	Meter
Time	Second
Mass	Kilogram
Area	Square metre
Volume	Cubic metre
Velocity	Metre/second
Acceleration	Metre/second square
Density	Kilogram/metre cube
Momentum	Kilogram metre/second
Work	Joule
Energy	Joule
Force	Newton
Pressure	Pascal or Newton/sq. metre
Frequency	Hertz
Power	Watt

Quantity	Unit(SI)
Weight	Newton or kilogram
Impulse	<i>Newton-second</i>
Heat	Joule
Temperature	Kelvin
Absolute temperature	Kelvin
Resistance	Ohm
Electric current	Ampere
Electromotive force	Volt
Electric energy	Kilo watt hour
Electric power	Kilo watt or watt
Charge	Coulomb
Luminous flux	Candela
Intensity of sound	Decibel
Power of lens	Diopetre
Depth of sea	Fathom

Scalar Quantities

Physical quantities which have magnitude only and no direction are called scalar quantities. e.g. Mass, speed, volume, work, time, power, energy etc.

Vector Quantities

Physical quantities which have magnitude and direction both and which obey triangle law are called vector quantities. e.g., displacement, velocity, acceleration, force, momentum, torque etc.

Displacement

- The difference between the final and the initial position of an object is called displacement. It may be positive, negative or zero.
- It is a vector quantity which has both magnitude and direction. Its unit is also metre.

Speed

- Speed is a distance covered by a moving body in unit time.
- It is a scalar quantity. It is always equal to or greater than magnitude of the velocity.

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Chemistry

Matter

- Matter is anything which has mass and EID or occupies space.
- It exists in five phases, viz ,solid, liquid, gas, plasma, Boss Einstein condensate. Out of which the former three are commonly seen.

Solids

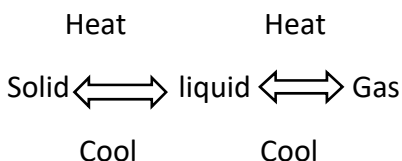
- They have definite volume and shape
- They are incompressible and have strongest intermolecular interaction.
- They are very dense as compared to liquid and gas Examples are wood, stone iron.

Liquids

- These have definite volume but what no definite shape. They take the shape of the vessel in which these are kept.
- They can flow so considered as fluids.
Examples of liquids are milk, water, mercury etc.

Gases

- These have neither definite volume no definite shape. These take the shape and volume of the container in which these are filled.
- These are highly compressible.
- These can flow so considered as fluids.
Examples are air, oxygen, nitrogen.
- Solid, liquid and gases are inter convertible by changing the conditions of temperature and pressure



Melting point

- It is temperature at which a substance converts from its solid state to liquid state.
Melting point of ice is 0°C.
- Melting point decreases in the presence of impurity.

Boiling point

- It is a temperature at which vapor pressure of a liquid become equal to atmosphere of a liquid becomes equal to atmospheric pressure.
- It is different at different places.
- Boiling point of water at normal conditions is 100°C.

Smart Facts

- It usually decreases at high altitudes, that's why at high altitudes, that boiling points of water is less than hundred degree Celsius and more time is required to cook a food.
- Boiling point of water in pressure cooker is high due to high pressure and hence less time is required to cook the food.
- Boiling point increase in the presence of impurity

Evaporation

- It is the process of conversion of a liquid into vapors at any temperature below its boiling point.
- It increases with increase in surface area and temperature.
- It produces cooling. That's why we feel cool when some nail polish remover for spirit is kept on our palm.

Sublimation

- It is the process of transition of a substance from the solid phase to the gas phase without passing through an intermediate liquid phase.
- It is used to separate a sublimate (substance undergoing sublimation like camphor, naphthalene, ammonium chloride etc.) from non-sublimate.

Atom

- It is the smallest partition of matter that takes part in chemical reaction. (by Dalton's atomic theory)
- It can neither be created nor destroyed (law of conservation of mass given by Lavoisier).
- It does not exist in Free State and has a fixed atomic mass e.g. iron, (Fe), gold (Au), silver Ag etc.

Molecules

- These are the smallest part of the matter that exists in Free State.
- They are formed by the joining of two or more atoms in fixed ratio (law of multiple proportions given by Dalton).

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Biology

- Biology is a natural science concerned with the study of life and living organisms, plants and animals
- Study of plant is called **Botany** and study of animal is called **Zoology**. Zoology and botany are collectively called biology the term **Biology** was coined by **Lamarck** and **Treviranus**.
- The scientist who gave his thought for the first time about the life of plants and animals was **Aristotle**. That's why he is known as the *Father of biology*. He is also known as the *Father of Zoology*.
- **Theophrastus** is known as *Father of Botany*.

The cell

- The cell is the basic structural and functional unit of all non living organism. It is the smallest unit of life and is often called the building block of life.
- The branch of Biology which deals with the study of cell, is called **Cytology**.
- **Robert Hooke** coined the term cell when he saw honey comb-like structure in the section of cork. However, he only discovered **cell wall**.
- The first living cell was discovered by **Leeuwenhoek**.

Know It!

- The largest known cells are unfertilized **ostrich egg** shells (size 6 inch diameter).
- The smallest cell is of **PPLO** (mycoplasma gallisepticum-size(0.1-0.3 m).
- Human Nerve cells is the **longest animal cell**.
- Largest acellular plant *Acetabularia* is 10 cm and animal Amoeba, is 1mm.
- The largest human cell is the **female ovum** and the smallest human cell is the **red blood cell**.

Types of cells

These are two types

1. **Prokaryotic cells** -These are primitives cell, lacking a nucleus and most of the other cell organelles, e.g. bacteria cell.
2. **Eukaryotic cells** - These have nucleus and membrane bound cell organelles. These are present in unicellular and multicellular plant and animal cells.

Cell organelles, their Discovery and functions

Cell organelle	Discoverer	Function
Mitochondria	Koiker (1880), named by C Benda	Powerhouse of cell
Chloroplast	Schimper (1885)	Photosynthesis
Endoplasmic reticulum	Porter (1945)	Protein packaging, detoxification and steroid synthesis
Golgi complex	Camillo Golgi (1898)	Glycosylation of lipids and proteins
Ribosome	Palade (1955) in animal and Robinson (1953) in plants	Protein synthesis
Lysosome	De Duve (1955)	Digestion of extracellular material suicidal bags
Centrosome	T Boveri (1888)	Organisation of spindle fibre
Nucleus	Robert Brown (1831)	Control synthesis
Nucleolus	Fontana (1781)	Ribosome synthesis
Chromosome	Waldeyer (1888)	Inheritance of characters from parent to offspring

Deoxyribonucleic Acid (DNA)

- It is a long polymer made from repeating units called **nucleotides**.
- Each nucleotide consists of a nucleoside (i.e., nitrogenous base and deoxyribose sugar) and a phosphate group, joined together by ester bonds.
- It has four bases, i.e., adenine, guanine, cytosine and thymine.
- Adenine and guanine are the purine bases; cytosine and thymine are pyrimidine bases.

DNA was discovered by James D Watson and Francis Crick, who got noble prize for this discovery

Ribonucleic Acid (RNA)

- It is also made up of a long chain of nucleotides.
- Each nucleotide consists of a nitrogenous base, a ribose sugar and a phosphate group.
- It contains uracil in place of thymine.

RNA is of three types

1. mRNA (messenger RNA)
2. rRNA (ribosomal RNA)
3. tRNA (transfer RNA)

- These three take part in protein synthesis.

INDIAN POLITY

Framing of the Indian Constitution

- The idea to have a Constitution was given by **MN ROY** (political philosopher). The Constitution was framed by the **Constituent Assembly** of India, set up in December 1946, in accordance with the **Cabinet Mission Plan** under the chairmanship of **SachidanandSinha**, initially. On the demise of SachidanandSinha, **DrRajendra Prasad** was elected as the **President**. **BN Rao** was appointed as the Constitutional advisor.
- The total membership of constituent assembly was 389, where 93 were representatives from the Indian States and others from British India. The **Chairman** of the drafting committee was **Dr. BR Ambedkar**.

Enactment of the Constitution

- The Constitution, adopted on November 8, 1949, contained **395** Articles and **8** schedules. Presently, it has **444** Articles and **12** schedules. The constituent assembly took **2 years, 11 months and 18 days** to complete the Constitution.
- Some of the provisions as those related to citizenship, elections, provisional parliament etc, were given immediate effect. The Constitution came into force on **26 January 1950**, known as **Republic day of India**.
- The Constitution was delayed till 26 January because, in 1929, on this day Indian national congress demanded **PoornaSwaraj** in Lahore session under J L Nehru. The constituent assembly adopted our National flag on **July 22, 1947**. It was designed by **PingaliVenkiah**.

Preamble

LEARN WHILE ENJOYING

- It is the preface or the introduction of the Constitution. It is not an integral part of the Constitution. The interpretation of the Constitution is based on the spirit of the preamble.
- The idea of the preamble was borrowed from the Constitution of USA. The words, **Socialist, Secular** and **Integrity** were added by the **42nd Amendment in 1976**.

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The Preamble States

"WE THE PEOPLE OF INDIA, have solemnly resolved to constitute India into a SOVEREIGN, SOCIALIST, SECULAR, DEMOCRATIC, and REPUBLIC and to secure to all its citizens: JUSTICE social, economic and political; LIBERTY of thought, expression, belief, faith and worship; EQUALITY of status and of opportunity; and to promote among them all; FRATERNITY assuring the dignity of the individual and the unity and integrity of the nation. IN OUR CONSTITUENT ASSEMBLY, this 26th day of November, 1949, do HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION."

Main Features

- Bulkiest Constitution of the world
- Written Constitution
- Combination of Rigidity and Flexibility
- Parliamentary system of Government
- Federal system with a unitary bias
- Fundamental rights and duties
- Directive principles of state policy
- Independent judiciary
- Single citizenship

Sources of the Indian Constitution

UK	Nominal head – President (like queen) Cabinet systems of ministers Post of Prime Minister Parliamentary type of Government Bicameral parliament Lower house more powerful Council of ministers responsible to the lower house Speaker in Lok Sabha Single citizenship Law making procedures
USA	Written Constitution Vice president as the Ex officio chairman of upper house Fundamental rights Supreme Court Provision of States Independence of judiciary and judicial review Preamble

Geography

Glimpse of Natural Facts

“Geography is description of the Earth. The term geography first coined by Earth osthene, a Greek Scholar (276-194 BC). The word has been derived from Greek Language Geo (Earth) and Graphos (description). Geography is the science that studies the land, pastures, inhabitants and phenomena of Earth. Geography is defined as the description of the Earth as the abode of human beings. Geography, thus is concerned with the study of Nature and human interaction as an interactions as an integrated define whole”

Solar System

- Our galaxy is **Milky Way Galaxy** (or the **Akash Ganga**). It is spiral in shape. Nearest galaxy to ours is Andromeda.
- Our solar system consists of star (sun), 8 planets and countless fragments of left-over are called **asteroids, mentors, comets** and **satellites** of planets.

The Sun

The most important and centre member of our Solar System.

Exam Analysis

Sun Statistics

- **Diameter** 1391980 km.
- **Temperature** 6000⁰ C at surface.
- **Distance from Earth** 149.8 million km
- Made up of hydrogen – 70%, Helium-28%, and others 2.5%.
- Sun is brightening due to **nuclear fusion** is taking place.
- Sun's glowing surface is called **photosphere** above the photosphere is the **chromospheres**
- Sun revolves in elliptical shape. It takes 250 million years to complete one revolution; it is also known as **cosmic year**.
- The glowing surface of the Sun that we see is called the photosphere. Above the photosphere are coloured chromospheres and beyond it is magnificent Corona, which is visible during eclipses.
- The sun is continuously emitting streams of protons in all direction either as persistent spiral streams called solar winds or as bouts of incandescent material called solar Flares.
- The sun is constituents particle of solar wind are trapped by the Earth's magnetic field and enters the Earth's upper atmosphere as aurora displays, described as Aurora borealis in the northern hemisphere and Aurora Australia in southern hemisphere.
- The planet travels with sun through millions of stars inn ours galaxy at a speed of about 7000 km per hour.
- The sun is about 1580 million km away from the earth

Year	Q. Nos.
2015	7
2014	6
2013	7
2012	8
2011	7

- Light (at the speed of 300000 km/second) takes about the 8.5 minutes to reach the earth from sun.

Sunspots and Solar Activity

Many photographs of the sun had taken in white light showing many dark spots which are called sunspots. It appears dark by contrast with the solar surface because of having a somewhat lower temperature of about 4500 K. It is characterized by intense magnetic fields.

Planets

- A planet is a heavenly body that moves in an orbit around a star, such as the sun.
- In our solar system there are eight planets.

Points to remember

Inner planets or **Terrestrial planets** Mercury, Venus, Earth, Mars.

Outer planets or **Jovian planets** Jupiter, Saturn, Uranus, Neptune.

All planets move in orbits that are very slightly elliptical.

Only five planets Mercury, Venus, Mars, Jupiter and Saturn-are visible with the naked eyes.

Mercury

- Revolution 88 days (Fastest revolution in solar system)
- Maximum diurnal range of temperature. Its days are scorching hot and nights are frigid.
- It has no atmosphere and no satellite.

Venus

- Also called Earth's twin, because it is slightly smaller than Earth (500 km less in diameter).
- Popularly known as Evening star and Morning star.
- Brightest planet (because of 70% albedo, the reflecting power).
- Closest planet to earth.
- It is the hottest planet in solar system. It is because of the Green house effect as its atmosphere contains 90-95% carbon dioxide.
- Rotates (clockwise) 275 days (slowest in solar system)
- No satellite.

Mars

- Also called 'Red Planet'.
- Rotation: 24.6 hours.
- Revolutions: 687 days
- It has 2 satellites Phobos and Deimos.

Big Bang Theory

- The big bang theory was postulated in 1950 and 1960. It explains the origin of Universe.
- It says that all the matter in the universe was originally a concentrated lump called primeval atom.

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Indian Economy

Outline of Indian Economy

Nature

- **Mixed Economy** Existence of both public and private sectors. This term was coined by **JM Keynes**.
- **Agrarian Economy** Even after six-decades of independence 58% of the work force of India is still agriculturist and its contribution to **GNP** is 17.4 % in 2014-15.

Features

- (i) Slow growth of national and per capita income.
- (ii) Capital deficiency and low rate of capital formation, hence low rate investment, low production, etc; poor quality of human capital.
- (iii) Over-dependence on agriculture along with low productivity in agriculture; heavy population pressure.
- (iv) Unequal distribution of income and wealth.
- (v) Mass poverty, chronic inflation and chronic unemployment.

Classification

- According to the **World Development Report** (2014), sub-titled **Gender Equity and Development**, India with its per capita income of US \$ 1570 is placed in lower middle income countries in 2010.
- Even on **PPP** (Purchasing Power Parity) basis India with US \$ 5350 is placed in middle income countries in 2010.
- India has a share of 17.4% in world population but accounts for only 2.3 % of world GNI on exchange rate basis.

Socio-Economic Indicators

- Per capita daily intake calorie is 2496 (in 1999).
- Poverty level more than 37% (Tendulkar Committee).
- With **HDI** value of 0.624, India ranked 134/187, and hence has a medium Human Development (HDR 2016).
- Inequality in India, in terms of Gini co-efficient of 0.36 is huge.
- Illiteracy more than one-fourth of population.