

*Thoroughly Revised  
& Improved Edition*

# General Studies

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**SSC | Railways | Banking | PSUs | UPSC**  
State Public Services & State Engineering Exams

*by*

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# Preface

This comprehensive text book on General Studies explains the subject matter in a brief and simple style. The authors are very well aware of the requirements of examinations conducted by UPSC, SSC, State Public Service Examinations, Railways Examinations and Public Sector Examinations. This book has been very well targeted covering all the aspects of subject matter required for various examinations.

Since last one decade, authors have closely studied the marks of various candidates appeared & selected in government sectors and other examinations and found that those who have scored below average or poor marks in General Studies section, are either not able to get selection or get poor ranks, hence it has been realized that general studies section should be given significant importance.

There is no good book available to the readers in the market, which covers all the aspects of Geography, Polity, History, Life Science, Economy, General knowledge, General Science, Environment, Basics of Computer Applications and Science & Technology that may satisfy the requirements of various competitive examinations conducted for aspirants. In this edition authors have put sincere efforts to satisfy all the requirements of various examinations. The book is thoroughly revised and updated. Authors have tried to incorporate previous year questions of UPSC, SSC, State Public Service Examinations, Railways examinations and Public Sector Examinations.

The authors feel that this book will be sufficient and highly useful for all the competitive examinations conducted for graduates from every discipline.

Any suggestions from the readers for the improvement of the book are most welcome.

**B. Singh  
A.P. Singh**

# General Studies

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# Basic General Knowledge of India & World

## NATIONAL SYMBOLS

### National Flag

- The National Flag of India is a horizontal tricolour of deep saffron (Kesaria) at the top, white in the middle and dark green at the bottom in equal proportion. The ratio of width of the flag to its length is 2:3. In the centre of the white band a navy-blue wheel is located which represents the Chakra.
- It was adopted by Constituent Assembly of India on July 22, 1947.
- A tricolour flag was first accepted by the Indian National Congress in 1931, having Charkha in place of today's Chakra.
- The horizontal colour strip of deep Saffron at top represents courage, sacrifice and renunciation, White at middle shows truth and purity in thoughts and dark Green at the bottom is the symbol of life abundance and prosperity.
- A wheel (Chakra) in centre of the white strip is the symbol of progress and movement. It has 24 spokes.
- Supreme Court declared the right to hoist flag as a Fundamental Right under Article 19 (i) (a) of the Constitution in 2002. Flag hoisting in India is regulated by Flag Code of India, 2002.
- The Flag was designed by **Pingali Venkayya** and first time, the flag was hoisted by **Sacchindra Prasad Bose** in 1906 in Calcutta and later on in the year 1907 an another tricolour flag was unfurled by **Madam Bhikaji Cama** in Stuttgart, Germany.
- The first flag committee was headed by **Dr. Rajendra Prasad**.

### National Emblem

- The National Emblem of India is an adaptation from the Sarnath Lion Capital of Ashoka. It was adopted by the Government of India on January 26, 1950.
- In this emblem, only three lions are visible, the fourth lion being hidden from view. The wheel appears in relief in the centre of the abacus with a **bull** on **right** and a **horse** on **left**. The bell shaped lotus (as in the original) has been omitted. The other animals present in the emblem are an Elephant and a Lion.
- The words *Satyameva Jayate* are inscribed below the abacus in Devanagri script. These words are taken from *Mundaka Upanishad*.

### National Anthem

- The song *Jana gana mana* is the National Anthem of India which was composed by **Rabindra Nath Tagore**, originally in Bengali.
- It was adopted by Constituent Assembly on January 24, 1950 in its Hindi version.
- The song Jana gana mana was first published in January, 1912 under the title '**Bharat Vidhata**' in Tattva Bodhini Patrika.
- The song was translated in English in 1919 with the title "**Morning Song of India**".
- It was first sung at the Calcutta Session of Congress on December 27, 1911.
- Playing time of full version of National Anthem is 52 seconds while it is 20 seconds for first and last lines of the stanza.

## National Song

- “*Vande Mataram*” is the National song of India, which was composed by **Bankim Chandra Chatterjee**, originally in Sanskrit.
- It was adopted on January 24, 1950, providing it equal status with National Anthem *Jana gana mana*.
- It is taken from his novel **Anand Math** published in 1882. Its English translation was done by Sri Aurobindo.
- It was sung for the first time at the Congress Session of 1896.

## National Calendar

- National Calendar is based on Saka Era (began on 78 A.D.) with Chaitra as its first month and Phalgun as its last month with a normal year of 365 days adopted from March 22, 1957 along with the Gregorian Calendar.
- First day of Chaitra normally falls on March 22 and on March 21 in leap year.

## National Animal

- The Tiger (*Panthera Tigris*) is the National Animal of India. It has a thick yellow coat of fur with dark stripes.
- Lion was the National Animal of India till 1972. Later on, it was replaced by Tiger.

### Other Indian National Symbols

National Bird	Peacock ( <i>Pavo Cristatus</i> )
National Flower	Lotus ( <i>Nelumbo Nucifera Gaertn</i> )
National River	Ganga
National Tree	Banyan ( <i>Ficus Benghalensis</i> )
National Fruit	Mango ( <i>Mangifera Indica</i> )
National Aquatic Animal	Ganges River Dolphin
National Heritage Animal	Elephant
National Game (De-facto)	Hockey

### National Emblems of Countries

Country	Emblem
India	Sarnath Lion Capital
Australia	Kangaroo
Bangladesh	Water Lily
Canada	White Lily
France	Lily
Germany	Corn flower
Iran	Rose
Italy	White Lily
Japan	Chrysanthemum
Pakistan	Crescent
Spain	Eagle
Sri Lanka	Sword & Lion
Russia	Sickle and Hammer
Norway	Lion
United Kingdom	Rose
USA	Golden Rod

### Significance of Signs and Symbols

Symbol	Meaning
Red triangle	Family planning
Red cross	Hospital/Ambulance
Red light	Danger/Emergency
Green light	Line clear signal
Olive branch	Peace
Black arm-band	Sign of mourning/protest
Dove	Peace
Black flag	Demonstration of protest
Red flag	Sign of danger, revolution
Yellow Flag	Displayed by ship with infectious disease on board or ship in quarantine.
White Flag	Truce
Tricolour	National Flag of India

# 2

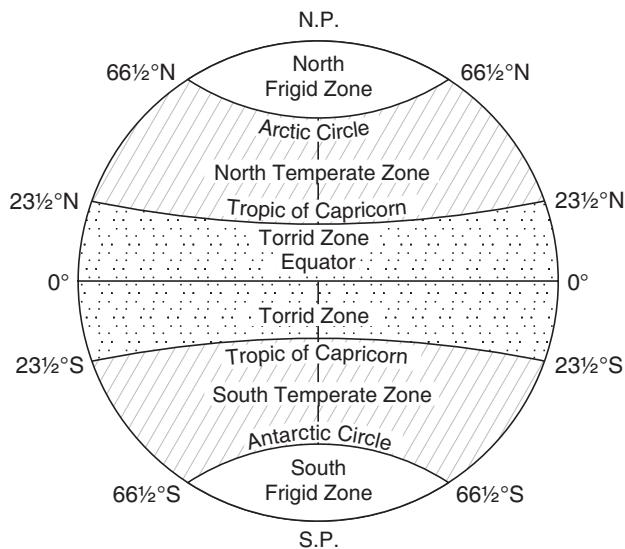
# GEOGRAPHY

## CHAPTER

### General Aspects of Geography

#### Latitude

- It is the angular distance of a point on the earth's surface, measured in degrees from the centre of the earth. It varies from 0 to 90° North and 0 to 90° South.
- Latitudes are circular lines which are parallel to the equator, which lies midway between the poles. Hence, these lines are called **parallels of latitude**. The latitudes are also called as temperature coordinates because with the increase in latitudinal distance towards the poles, the temperature reduces.

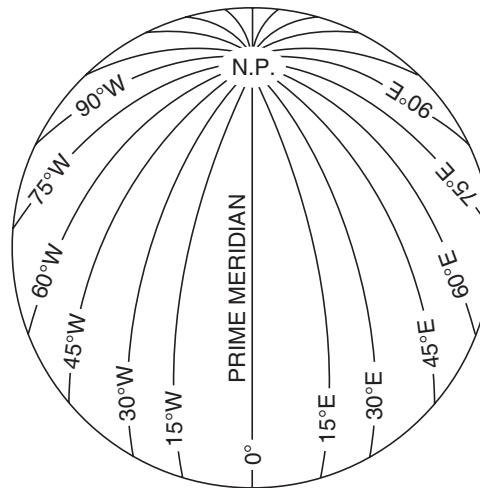


- The most important lines of latitude are the Equator (0°), the Tropic of Cancer (23½°N), the Tropic of Capricorn (23½°S), the Arctic Circle (66½°N) and the Antarctic Circle (66½°S).
- The midday sun is exactly overhead at least once a year on all latitudes in between the Tropic of Cancer and the Tropic of Capricorn. This area, therefore receives the maximum heat and is called the **Torrid Zone** (or Tropical Zone).

- The areas bounded by the Tropic of Cancer and the Arctic Circle in the northern hemisphere, and the Tropic of Capricorn and the Antarctic Circle in the southern hemisphere, have moderate temperature, hence called **Temperate Zones** (or Mild Zone).
- Areas bounded by the Arctic Circle and North Pole, and the Antarctic Circle and South pole are called **Frigid Zones**. These zones are very cold as the sun does not rise above the horizon.

#### Longitude

- It is an angular distance measured in degrees along the equator east or west of the Prime Meridian (0°). It varies from 0 to 180° E and 0 to 180° W. It is also called as time coordinates.
- Longitudes are also known as **Great circles** because it divides earth into two equal parts. Each longitude cuts each latitude at 90°.  
 $1^\circ = 4$  minute i.e.  $15^\circ = 1$  hour
- Meridians are a series of semicircles that run from pole to pole passing through the equator.



- The Prime Meridian is at  $0^{\circ}$  and is known as the **Greenwich line** as it passes through Greenwich near London, where the British Royal Observatory is located.
- Longitudes have one very important function i.e. they determine Local Time in relation to Greenwich Mean Time (GMT).
- Local Time is the time reckoned by the noon-sun at a given place and Standard Time is the Local Time of the Standard Meridian of a country.
- In India, the longitude of  $82\frac{1}{2}^{\circ}$  E is treated as the Standard Meridian. The Local Time at meridian is taken as the Standard Time for the whole country. It is known as the **Indian Standard Time** (IST).

### International Date Line

- It is an imaginary line drawn at  $180^{\circ}$  longitude, avoiding the continuous land parts.
- International Date Line passes through Arctic Ocean, Bering Strait, Pacific Ocean, Antarctica, Fiji, Tonga and other islands.
- It is also the longitude where the date changes by exactly one day when it is crossed. If a traveller crossing the date line from east to west, he loses a day and while crossing the date line from west to east, he gains a day.

### Motions of Earth

- The earth is a planet of the solar system. It is not static but has two types of motions:
  - Rotational Motion
  - Revolutional (or Orbital) Motion

#### (a) Rotation of Earth

- The earth spins (or rotates) continuously on its own axis from west to east once in every 24 hours, causing day and night. This motion is called Rotation of the Earth (also called 'Daily Motion').
- Day and Night:** When the earth rotates on its own axis, only one portion of the earth's surface comes into the rays of the sun and experiences day light whereas the other portion experiences darkness (or night).

#### (b) Revolution of Earth

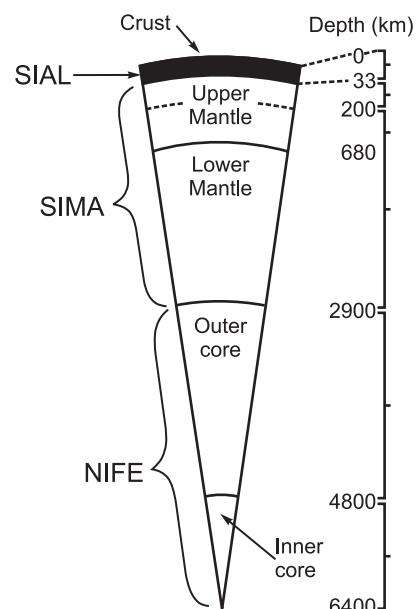
- The earth also revolves around the sun in an orbit once in about 365 days and 6 hours, causing formation of seasons and the year. This motion

is called Revolution of earth (also called annual movement).

### Varying Lengths of Day and Night

- The axis of the earth is inclined to the plane of earth's orbit at an angle of  $66\frac{1}{2}^{\circ}$  giving rise to different seasons and varying lengths of day & night.
- The earth's revolution round the sun with its axis inclined at  $66\frac{1}{2}^{\circ}$  to the plane of earth's orbit changes the apparent altitude of the midday sun.
- The sun is vertically overhead at the equator on 21 March and 21 September and these two days are termed as **Equinoxes** (equal length of day & night in both the hemisphere).
- On 21 June, the sun is vertically overhead at the Tropic of Cancer ( $23\frac{1}{2}^{\circ}$  N). This is known as **summer solstice**, when the northern hemisphere will have its longest day and shortest night.
- On 22 December, the sun is vertically overhead at the Tropic of Capricorn ( $23\frac{1}{2}^{\circ}$  S). This is known as **winter solstice**, when the southern hemisphere will have its longest day and shortest night.
- Beyond the Arctic Circle ( $66\frac{1}{2}^{\circ}$  N) and Antarctic Circle ( $66\frac{1}{2}^{\circ}$  S) darkness lasts for 6 months and daylight is continuous for the remaining 6 months.

### Structure of Earth



- The earth as a whole has been divided into three broad zones:

**1. Crust (SIAL) :** The earth is made up of several distinct layers but the outermost layer is called the crust. The crust is not a continuous layer of rocks, but consists of large masses called plates, which are free to drift slowly over a layer called **Asthenosphere**.

- The crust has a thickness of about 33 km in the continents (Continental crust) and 5-10 km thick in the ocean basins (Oceanic crust). **Silica** and **Aluminium** are the main constituent of the earth therefore it is also known as Sial.

**2. Mantle (SIMA) :** The layer of rock below the crust is called the mantle. It is about 2900 km thick and is divided into the upper and lower mantle. This layer contains most of the mass of the earth, and is where most of the earth's heat is located. The mantle is composed mainly of **Ferro-magnesium silicates**.

(a) **Upper Mantle:** The upper mantle is about 650 km thick and has two distinct layers. The top layer of the upper mantle is solid. Combined with the crust, this layer forms the Lithosphere, which makes up the earth's plates. Within this layer is the **Asthenosphere**, where semi molten rock flows slowly.

(b) **Lower Mantle :** The lower mantle is solid and is about 2700 km thick. Though temperatures are higher here but the tremendous pressures keep the rock material from melting.

**3. Core :** It is the innermost part of the earth and it comprises of outer core and inner core.

(a) **Outer Core :** The outer core is liquid and is about 1900 km thick. It comprises of **molten iron** and **nickel**, formed as a result of the extremely high temperature. This liquid outer core controls the earth's magnetic field.

(b) **Inner Core:** The earth's innermost core is about 1600 km thick and is made up of **solid iron** and **nickel**. The inner core is incredibly hot, with temperature reaching about 5,500°C and is subjected to a pressure of about 4 million atmospheres. It is this extreme pressure that keeps the inner core in a solid state.

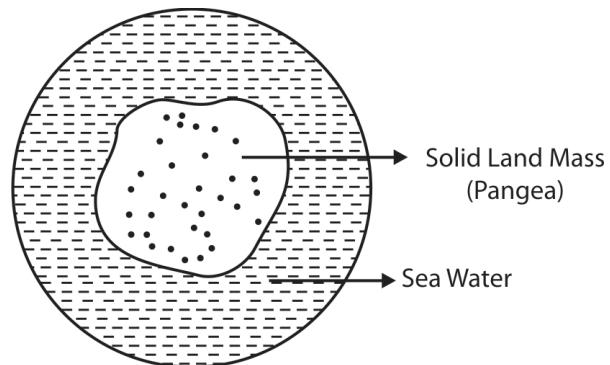
## Formation of Continents

- The age of earth is about 4500 million years (4.5 billion) and about 70%, of the total surface area of the globe is represented by the oceans (Hydrosphere), whereas remaining, 29.2% is represented by the continents, (Lithosphere).

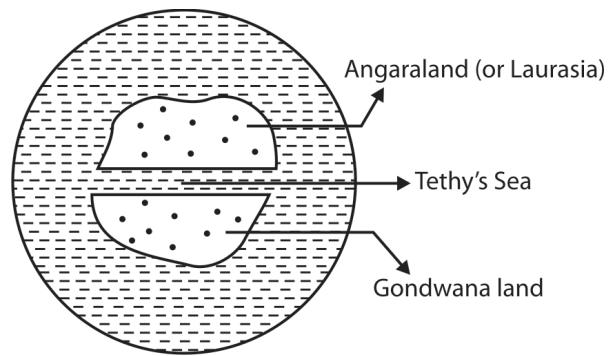
- More than 75% of the total land area of the globe is situated to the north of the equator, therefore the northern hemisphere is also known as the '**Land Hemisphere**' and the Southern hemisphere as the '**Water Hemisphere**'. It is believed that the continents are moving away from each other, Several theories have been propounded to explain this phenomenon:

### Continental Drift Theory:

- This theory was proposed by famous German Geographer, Prof. **Alfred Wagner** in 1924. According to this theory, before 200 million years ago, there was a single land mass surrounded by water which was named as **Pangea**.



- About 200 million years ago, pangea got cracked into two parts i.e. (a) **Angaraland** (or Laurasia) (b) **Gondwana land**, and ocean water filled in it. As a result, a narrow sea was created, known as **Tethy's Sea**.



- During further course of time, Angaraland was cracked into:
  - (i) North American Plate (ii) Eurasian Plate
 Whereas Gondwana land was cracked into 5 plates:
  - (i) African Plate
  - (ii) South American Plate
  - (iii) Indian Plate
  - (iv) Australian Plate
  - (v) Antarctic Plate

# 3

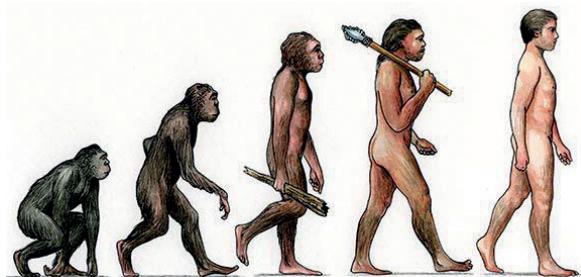
## CHAPTER

# HISTORY & CULTURE

## Ancient India

### PREHISTORIC PERIOD

- The early prehistoric period was observed before the 8<sup>th</sup> millennium BCE.
- The period of the prehistoric agriculturalists and pastoralists was during approximately the 8<sup>th</sup> to the mid-fourth millennium BCE.



### INDUS VALLEY CIVILIZATION

- Indus Valley Civilization is one of the oldest civilizations of the world. It flourished around the Indus river and its tributaries. The area consists of modern Pakistan and Northwestern India. Mohenjodaro is the largest site of the Civilization.
- Indus valley civilization is also called as Harappan civilization because Harappa was the first site to be excavated in 1921 under the supervision of **Daya Ram Sahni**.
- The known extent of this civilization in the west is upto Sutkagendor in Baluchistan; Alamgirpur (UP) in the east; Daimabad (Maharashtra) in South; and Manda (J and K) in the north.
- This civilization belongs to Bronge Age/ Chalcolithic Age. Hence, it is also called Bronze Age civilization.
- Contemporary civilizations of Harappan civilization are Mesopotamian or Sumerian civilization, Egyptian civilization and Chinese civilization.
- John Marshall was the first scholar to use the term "Indus Valley Civilization".

#### Important Sites of Harappan Civilization

##### 1. Harappa

- People of Harappa knew the process of making tarcoal.
- Main gate for the entry in the houses of Harappa was in the north direction.
- R-37 cemetry have been found here.
- Terracotta figurine of Mother Goddess have been found here.

##### 2. Mohenjo-daro

- Mohenjo-daro was discovered in 1922 under the supervision of **R.D. Bannerji**.
- The literal meaning of Mohenjo-daro in Sindhi language is **mound of the dead**.

Period/ Age	Remarks
Paleolithic Age	<ul style="list-style-type: none"> <li>People in Paleolithic age were dependent on hunting for their livelihood and used to travel from one place to another depending on the availability of natural resources for survival. They developed sharp weapons of stone for hunting purpose.</li> </ul>
Mesolithic Age	<ul style="list-style-type: none"> <li>During Mesolithic age, people were still hunter-gatherers, but were possibly starting to stay in one place.</li> <li>Domestication of animals can be seen in this age.</li> </ul>
Neolithic Age	<ul style="list-style-type: none"> <li>During Neolithic age, stone tools and weapons were also further modified and were sharpened by fine shedding of the stones.</li> <li>It also contributed greatly in the field of transportation by an important invention of the wheel.</li> </ul>
Chalcolithic Age	<ul style="list-style-type: none"> <li>The people of Chalcolithic age practiced agriculture. They used tools made up of copper and stone.</li> <li>Painted pottery was the most distinguishing feature of all Chalcolithic cultures.</li> </ul>

- The Great Bath, a granary, big halls, a bronze statue of a dancing girl, idol of a yogi and numerous seals have been found here.
- Seven layers of Mohenjo-daro city directs that the city was destroyed and rebuilt seven times.

### 3. Lothal

- In 1954, Lothal was discovered by S.R. Rao in Gulf of Cambay in Gujarat.
- Red & black clay pots, copper tools, brick built tank like structure, a bead making factory and a seal from Iran have been found at Lothal.
- Linear scale of bronze have been found here.
- A dockyard has been found at Lothal.

### 4. Kalibangan

- Kalibangan was discovered in 1953. It is located in upper Rajasthan.
- It did not have a drainage system.
- A number of firepits *agnikundas* (firepits) have been found here.
- It saw two cultural phases viz. pre-Harappan and Harappan.
- A ploughed field have been found here.

### 5. Dholavira

- Dholavira in Gujarat was discovered in 1992 by **J.P. Joshi**.
- Dholavira shows all the three phases of Harappan civilization.
- A script consists of big alphabets has been found on a gate in Dholavira.



**Major Harappan Sites and their Excavators**

Site	River	District	Province/ State	Country	Excavators
Harappa	Ravi	Montgomery	Punjab	Pakistan	Daya Ram Sahni (1921), Madho Swaroop Vatsa (1926), Wheeler (1946)
Mohenjodaro	Indus	Larkana	Sindh	Pakistan	Rakhal Das Bannerji (1922), Mackay (1927), Wheeler (1930)
Chanhudaro	Indus	Nawabshah	Sindh	Pakistan	Mackay (1925), N.G. Mazumdar (1931)
Lothal	Sabarmati & Bhogva	Ahmedabad	Gujarat	India	S.R. Rao (1954)
Kalibangan (i.e., the bangles of black colour)	Ghaggar	Sri Gangana-gar	Rajasthan	India	Amalanand Ghosh (1951), B.B. Lai & B.K. Thapar (1961)
Banawali	Saraswati	Fatehabad	Haryana	India	R.S. Bist (1973)
Dholavira	Luni	Kutchh	Gujarat	India	J.P. Joshi (1967-68)

Major Harappan Sites and Archeological Findings	
Site	Archaeological Findings
Harappa	6 Granaries in row, Working floors, Workmen's quarters, Virgin-Goddess (seal), Cemetery (R-37, H), Stone symbols of Lingam (male sex organ) & Yoni (female sex organ), Painted pottery, Clay figures of Mother Goddess, Wheat & Barley in wooden mortar, Copper scale, Crucible for bronze, Copper-made mirror, Vanity box, Dice.
Mohenjodaro	Great Bath, Great Granery (the largest building of civilization), Assembly hall, Shell strips, Pashupati Mahadeva/Proto-Shiva (seal), Bronze Image of a nude woman dancer, Steatite image of bearded man, Human skeletons huddled together, Painted seal (Demi-God), Clay figures of Mother Goddess, A fragment of woven cotton, Brick Kilns, 2 Mesopotamian seals, 1398 seals (57% to total seals of civilization), Dice.
Chanhudaro	City without a citadel, Inkpot, Lipstick; Metal-workers', shell-ornament makers' and bead-makers' shops; Imprint of dog's paw on a brick, Terracotta model of a bullock cart, Bronze toy cart.
Kalibangan	Ploughed field surface (Pre-Harappan), 7 Fire altars, Decorated bricks, Wheels of a toy cart, Mesopotamian cylindrical seal.
Lothal	Dockyard, Rice husk; Metal-workers', shell-ornament makers' & bead-makers' shops; Fire altars, Terracotta figurine of a horse, Double burial (burying a male and a female in a single grave), Terracotta model of a ship, Dying vat, Persian/ Iranian seal, Baharainean seal, Painted jar (bird & fox).
Surkotada	Bones of horse, Oval grave, Pot burials.
Banawali	Lack of chess-board or gridiron pattern town planning, Lack of systematic drainage system, Toy plough, Clay figures of Mother Goddess.
Daimabad	Bronze images (Charioteer with chariot, ox, elephant & rhinoceros)
Dholavira	A unique water harnessing system and its storm water drainage system, a large well and a bath (giant water reservoirs), Only site to be divided into 3 parts, Largest Harappan inscription used for civic purposes, A stadium.

### Important Features of Indus Valley Civilization

- **Town planning** was the most distinguishable feature of the Harappan civilization. Hence, this civilization is also called first urbanisation.
- Towns were divided into parts viz. citadel and lower town. Citadels were occupied by members of ruling class and lower town was inhabited by the common people.
- Harappan cities were developed in **Block Pattern/Chess Board Pattern** because roads of these cities used to cut each other at right angles.
- Most peculiar feature of town planning was their **drainage system**. Drains were built of burnt bricks and covered by stone lids and manholes for cleaning.
- Complete burial was the most common method of the disposal of the dead.
- They grew wheat and barley on a large scale. The other crops grown were pulses, cereals, cotton, dates, melons, pea, sesamum and mustard.
- No clear evidence of rice has been found, except from Rangpur and Lothal where some grains of rice were found, but they may be of later period.
- Harappan people were mostly peasants and thus the Harappan civilization was an agro-commercial civilization.
- Evidences of hoe and plough have been found in Kalibangan and Banawali.

# World History

## ANCIENT WORLD

### Bronze Age Civilization

Sl. No.	Name of Civilization	Modern Area	River Valley
1.	Mesopotamian Civilization (4000 BC - 6th Cen. BC)	Iraq	Tigris and Duperates
2.	Egyptian Civilization (3400 BC - 1000 BC)	Egypt	Nile
3.	Harappan Civilization (2500 BC - 1750 BC)	India and Pakistan	Indus
4.	Chinese Civilization (1765 BC - 250 BC)	China	Hwang-Ho

### Mesopotamian Civilization

- The Oldest Civilization of the World Mesopotamia means land between the rivers. Mesopotamia is the land between the Tigris and Euphrates rivers.
- The potter's wheel was perhaps first used in Mesopotamia. The Mesopotamians also seem to have been the first to make glass ware. The Sumerians were the first to evolve a proper system of writing. This system is called cuneiform. The cuneiform script was deciphered by Henry Ravlinson.
- The Mesopotamian system of counting is known as sexagesimal because Ae Mesopotamian people counted by sixties as we count by tens (decimal system).
- Mesopotamians had discovered Pythagoras theorem. They could calculate the length of the day and the night.

### Egyptian civilization

- Egypt is called the 'Gift of the Nile'.
- The Old Kingdom is also called the 'Age of the Pyramids'.
- The Egyptian King was called the pharaoh.
- The Egyptian were the worshipper of the nature and the nature the sun was their most important god.
- The Egyptians believed that after death both the body and the soul live, So, Egyptians took great care in preserving the body of the dead. The body was embalmed in spices and then wrapped in strips of fine linen. Wooden box and buried.
- The Pyramids and the Sphinx are the two specimens of Egyptian of these monarchs.
- The Egyptians developed a decimal system of numeration.
- The crowing achievement of the Egyptians was the solar calendar.

# 4

## CHAPTER

# INDIAN POLITY

## Constitutional Developments

- It was in 1934 when the idea of Constituent Assembly for India was put forward for the first time by M. N. Roy (A pioneer of communist movement in India).
- In 1935, the Indian National Congress (INC) demanded a Constituent Assembly to frame the Constitution of India.
- In 1938, Jawaharlal Nehru, on behalf of INC declared that the Constitution of Free India must be framed without outside interference and by a Constituent Assembly elected on the basis of Adult Franchise. The demand was accepted by British Government during August Offer in 1940.
- In 1942, Sir Stafford Cripps, a member of the British Cabinet came to India with draft proposal of the British Government on the framing of an independent Constitution which to be adopted after the World War II.
- The Cripps Proposals were rejected by the Muslim League which wanted India to be divided into two autonomous States with two separate Constituent Assemblies.
- Finally, the Constituent Assembly was constituted in November, 1946 under the scheme formulated by the Cabinet Mission Plan.

## Important British Acts of Constitutional Significance

### Regulating Act, 1773

- The Regulating Act, 1773 was the first step taken by the British Government to control and regulate the affairs of the East India Company in India.
- It designated the Governor of Bengal as the 'Governor-General of Bengal' and created an Executive Council consisting of four members to

assist him. The first Governor-General of Bengal was Lord Warren Hastings.

- It made a provision of Supreme Court at Fort William in Calcutta, comprising one Chief Justice and three other judges.
- It strengthened the control of the British Government over the East India Company by requiring the Court of Directors which was a governing body of the Company to report on its revenue, civil and military affairs in India.

### Pitt's India Act, 1784

- This Act created a new body called Board of Control to manage the political affairs while Court of Directors were allowed to manage the commercial affairs. Thus, Pitt's India Act made a provision of separation in company's political and commercial activities.
- It empowered the Board of Control to supervise and direct all operations of the civil and military affairs and revenues of the British possessions in India.
- The Company's territories in India were for the first time called **British Possessions in India**.

### Charter Act, 1793

- This Act recognised the courts and redefined their jurisdictions. Accordingly, the revenue administration was separated from the judiciary functions. This provision led to disappearing of the Maal Adalats (Revenue courts).
- Salaries of the members of the Board of Control to be drawn from the Indian exchequer.

### Charter Act, 1813

- The East India Company's monopoly over trade was abolished in India but its monopoly over trade with China and for trade in tea retained.
- This Act asked Company to spend one lakh rupees every year on the education of Indians.
- Christian missionaries were permitted to propagate their religion in India.

### Charter Act, 1833

- This Act made the Governor-General of Bengal as the Governor-General of India and vested in him all civil and military powers. Lord William Bentinck was made the first Governor-General of India.
- The East India Company lost its monopoly over trade with China also and it was asked to close the commercial business. The Company became a purely administrative body.
- This Act asked government to abolish **slavery** in India.

### Charter Act, 1853

- This Act had provisions of separation of executive and legislative functions of the Governor General's Council. It provided for addition of six new members called Legislative Councillors to the **Indian (Central) Legislative Council**.
- For the first time, the local representation in the Indian (Central) Legislative Council was allowed.
- An open competition system of selection and recruitment of civil servants was introduced. For the first time, Indians were allowed to take part in Civil Services recruitment process. Consequently, the Macaulay Committee (the Committee on the Indian Civil Service) was appointed in 1854.

### Government of India Act, 1858

- It brought an end to the Company's rule and transferred all powers to the British crown.
- The system of **Dual government** (Board of Control and Court of Directors) introduced by Pitt's India Act was abolished by this Act.
- A new office of **Secretary of State for India** was created and he was vested with complete authority and control over Indian administration. He was a member of the British Cabinet and was ultimately responsible to the British Parliament. Lord Stanley was the first Secretary of State for India.

### Indian Councils Act, 1861

- The Viceroy was empowered to issue ordinances in case of emergency without the concurrence of the legislative council. The life span of such ordinances was six months.
- This Act also introduced the 'portfolio' system. Under this, a member of the Viceroy's council

was made in-charge of one or more departments of the government.

### Indian Councils Act, 1892

- This Act empowered the Universities, district boards, municipalities, zamindars and chambers of Commerce to recommend members to the Provincial Legislative Council which were to be nominated by governors.
- According to this Act, the members of the Legislatures were for the first time entitled to take part in debate over Annual Statement of Revenue and Expenditure i.e. Budget. They could also put questions within certain limitations.

### Indian Councils Act, 1909 (Morley-Minto Reforms)

- This Act is also known as **Morley-Minto Reforms**. Morley was the then Secretary of State for India and Lord Minto was the then Viceroy of India.
- Muslims were given separate representation and hence Lord Minto came to be known as the **Father of Communal Electorate**.
- A provision was made for the association of Indians with the Executive Council of the Viceroy and Governors. **Satyendra Prasad Sinha** became the first Indian to join the Viceroy's Executive Council. He was appointed as Law Member.

### Government of India Act, 1919 (Montague-Chelmsford Reforms)

- This Act is also known as **Montague-Chelmsford Reforms or Montford Reforms**. Montague was the then Secretary of State for India and Chelmsford was the then Viceroy of India.
- All administrative subjects were divided into two groups viz. central and provincial subjects. Provincial subjects were further divided 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 whereas Governor was not responsible towards Legislative Council in the discharge of **reserved subjects**.
- This dual scheme of governance was known as 'dyarchy', a term derived from the Greek word diarche, which means double rule.
- For the first time, Indian Central Legislature was made **bicameral** (two Houses).

# Practice Questions

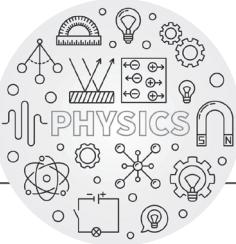
## INDIAN POLITY

- Q.1** In India, the Judges of the High Court of a State are appointed by the  
(a) President      (b) Vice-President  
(c) Chief Justice of India  
(d) Governor
- Q.2** According to which Article Hindi, in Devnagari script is the official language of the Union ?  
(a) Article 343      (b) Article 243  
(c) Article 223      (d) Article 123
- Q.3** In the Union Government, the Council of Ministers is collectively responsible to the  
(a) President      (b) Prime Minister  
(c) Lok Sabha      (d) Parliament
- Q.4** The conditions of service and tenure of the Election Commissioner in India is prescribed by the  
(a) Constitution      (b) Parliament  
(c) President      (d) Government
- Q.5** The Supreme court of India dispenses justice putting its reliance on the principles of  
(a) rule of law  
(b) due process of law  
(c) procedural due process  
(d) procedure established by law
- Q.6** Centre-State financial distribution takes place following the recommendations made by the  
(a) Inter-State Council  
(b) Finance Commission  
(c) NITI Aayog  
(d) Parliament
- Q.7** In India, the power of judicial review is restricted because  
(a) the Executive is supreme  
(b) the Legislature is supreme  
(c) the Constitution is supreme  
(d) the Judges are transferable
- Q.8** Which one of the following Statements is correct?  
(a) The Constituent Assembly of India was elected by the Provincial Assemblies in the year 1946.  
(b) Jawaharlal Nehru, M.A. Jinnah and Sardar Vallabh Bhai Patel were members of the Constituent Assembly of India.  
(c) The First Session of the Constituent Assembly of India was held in January, 1947  
(d) The Constitution of India was adopted on 26th January, 1950.
- Q.9** Which one of the following Schedules of the Constitution of India contains provisions regarding Anti-Defection Act?  
(a) 2nd Schedule      (b) 5th Schedule  
(c) 8th Schedule      (d) 10th Schedule
- Q.10** The Constitutional Adviser to the Constituent Assembly was  
(a) Sachidanand Sinha  
(b) B.N. Rau  
(c) N. Gopalaswamy  
(d) H.N. Kunzru
- Q.11** The Constitution is declared to have been adopted and enacted by the  
(a) Constituent Assembly  
(b) People of India  
(c) Indian Parliament  
(d) British Parliament
- Q.12** The Constitution of India was adopted and came into force on  
(a) November 26, 1949/January 26, 1950  
(b) August 15, 1947/November 26, 1950  
(c) January 26, 1949/November 26, 1950  
(d) November 26, 1948/January 26, 1950

# 5

# GENERAL SCIENCE

## CHAPTER



# PHYSICS

Physics is a branch of science which is concerned with all aspects of nature on both the microscopic and macroscopic level. Its scope of study encompasses not only the behavior of objects under the action of forces but also the nature of gravitational, electromagnetic, nuclear forces among others. The ultimate objective of physics is to formulate comprehensive principles that bring together and explain all such phenomena.

Systems of units	Length	Mass	Time
C.G.S. System	Centimetre	Gram	Second
F.P.S. System	Foot	Pound	Second
M.K.S. System	Metre	Kilogram	Second

## UNITS & MEASUREMENT

- Unit is the chosen standard used for measuring a physical quantity.
- There are basically two types of unit:
  - Fundamental Unit:** These units are a set of measurements, defined arbitrarily and from which other units are derived. Examples: meter, kilogram, second, etc.  
The fundamental unit of some of the physical quantities are given below:

International System of Units (S.I.)		
Physical	Fundamental	Symbol
Mass	Kilogram	kg
Length	Metre	m
Time	Second	s
Temperature	Kelvin	K
Electric-current	Ampere	A
Luminous intensity	Candela	Cd
Quantity of matter	Mole	mol

**2. Derived Unit:** All the units which are expressed in terms of fundamental units are known as derived units. Examples: Newton, Joule, etc.

- Internationally, there are four types of unit systems. These are:

**1. S.I. Units/System:** It is the modern form of the metric system, and is the most widely used system of measurement. It comprises a coherent system of units of measurement built on seven base units namely kilogram, meter, second, candela, ampere, kelvin and mol.

**2. CGS System:** The centimeter-gram-second (CGS) system of units is a variant of the metric system based on centimetre as the unit of length, gram as unit of mass, and the second as the unit of time.

**3. FPS System:** The foot-pound-second (FPS) system is a system of units built on three fundamental units: the foot for length, the pound for mass and the second for time.

**4. MKS System:** The MKS system of units is a physical system of units that expresses any given measurement using base units of the metre, kilogram, and second.



## Basics of Motion

A body is said to be in motion if it changes its position with respect to its surroundings as time goes on. A body is said to be at rest if it does not change its position with time, with respect to its surroundings.

### Types of Motion

- When a particle or a body moves along a straight path, its motion is Rectilinear or translatory motion.
- When a particle or a body moves in a circular path, its motion is circular motion. When a body spins about its own axis, it is said to be in rotational motion.
- When a body moves to and fro or back and forth repeatedly about a fixed point in a definite interval of time, it is said to be in vibrational or oscillatory motion.

### Speed

The time rate of change of position of an object in any direction i.e. the rate of change of distance of an object with respect to time is known as speed.

$$\text{Speed} = \frac{\text{displacement}}{\text{time taken}}$$

### Velocity

The rate of change of displacement of an object with respect to time is known as velocity.

$$\text{Velocity} = \frac{\text{displacement}}{\text{time}}$$

### Acceleration

The rate of change of velocity with respect to time is called acceleration.

$$\text{Acceleration} = \frac{\text{Change in velocity}}{\text{time taken}}$$

When a body completes equal displacement in equal interval of time, its velocity is constant and hence, it does not have an acceleration. When a body shows equal change in velocity in equal interval of time its velocity is not constant but it has a constant acceleration.

## Equation of Motion

### For a body moving with a uniform velocity

If a body completes a displacement ' $S$ ' in time ' $t$ ' with a uniform velocity ' $V$ ', then,

$$\text{Displacement} = \text{velocity} \times \text{time}$$

$$\text{or } S = vt \quad \dots(i)$$

### For a body moving with a uniform acceleration

If a body starting with an initial velocity ' $u$ ' moves with a uniform acceleration ' $a$ ' for a time ' $t$ ' and attains a final velocity ' $v$ ' after travelling a displacement ' $s$ ' then,

$$S = ut + \frac{1}{2}at^2 \quad \dots(iii)$$

$$v^2 = u^2 + 2as \quad \dots(iv)$$

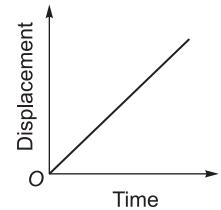
When the velocity of a body increases, it has a positive acceleration and when the velocity decreases, it has a negative acceleration.

This negative acceleration is called deceleration or retardation.

## Position (Displacement)-Time Graphs

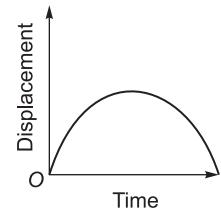
### For a body moving with a uniform velocity

This graph comes as a straight line because in a uniform velocity the particle completes equal displacement in an equal interval of time.



### For the motion of a body thrown vertically upwards

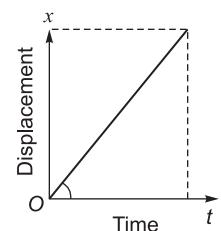
When the body moves up, its velocity continuously decreases due to gravity and finally becomes zero at the maximum height. Then, the body falls with an increasing velocity.



The slope of the position time graph is equal to the uniform velocity.

$$\text{Slope} = \frac{\text{Displacement}}{\text{Time}}$$

$$\text{or } V = \frac{x}{t}$$



## Introduction

The word ‘environment’ has been derived from French word “*Environner*” which means “*to encircle*” or “*to surround*”, whereas “Nature” word is derived from Latin word “*Natura*” which refers to characteristics of plants, animals and other creatures.

Components of Environment	
Abiotic	Biotic
<ul style="list-style-type: none"> <li>• Energy</li> <li>• Radiation</li> <li>• Temperature and heat flow</li> <li>• Water</li> <li>• Atmospheric gases and wind</li> <li>• Fire</li> <li>• Gravity</li> <li>• Topography</li> <li>• Soil</li> <li>• Geological substratum</li> </ul>	<ul style="list-style-type: none"> <li>• Green plants</li> <li>• Non-green plants</li> <li>• Decomposers</li> <li>• Parasites</li> <li>• Symbionts</li> <li>• Animals</li> <li>• Man</li> </ul>

All organisms (from virus to man) are obligatorily dependent on the environment for food, energy, water, oxygen, shelter and for other needs.

Environment is total sum of all conditions which affect evolution and development of life on Earth’s surface where organisms live including abiotic components (soil, water, air, etc.) and biotic components (plants, animals, microorganisms, etc.).

## Biosphere

Biosphere is the part of the earth’s crust, hydrosphere, and atmosphere that supports life. It is formed through the interaction of atmosphere, lithosphere and hydrosphere.

The area of contact and interaction between these three components are the basic requirement for the biosphere to exist.

## Atmosphere

The atmosphere is the body of air which surrounds earth. Most of the atmosphere is located close to the earth's surface where it is most dense.

The atmosphere is divided into a series of concentric shells of sphere due to the variations in temperature and pressure at various altitude.

## Air Composition

Nitrogen and oxygen are the most abundant gases in the Troposphere, constituting about 78% and 20.9% of total gaseous volume respectively. The remaining 1 % consists of argon, water vapour, CO<sub>2</sub> and ozone. These gases occur in minute quantities in the atmosphere, but are essential for maintaining life on the earth.

Carbon dioxide, water vapour and ozone play an important role in maintaining the heat balance of the earth.

## Normal Composition of Gases in Air

Constituents	Chemical Symbol	Mole Percent
1. Nitrogen	N <sub>2</sub>	78.084%
2. Oxygen	O <sub>2</sub>	20.947%
3. Argon	Ar	0.934%
4. Carbon dioxide	CO <sub>2</sub>	0.038%
5. Neon	Ne	0.001818%
6. Helium	He	0.000524%
7. Methane	CH <sub>4</sub>	0.00017%
8. Krypton	Kr	0.000114%

## Lithosphere

The Lithosphere is the solid, rocky crust covering entire earth. This crust is inorganic and is composed of minerals.

Geologically, Lithosphere refers to the combination of earth’s crust and outer mantle. It provides the platform and habitat to the biotic elements of the ecosystem. It covers the entire surface of the earth from the top of Mount Everest to the bottom of the Mariana Trench.

# Important Terms used in ECONOMICS

## Bank Rate

Bank rate is the rate charged by the Reserve Bank of India for lending funds to commercial banks. It influences lending rates of commercial banks. Higher bank rate will translate to higher lending rates by the banks. In order to curb liquidity, the central bank can resort to raising the bank rate and vice versa.

## Gross Domestic Product

GDP is the final value of the goods and services produced within the geographic boundaries of a country during a specified period of time, normally a year. GDP growth rate is an important indicator of the economic performance of a country.

## Gross National Product

Gross National Product (GNP) is Gross Domestic Product (GDP) plus net factor income from abroad. It measures the monetary value of all the finished goods and services produced by the country's factors of production irrespective of their location. It includes taxes but does not include subsidies.

## Wholesale Price Index

Wholesale Price Index (WPI) represents the price of goods at a wholesale stage i.e. goods that are sold in bulk and traded between organizations instead of consumers. WPI is often used as a measure of inflation.

## Inflation

Inflation is the percentage change in the value of the Wholesale Price Index (WPI) on a year-on year basis. It effectively measures the change in the prices of a basket of goods and services in a year. It occurs due to an imbalance between demand and supply of money, changes in production and distribution cost or increase in taxes on products. When economy experiences inflation the price level of goods and services rises and the value of currency reduces.

## Liquidity

Liquidity means how quickly one can get his cash in hand. In simpler terms, liquidity is to get your money whenever you need it. It might be emergency savings account or the cash lying with you that you can access in case of any unforeseen happening or any financial setback.

## Non-Performing Assets

A non-performing asset (NPA) is a loan or advance for which the principal or interest payment remained overdue for a period of 90 days.

## Monetary Policy

Monetary policy is the macroeconomic policy laid down by the Reserve Bank of India. It involves management of money supply and interest rate and it is the demand side economic policy used by the government of a country to achieve macroeconomic objectives like inflation, consumption, growth and liquidity.

## Purchasing Power Parity

Purchasing Power Parity aims to determine the adjustments needed to be made in the exchange rates of two currencies to make them at par with the purchasing power of each other. It is the expenditure on a similar commodity must be same in both currencies when accounted for exchange rate. It is used worldwide to compare the income levels in different countries.

## Repo Rate

Repo rate is the rate at which the Reserve Bank of India lends money to commercial banks in the event of any shortfall of funds. For RBI point of view it is called as short term lending and from banks point of view it is short term borrowing.

## Statutory Liquidity Ratio (SLR)

It is the ratio of total deposits of a commercial bank which it has to keep with itself in the form of liquid assets. Liquid assets may consist of cash in hand, gold, reserves with RBI, excess reserves, government securities and other encumbered securities, etc.

## Sovereign Risk

Any risk arising on chances of a government failing to make debt repayments or not honouring a loan agreement is a sovereign risk.

## Service Tax

Service tax is a tax levied by the government on service providers on certain service transactions, but is actually borne by the customers.