

## **SUBJECT –GEOGRAPHY**

### **PAPER NAME CLIMATOLOGY**

#### **SEMESTER 3<sup>RD</sup>**

#### **THEORY, MODULE 1: ATMOSPHERE, ENERGY AND TEMPERATURE**

## **Atmosphere: Origin, Structure and Composition**

The **atmosphere** is a thick envelope of gases surrounding the Earth, held in place by gravitational force. It plays a vital role in sustaining life by regulating temperature, protecting the Earth from harmful solar radiation, and supporting weather and climatic processes. The study of the atmosphere forms an essential part of physical geography.

### **Origin of the Atmosphere**

The origin of the Earth's atmosphere is closely related to the formation of the Earth itself. During the early stages of Earth's evolution, intense volcanic activity released large quantities of gases such as water vapour, carbon dioxide, nitrogen, and sulphur compounds through a process known as **degassing**. This early atmosphere was devoid of free oxygen. Over time, as the Earth cooled, water vapour condensed to form oceans, and carbon dioxide was gradually reduced. The emergence of plant life led to the process of **photosynthesis**, which released oxygen into the atmosphere. This resulted in the development of the present oxygen-rich atmosphere, making life possible on Earth.

### **Structure of the Atmosphere**

The atmosphere is vertically divided into several layers based on variations in temperature and other physical characteristics. The **troposphere** is the lowest layer and extends up to about 8–18 km from the Earth's surface. It contains most of the atmospheric mass, water vapour, and dust particles, and all weather phenomena occur within this layer. Above the troposphere lies the **stratosphere**, extending up to about 50 km. This layer contains the **ozone layer**, which absorbs harmful ultraviolet radiation from the Sun. The **mesosphere**, located above the stratosphere, extends up to about 80 km and is characterized by decreasing temperatures; meteors often burn up in this layer. The **thermosphere**, which includes the **ionosphere**, extends from about 80 km to several hundred kilometres and is marked by very high temperatures and ionized gases. The outermost layer, the **exosphere**, gradually merges with outer space.

### **Composition of the Atmosphere**

The atmosphere is composed of a mixture of gases, water vapour, and dust particles. **Nitrogen** constitutes about **78 per cent** of the atmosphere and plays an important role in plant growth and the nitrogen cycle. **Oxygen**, making up about **21 per cent**, is essential for respiration and combustion. **Argon** accounts for about **0.93 per cent**, while **carbon dioxide** is present in a small proportion (about **0.04 per cent**) but plays a crucial role in regulating the Earth's temperature through the greenhouse effect. In addition to these gases, the atmosphere

contains variable amounts of **water vapour**, which influences humidity, cloud formation, and precipitation, as well as **dust particles** that aid in condensation processes.

## Conclusion

In conclusion, the atmosphere is a dynamic and life-supporting system that has evolved over millions of years. Its layered structure, unique composition, and protective functions make it indispensable for life on Earth. Understanding the origin, structure, and composition of the atmosphere is fundamental to the study of weather, climate, and environmental processes.

## STUDY MATERIAL 2

### PAPER NAME- HUMAN GEOGRAPHY

#### MODULE 1: INTRODUCTION TO HUMAN GEOGRAPHY

## Concept of Space and Society in Human Geography

Human geography is concerned with the study of spatial relationships between human population, culture, economy, and the physical environment. The concepts of **space** and **society** are central to human geography, as they help in understanding how human activities are organized spatially and how social processes shape geographical patterns.

### Concept of Space in Human Geography

In human geography, **space** refers to the physical and abstract arena in which human activities take place. It is not merely an empty container but a dynamic dimension shaped by social, economic, cultural, and political processes. Space determines the **location**, **distribution**, and **interaction** of human activities such as settlement, transport, trade, and land use. Geographers study space in terms of **absolute space** (fixed and measurable), **relative space** (space defined by distance, time, and cost), and **relational space** (space shaped by social relationships and power structures). Thus, space is both a physical reality and a social construct.

### Concept of Society in Human Geography

**Society** refers to an organized group of people living together and sharing common cultural, economic, social, and political institutions. In human geography, society is studied to understand how human groups interact with their environment and organize space according to their needs and values. Social factors such as population structure, culture, religion, technology, and economic activities play a crucial role in shaping settlement patterns, land use, and regional development. Society influences how space is perceived, used, and transformed over time.

### Relationship between Space and Society

The relationship between space and society is **reciprocal and dynamic**. Society shapes space through human activities such as urbanization, industrialization, agriculture, and infrastructure development. At the same time, space influences social processes by affecting accessibility, resource availability, social interaction, and economic opportunities. For example, urban spaces reflect social inequalities through residential segregation, while rural spaces display different social and economic structures. Thus, space and society continuously interact and influence each other.

## **Importance in Human Geography**

The concept of space and society is fundamental to understanding regional diversity and spatial inequality. It helps geographers analyze issues such as population distribution, migration, urban growth, regional planning, and social justice. By studying the interaction between space and society, human geography provides insights into how human life is organized across different regions of the world.

## **Conclusion**

In conclusion, space and society are interrelated concepts that form the core of human geography. Space provides the framework within which social life operates, while society actively shapes and transforms space. Understanding this relationship is essential for analyzing human activities, regional development, and spatial patterns in a rapidly changing world.