

## **GEOGRAPHY NOTES – Part I**

### **1. Universe**

Universe came into being as a result of the Big Bang, which took place nearly 14 billion years ago.

Since then, the Universe has been expanding outwards at a very high-speed.

### **2. Aryabhata** born in 476 AD is known as the “Father of Indian Astronomy.”

### **3. The Stars**

Stars are very big and hot bodies of gases.

They have their own heat and light.

The Pole Star is a bright star which always shines in the north direction. It helped the navigators to find the direction when the magnetic compass was not discovered.

### **4. Constellation**

Some stars appear as groups and form recognizable patterns called constellations.

One such constellation is the Ursa Major or the Great Bear. In India it is known as *Saptrishi Mandal*

Other known constellations are Orion, Leo, Gemini, etc.

### **5. Galaxy**

A galaxy is a large cluster of stars, gases, dust etc. held together by gravitational attraction.

There are millions of galaxies in the Universe.

Galaxies vary in size and form.

Our Solar System belongs to the Milky Way galaxy. It is also known as Akash Ganga

### **6. The Solar System**

Solar system is family of Sun. The system comprises of eight planets which go around the Sun in certain path called orbits.

The Sun is in center and controls the movement of the bodies by its gravitational force.

The Planets are the large celestial bodies in the Solar System which do not have their own light. They reflect the light of the Sun. They are spherical in shape and rotate on their own axis.

The planets in order of increasing distance from the Sun are- Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.

All the planets except Mercury and Venus have satellites called moons. Those planets that lie within the asteroid belt, that is Mercury, Venus, Earth and Mars are called the inner planets. They are also known as terrestrial planets because their structure is similar to that of the earth. They have rocky composition.

Jupiter, Saturn, Uranus and Neptune are called the outer planets. They are also called Jovian planets because their structure is similar to that of Jupiter. They have ring systems around and have a large number of moons. They are of gaseous origin.

## 7. **The Sun**

The Sun is a star

It is 150 million km away from the Earth.

Its diameter is about 109 times more than the Earth's diameter measuring about 1392000 km

Its weight is 300 000 times more than the Earth.

Sun is the ultimate source of heat and light for the Earth.

Nuclear fusion takes place on sun. Hydrogen atoms combine to form Helium atom and thereby releasing large amount of energy.

There are large dark spots on the surface of the sun. They appear dark because they are cooler and have a lower temperature than the surface of the sun and are called SUNSPOTS.

## 8. **STARS**

The stars like the sun radiate heat and light. Planets have no light of their own. They reflect the light of their stars. All planets revolve round their stars in fixed paths called orbits.

The stars radiate not only light and heat but also radio waves, ultraviolet rays, infrared rays and also x-rays.

The pole star can be seen at 90 degree at the North Pole and zero-degree angle at Equator.

## 9. **Mercury**

It is the smallest and the closest planet to the Sun, so it is one of the hottest planets.

Its orbit is the shortest.

It takes 88 days (least time) to complete one revolution

## 10. **Venus**

It is often called the Morning star and the evening star because it is the brightest planet.

It is similar to the size of the Earth

It takes 255 days to complete one orbit

Venus is the second planet from the sun but it is hotter than Mercury. This is because the atmosphere around Venus is mainly carbon dioxide. The carbon dioxide produces Greenhouse effect on the surface of Venus. Thus the temperature on its surface remains very high.

## 11. **Earth**

It is the third nearest planet to the Sun and the fifth largest planet in the Solar system.

It completes one orbit in 365 days and 6 hours

It is spherical in shape, slightly flattened at the poles.

From space, the earth looks blue because 70% of its area is covered by water.

Hence, it is also called as the watery planet.

It is the only planet which has conditions required to support life  
Moderate Temperature

Presence of water and air (21%Oxygen) support all forms of life. Earth is unique as , it is at optimum distance from the sun , so neither too hot nor too cold., has an average temperature of 17 degrees, its atmosphere is made up of life supporting gases like nitrogen, oxygen and carbon dioxide. Ozone present in the earth's atmosphere absorbs the harmful ultraviolet rays of the sun.

The earth is not a perfect sphere. It bulges slightly at the center and is flattened at the poles. The polar diameter is 12714 km as against 12756 km at the equator. The earth rotates from west to east and therefore, people in the east can see sun earlier than those in the west.

**12. MARS**

It is called the Red Planet because it has iron rich red soil and pink sky. It completes one orbit in 687 days.

**13. JUPITER**

It is the largest planet in the Solar System. It completes one orbit in 11 years and 11 months.

**14. SATURN**

It is the second largest planet in the Solar System. It has over 1,00,000 rings around it which are made up of dust particles, rocks and ice. It completes one orbit in 29 years and 5 months.

**15. URANUS**

It is the third largest planet. It completes one orbit in 84 years. It is greenish in colour because it is covered with a thick layer of blue-green gas.

**16. NEPTUNE**

It is very similar to Uranus. It completes one orbit in 165 years. Neptune's outer atmosphere is one of the coldest places in the Solar System.

**17. PLUTO**

International Astronomical Union (IAU) has decided that Pluto is not a Planet but a minor planet and has given new name- Asteroid number 134340. To be classified as a Planet, it must revolve around a star, it should not be a star, it must have sufficient mass for its self-gravity to have nearly round body and it must have cleared the cosmic debris in its neighborhood.

**18. SATELLITES**

The word satellite means companion. They are small celestial bodies. They move around the planets in the similar way as the planets move around the Sun. They do not have their own light. They shine by reflecting light from the Sun. All the planets in the Solar System have one or more satellites except Mercury and Venus which have no satellites.

**19. The MOON**

The Moon is the only natural satellite of the Earth. It is about 3,84,000 km away from Earth. It does not have heat and light of its own. It reflects the light of the Sun which reaches on the Earth in just one and quarter second. It does not have water or atmosphere.

## **20. ASTEROIDS**

Numerous tiny bodies revolving around the Sun between the orbits of the Mars and the Jupiter are called asteroids.

It is believed that they are broken pieces of a planet which exploded at the time of its birth.

Ceres is the largest asteroid.

## **21. METEOROIDS**

Small pieces of rocks revolving around the Sun are called meteoroids.

Whenever they enter the earth's atmosphere, they start burning causing a flash of light as they fall.

They are burn up in the upper atmosphere of the Earth and never reach the ground.

They are called meteors or shooting star.

The unburnt part of a meteor that falls on the Earth is called a meteorite.

Large meteorites can cause huge craters when they land on the earth

## **22. COMETS**

The luminous celestial bodies which move around the Sun are called comets.

They revolve around the Sun in long elliptical orbits.

When they come near the Sun they glow.

They are usually accompanied by a long glowing tail so they are also known as tailed star.

All comets do not have tails.

Halley's Comet appears after every 76 years. It was last seen in 1986.

## **23. LATITUDE**

A globe is a model of the Earth.

The horizontal lines are lines of Latitude or parallels

The Latitude which divides the globe into two equal halves is known as Equator.

This is numbered as  $0^{\circ}$

The equal halves are called hemispheres. To the north of Equator is the Northern Hemisphere and to the south is the Southern Hemisphere.

## **24. LONGITUDE**

The vertical lines are lines of longitude or meridians.

Prime Meridian - the longitude running through the British Royal Observatory at Greenwich near London as Prime Meridian.

Prime Meridian was given the value of  $0^{\circ}$

The other half of this line is the  $180^{\circ}$  longitude and it is named as the International Date Line.

The Prime Meridian divides the earth into two hemispheres- Eastern Hemisphere and the Western Hemisphere.

As there are  $360^{\circ}$  in a circle the total number of meridians are 360. They are 180 to the east and 180 to the west of the Prime Meridian.

## 25. DIFFERENCE BETWEEN LATITUDES & LONGITUDES

LATITUDES	LONGITUDES
Latitudes are horizontal lines	Longitudes are vertical lines
The parallels of latitude are drawn in the east-west direction	The meridian of longitudes are drawn in the north-south direction
The length of parallels of latitude goes on decreasing towards the poles; the longest being the equator and the smallest being the two poles.	The meridians of longitude are always equal in length. They converge at the poles
The parallels of latitude including equator are 181 in number; 90 in the Northern Hemisphere and 90 in the Southern Hemisphere.	The meridians of longitude are 360 in number 180 towards the east of the Prime Meridian and 180 towards the west of the Prime Meridian.
Latitudes help us to know the temperature of a place	Longitudes help us to know the time of a place.

## 26. HEAT ZONES OF THE EARTH

The spherical shape of the earth causes different parts of the earth to be heated to different degrees. The regions near the equator are the hottest as they get more direct rays of the sun.

As we move away from equator towards the north or south, the temperature gradually decreases.

On the basis of heat received from the sun, the earth can be divided into three heat zones

- Torrid zone
- Temperate zone
- Frigid zone

**Torrid Zone-** Torrid means hot. This region lies between Tropic of Cancer and Tropic of Capricorn and receive maximum amount of heat throughout the year because the rays of sun fall vertically on this region.

**Temperate Zone-** Temperate means moderate neither very hot nor very cold. The regions between Tropic of Cancer and Arctic Circle in the Northern Hemisphere and regions Tropic of Capricorn and Arctic Circle in the Southern Hemisphere are two temperate zones. Here the sunrays are always slanting so the temperature is always moderate.

**Frigid Zone-** Frigid means cold. The regions between the Arctic Circle and North Pole in the Northern Hemisphere and the regions between Antarctic Circle and South Pole in the Southern Hemisphere are the two frigid zones.

## 27. LONGITUDE AND TIME

The earth takes 24 hours to complete one round of an angle of  $360^\circ$  or 360 longitudes. It means it takes 4 minutes for each degree to pass it in front of the Sun.

### LOCAL TIME

As the earth rotates west to east, every meridian faces the Sun once a day. When any meridian is facing the Sun, it is having 12 o'clock noon. All the places on the meridian will have midday or noon. It is called the local time.

If it is 12 o'clock noon on the Prime Meridian, it will be 1 o'clock afternoon at  $15^\circ\text{E}$ , 2 o'clock afternoon at  $30^\circ\text{E}$  and so on. Similarly, on  $15^\circ\text{W}$  meridian it will be 1 hour behind i.e. 11 am and on  $30^\circ\text{W}$  it will be 2 hours behind i.e. 10 am and so on.

## 28. STANDARD TIME

Every country chooses a central meridian, which is called the Standard Meridian of that country.

In India the longitude of  $81\frac{1}{2}^\circ\text{E}$  is treated as the Standard Meridian and the time on this meridian is the Standard Time for the whole country. It is known as the Indian Standard Time.

Similarly, the longitude or meridian that passes through the Greenwich (UK) is called the Prime Meridian. The time at the Prime Meridian is called the Greenwich Time (GMT) which is the standard time for UK.

The standard Meridian is generally a multiple of  $15^\circ$  or  $7\frac{1}{2}^\circ$  so that the difference between the standard time of a country and the GMT can easily be expressed. For ex. The IST is 5 hours and 30 min ahead of GMT. as India is to East to Greenwich

## 29. MOTIONS OF THE EARTH

The Earth rotates on its axis (ROTATION) and revolves around the Sun (REVOLUTION)

It is tilted in a fixed direction making an angle of  $66\frac{1}{2}^\circ$  to its orbital plane and  $23\frac{1}{2}^\circ$  to its vertical plane.

The tilt remains the same direction and at the same angle throughout the year.

The Earth rotates from west to east.

The Earth completes one Rotation in 24h. It causes day and night.

The Earth revolves around the Sun at a speed of about 1 lakh km/h. It takes 365 days and 6 hours to complete one revolution. One day is added every 4 years.

## 30. PERHELION and APHELION

The Earth has an elongated path while revolving the Sun.

Due to this the distance between the Earth and Sun varies.

When the earth is closest to the Sun, it is called Perihelion. It happens around 3<sup>rd</sup> January. At this time, the Earth is about 148 million km away from Sun.

When the Earth is farthest from the Sun, it is called Aphelion. It happens around 4<sup>th</sup> July. At this time, the Earth is about 151 million km away from the Sun.

## 31. SEASONS

The revolution of the earth on an inclined axis causes the seasons.

While revolving around the Sun, the earth's axis is inclined to one side. Due to this inclination on hemisphere receives more sunlight than the other.

When the Northern Hemisphere faces the Sun, it receives sunlight for a longer period which results summer season in this hemisphere while Southern Hemisphere experiences long dark hours with winters.

### 32. SOLSTICE

A solstice is an astronomical event that occurs twice each year as the sun reaches its highest or lowest excursion relative to the Equator.

Summer Solstice- Summer solstice occurs around June 21 in the Northern Hemisphere and marks the longest day of the year. On this day, the Sun is overhead at the Tropic of Cancer. On the same day the Southern Hemisphere experiences winter solstice marking the shortest day of the year.

Winter Solstice - Winter solstice occurs around Dec 22 in the Northern Hemisphere and marks the shortest day of the year. The Sun is overhead at the Tropic of Capricorn. During this time the Southern Hemisphere experiences summer solstice.

### 33. EQUINOX

The term equinox means equal days and nights.

During this period, the Sun shines vertically over the equator and all places on the earth have equal days and nights.

This occurs on 21<sup>st</sup> March Spring Equinox and 23<sup>rd</sup> September. Autumn Equinox in Northern Hemisphere.

While Southern Hemisphere experiences Autumn Equinox on 21<sup>st</sup> March and Spring Equinox on 23<sup>rd</sup> September.

### 34. RIVERS OF INDIA

#### ***Seven major Rivers of India***

Indus

Brahmaputra

Narmada

Tapi

Godavari

Krishna

Mahanadi

#### *RIVERS FLOWING INTO BAY OF BENGAL*

Brahmaputra

Kaveri

Ganga

Mahanadi

Godavari

Krishna

#### *RIVERS FLOWING INTO THE ARABIAN SEA*

Narmada

Tapi

Brahmaputra River is called Jamuna River in Bangladesh

All major rivers of India originate from one of the three main watersheds

The Himalaya and Karakoram Ranges

Vindhya and Saputara ranges and Chotanagpur Plateau in Central India

Sahayadri or Western Ghats in Western India

### 35. HIMALAYAN RIVERS

The main Himalayan river systems are the Ganga, The Indus and the Brahmaputra river systems. The Himalayan rivers form large basins. Many rivers pass through the Himalayas. These deep valleys with steep rock sides were formed by the down-cutting of the river during the period of the Himalaya uplift.

They perform intense erosional activity up the streams and carry huge load of sand and silt. In the plains, they form large meanders, and a variety of depositional features like flood plains, river cliffs and levees.

These rivers are perennial as they get water from the rainfall as well as melting of ice. These rivers are harnessed in their upstream catchment area to generate hydroelectricity.

### **36. PENINSULAR RIVERS**

The main peninsular river systems include the Narmada, the Tapi, the Godavari, the Krishna, the Kaveri and Mahanadi river systems. The peninsular rivers flow through shallow valleys. A large number of them are seasonal as their flow is dependent on rainfall. The intensity of erosional activities is also comparatively low because of the gentler slope. These rivers provide huge opportunities for hydro – electric power.

### **37. INDUS RIVER SYSTEM**

The Indus originates in the northern slopes of the Kailash range in Tibet near Lake Manasarovar. It follows a north –westerly course through Tibet. It enters Indian Territory in Jammu and Kashmir. It flows through the regions of Ladakh, Batistan and Gilgit and runs between the Ladakh Range and Zaskar range.

It crosses Himalayas through a 5181 m deep George near Attock, lying north of the Nanga Parbat and later takes a bend to the south west direction before entering Pakistan. It has total length of about 2897 km from the source to the point near Karachi where it falls into Arabian Sea. The main tributaries of the Indus in India are Jhelum, Chenab, Ravi, Beas and Satluj.

Chenab- It runs parallel to Pir Panjal Range

Ravi- it originated near the Rohtang pass in the Kangra Himalayas. The total length of the river is about 720 km

Beas- it originates In BEAS KUND lying near Rohtang pass. It runs past Manali and Kulu, where it's beautiful valley is known as the Kulu valley.

Sutlej- it originates from the Rakas Lake, which is connected to the Manasarovar Lake by a stream

### **38. THE BRAHMAPUTRA RIVER SYSTEM**

The Brahmaputra originates in the Mansarovar lake, also the source of Indus and Satluj. It is slightly longer than the Indus, but most of its course lies outside India. It flows eastward, parallel to the Himalays. Reaching Namcha Barwa(7757m), it takes a U turn around it and enters India in Arunachal Pradesh and known as dihang.

In India, it flows through Arunachal Pradesh and Assam. In Tibet the river is known as Tsangpo. In India shifting of the channels of the river is very common. The fury of the river during rains is very high. It is known for creating havoc in Assam and Bangladesh.

### **39. THE NARMADA RIVER SYSTEM**

The Narmada is a river in Central India. It forms a traditional boundary between North India and South India. Total length is 1289 km. Of the major rivers of peninsular India, only The Narmada, the Tapi and Mahi run from east to west. It rises on the summit of Amarkantak Hill in Madhya Pradesh state. .

At Jabalpur passing through the Marble Rocks it enters the Narmada Valley between the Vindhya and Saputara ranges. It goes to Gulf Of Cambay. It Passes through MP, Maharashtra and Gujarat. It empties into Arabian Sea, in the Bharuch district of Gujarat.



#### **40. THE TAPI RIVER SYSTEM**

The Tapi river of Central India. 724 km long. It rises in the eastern Satpura Range of Southern MP.

#### **41. GODAVARI RIVER SYSTEM**

The river with second longest course within India, Godavari is often referred to as Vridh Ganga or South Ganga. Length 1450km. It rises at Trimakeshwar near Nasik and flows southeast across south-central India through the States of MP, Karnataka, Orissa and Andhra Pradesh and empties into Bay of Bengal. At Rajahmundry 80 kms from the coast the river splits into two streams and thus forming a very fertile delta. It has pilgrimage sites Nashik, Triyambak and Bhadrachalam. It is a seasonal river.

#### **42. THE KRISHNA RIVER SYSTEM**

The KRISHNA is one of the longest rivers of India about 1300 km. It originates at Mahabaleshwar in Maharashtra, passes through Sangli and meets the sea in the Bay of Bengal at Hamasaadevi in AP. It flows through Maharashtra, Karnataka, and AP. It's most important tributary Tungabhadra.

#### **43. THE KAVERI RIVER SYSTEM**

The river is also called Dakshin Ganga. The headwaters are in the stern Ghats range of Karnataka State, and from Karnataka through Tamil Nadu. It empties into Bay of Bengal.

Its waters have supported irrigated agriculture for centuries and the Kaveri has been the lifeblood of the ancient kingdoms and modern cities of South India.

The source of the river is Talakaveri located in the Western Ghats about 5000ft above sea level. Talakaveri is a famous pilgrimage and tourist spot set amidst Bramahagiri Hills near Madikeri in Kodagu district of Karnataka.

Thousands of Pilgrims flock to the temple at the source of the river especially on the specified day known as Tula sankramana when the river water has been witnessed to gush out like a fountain at a predetermined time.

#### **44. MAHANADI SYSTEM**

The Mahanadi is a river of eastern India. The Mahanadi rises in Satpura Range of Central India and flows east to the Bay of Bengal. Length 860km.

The Mahanadi drains most of the state of Chattisgarh and much of Orissa and also Jharkand and Maharashtra. Near Sambalpur a large dam – The Hirakud dam is built on the river.

#### **45. ELLORA CAVES**

Ellora is an archaeological site 29 km north west of Aurangabad, Maharashtra.

Built by RASHTRAKUTA dynasty

Buddhist group of caves and Yadav (jain) group of caves

Epitome of Indian rock cut architecture

The 34 caves are actually structures excavated out of the vertical face of the Charanandri hills

Built between 5<sup>th</sup> century and 10<sup>th</sup> century

17 Hindus caves, 12 Buddhist caves, 5 Jain caves

Dancing Shiva, The wedding of Shiva

10 Avatars of Vishnu

Ganga Yamuna and Saraswati

Jain Digambara sect – Chhota Kailash, the Indra Sabha

Viharas with 8 cells

Chaitya griha

#### **46. BADAMI CAVES**

The Badami cave temples are a complex of three Hindu, a Jain located in Badami, a town in the Bagalkot district in Karnataka

They are example of Indian rock-cut architecture

Cave 1 - Tandava dancing Shiva as Nataraj

Cave 2 - Vishnu and Trivikrama

Cave 3 - largest Vishnu related Mythology

Cave 4 - Figures of Jainism

Around the lake Badami has other caves of which one may be a Buddhist cave

#### **47. INDIAN DESERT**

The western part of India has a large hot desert called the Thar Desert.

It is the seventh largest in the world.

It is extremely inhospitable and stretches over 208,110 sq km across the four states of Rajasthan, Gujrat, Punjab and Haryana.

The unique feature of Thar desert is the absence of oases.

Underground water is rarely found in the Thar.

#### **48. THE DECCAN PLATEAU OR PENINSULAR PLATEAU**

It is the oldest part of the Indian subcontinent and is formed of igneous and metamorphic rocks.

It is bound by the Eastern Ghats on the eastern edge and the Western Ghats on the western edge.

To the north of the Plateau lie the Vindhya and the Satpura Ranges.

The entire Plateau is a rich storehouse of minerals, especially the parts in the northern region.

In West Bengal, Jharkhand and Orissa it is known as Chota Nagpur Plateau and in Uttar Pradesh and Madhya Pradesh, as Malwa Plateau

#### **49. HYBRID SEEDS**

Hybrid seeds are developed by crossing two different crop varieties. This gives stronger and better crop yields, which can resist pest attacks.

#### **50. SOIL**

Soil is the surface layer of the earth's crust that develops because of weathering and erosion

This is a collection of loose particles of the earth's crust, which is a combination of decayed and disintegrated materials.

The rich soil of the top-most layer of the crust, made of decayed plants and dead organisms, is called humus

Soil is very vital for an area as it governs the agricultural pattern of a region.

The best soil is usually found in river valleys where silt is automatically renewed by annual flooding.

#### **51. SOILS OF INDIA**

Alluvial Soil

Black soil

Red soil

Laterite soil

Sandy soil

Mountain soil

## **52. ALLUVIAL SOIL**

The Northern Plains of India and the Coastal Plains, the largest producing areas of our country, have very fertile alluvial soil

The large rivers of the subcontinent such as the Ganga, the Sutlej, the Yamuna and the Brahmaputra along with their tributaries deposit millions of silt every year

Along the eastern coast, rivers such as the Mahanadi, the Godavari, the Krishna and the Kaveri make large deltas

Thus, the soil remains fertile because of annual flooding

The old alluvium called bhangar is less fertile whereas the new alluvium called khaddar is more fertile and finer in texture

## **53. BLACK SOIL**

Black soil found in the north-western part of the Deccan Plateau is formed of dark igneous rocks

Being rich in iron content, these rocks add fertility and black colour to the soil on disintegration

Locally the soil is called regur and is suitable for cotton cultivation

## **54. RED SOIL**

In other parts of the Deccan Plateau, reddish soil is found, which is not very fertile. They need regular chemical and natural fertilizers to make them fit for farming

## **55. LATERITE SOIL**

In areas of excessive rainfall, such as north-east India, Western Ghats and Chota Nagpur Plateau, the soil undergoes leaching.

Leaching is a process by which essential salts, nutrients and minerals drain out from soil due to heavy rains, thus reducing soil fertility.

Therefore, laterite soil is poor and needs to be enriched with fertilizers.

## **56. SANDY SOIL**

Loose, dry, sandy soil is found in Rajasthan.

It requires regular irrigation

The soil is very porous and cannot retain water and, therefore, is unsuitable for cultivation

## **57. MOUNTAIN SOIL**

- On the lower slopes of the Himalayas, the layers of the soil are very thin.
- They are poor in quality but constant clearing and adding of fertilizers have made them suitable for fruit cultivation

## **58. COFFEE**

Coffee is a native of Africa and is indigenous to the slopes of the Ethiopian Highlands.

Varieties of Coffee: Arabica, Robusta, Liberica, Esliaca

Bababundangiris in Karnataka is the birthplace of coffee in India.

## **59. RABI AND KHARIF CROPS**

Rabi crops are sown in winter around November and harvested in April-May

Kharif crops are sown after the rains in June-July and harvested in autumn

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