Geography

Universe

All existing matters, energy & space as a whole form universe. It contains both normal and dark matters. The normal matters are the visible parts such as sun, star, galaxies which contribute only 5% and the rest 95% are called the dark matter which is generally invisible.

Space

In astronomy & cosmology, space is the vast 3-dimensional region that begins where the earth's atmosphere ends. There are inter steller & intergalactic spaces.

- Study of Universe is known as **Cosmology**.
- **Big Bang Theory** explains the origin of the universe.
- Universe comprises galaxies, that are huge concentration of stars.

Galaxy

- **Galaxies** are also known as **Island Universe**.
- Galaxies may be–
  (i) Spiral (ii) Elliptical and (iii) Irregular
- The **Milky Way** is the galaxy that contains our Solar System.
- Latest known galaxy is the **Dwarf Galaxy**.

Star

- Stars account for most of the **Galactic Mass.**
- They tend to form groups called **Constellations**.
- A star goes through various stages of evolution.

The Life Cycle of a Star

- A **nebula** is a cloud of gas (hydrogen) and dust in space. **Nebulae** are the birthplaces of stars.
- A **star** is a luminous globe of gas producing its own heat and light by nuclear reactions **(nuclear fusion)**.
- Stars are born from nebulae and consist mostly of hydrogen and helium gas.
- **Red Giant stars** is a dying star, i.e. the later stages of the evolution of a star like the Sun, as it runs out of hydrogen fuel at its centre.
- In few billion years, the Sun will turn into a red giant star, expand and engulf the inner planets, possibly even the Earth. Red Giant stars are very cool, faint and small stars, approximately one tenth the mass and diameter of the Sun. **Proxima Centauri** and **Barnard's Star** are red dwarfs.
- **Red Dwarf stars** are the most common & longest lived stars.
- They are the smallest of the stars with low temperature.
- **White Dwarf** is very small, hot star, the last stage in the life cycle of a star like the Sun.
- **Black Hole** is very small, hot star, the last stage in the life cycle of a star like the Sun. The gravitational pull in a black hole is so great that nothing can escape from it, not even light. So, it is invisible.
- Renowned Indian physicist **S. Chandrasekhar** has given Chanderasekhar limit, which is about the formation of Black Holes.
- The closest star to the Earth is Sun.
- The closest star to our solar system is **The Proxima Centauri**.
- **Light year**, Astronomical unit (A.U.). **Parsec** is the unit of measurement of interstellar distance that is equal to 3.26 light years.

THE SOLAR SYSTEM

- The Sun, the nine planets (Pluto is not a planet now, considered as a dwarf planet) along with their satellites, the asteroids, the comets, the inter planetary dust and the electrically charged gases called **plasma**, together make up the solar system.
- Our solar system consists of an average star we call it the Sun, the planets – *Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune*. It also includes: the satellites of the planets; numerous comets, asteroids, and meteoroids; and the interplanetary medium.
- The Sun is an average star. It isn't the hottest, it isn't the coolest, it isn't the oldest. Nor is it brightest, biggest, etc.
- The Sun accounts for 99.85% of all the matter of the solar system.
- It is composed mainly of **hydrogen** and **helium**.
- **Nuclear fusion** in the core of the Sun is source of all its energy.
- The glowing surface of the Sun is called **Photosphere**.
- About it is red coloured Chromosphere and beyond it is **Corona** (visible during eclipses).
- The surface of the Sun changes continuously. Bright regions are called **Plages** and dark spots are called **Sun spots which** frequently form and disappear.

Sun Statistics

- Distance from the Earth – 150 mn km
- Diameter – 1391980 km
- Core temperature – 15000000°C
- Rotation time – 25 days
- Age – 5 billion years
- Composition – H_2 - 71%, He - 26.5% and other 2.5%
- Mass – 1.99×10^{33} kg

Solar Eclipse

- **Solar eclipse** is caused when the Moon revolving around the Earth comes in between the Earth and the Sun, thus making a part or whole of the Sun invisible from a particular part of the Earth.

Lunar Eclipse

During the revolution of Earth, when it comes between moon and the Sun the shadow of the Earth hides moon either fully or partially. This is called lunar eclipse.

Planet

A planet must meet three criteria:

(i) It must orbit the Sun,

(ii) It must be big enough for gravity to squash it into a round ball,

(iii) It must have cleared other objects out of the way in its orbital neighbourhood.

- The **Terrestrial Planets or Inner Planets** are the four innermost planets in the solar system, Mercury, Venus, Earth and Mars.
- The **Jovian Planets or Outer Planets** are Jupiter, Saturn, Uranus, and Neptune because they are all gigantic compared to Earth, and they have a gaseous nature.
- **Mercury** - It is the smallest and the closest planet to the Sun, without moon. Surface is full of craters.
- **Venus** - It is the second closest planet to the Sun, known as **evening** as well as **morning star**, rotates from east to west. It is the **hottest planet**. The atmosphere of venus is covered with thick clouds that strongly reflects sunlight.
- **Earth** - It is the third planet from the Sun with one moon. Perfect place for life. It consists of 78% nitrogen, 21% oxygen, and 1% other ingredients envelops it. **Moon** is the only natural satellite of Earth.
- **Mars** - It is the fourth planet from the Sun with two moons (**Phobos** and **Deimos**).
  It is known as the **Red Planet** because **iron** minerals in the Martian soil oxidize, or rust, causing the soil and the dusty atmosphere to look red. The planet is characterised by volcanoes, canyon systems, river beds, crated terrains and duncfields.
- **Jupiter** - It is the fifth planet, from the Sun. Its atmosphere is made up mostly of hydrogen (H_2) and helium (He). It has the fastest rotational velocity, completing one rotation in less than 10 hours.
  Jupiter has 67 known satellites and 4 Galilean moons. It has the biggest magnetosphere in the entire solar system.
- **Saturn** - It is the **second largest** planet of the solar system and surrounded by **rings** like structures. These rings are made of premordial dust and ice particles. More over Saturn is a gaseous planet. The planet has 62 prominent moons among which the largest moon is **Titan** which is the second largest in the entire solar system.
- **Uranus** - It is the seventh planet from the Sun. One day on Uranus takes about 17 hours (the time it takes for Uranus to rotate or spin once). Uranus makes a complete orbit around the Sun (a year in Uranian time) in about 84 Earth years. It has 27 moons. It is characterised by usual magnetic and electric field.
- **Neptune** - It is the eighth planet from the Sun. Its atmosphere is made up mostly of hydrogen (H_2), helium (He) and methane (CH_4). Triton is its largest moon. It is having a earth size blemish called as **Green dark spot**. It has 14 satellites among which **Triton** and **Nereid** are the prominent ones.

Pluto (not a planet now). It is now considered as a **dwarf planet**. It has slowest orbital velocity and hence, the longest year, **Charon**, is nearly half its size.

Dwarf planet– A dwarf planet is a planetary-mass object that is neither a planet nor a natural satellite. It shares its orbits around the Sun with other objects such as asteroids or comets. It is massive enough for its shape to be in hydrostatic equilibrium under its own gravity, but has not cleared the neighborhood around its orbit.
The first 5 recognised dwarf planets are – Ceres, Pluto, Eris, Haumea & Makemake.

Light year– A light-year is a unit of astronomical distance. It is the distance that light can travel in one year. It is approximately 9.5 trillion kilometres (or about 6 trillion miles).

Some facts about planets

1. Biggest Planet is **Jupiter**
2. Biggest Satellite is **Ganymede**
3. Blue Planet is **Earth**
4. Green Planet is **Uranus**
5. Brightest Planet is **Venus**
6. Brightest Planet outside Solar System is **Sirus**
7. Closest Star of Solar System is **Proxima Centauri**
8. Coldest Planet is **Neptune**
9. Evening Star is **Venus**
10. Farthest Planet from Sun is **Neptune**
11. Planet with maximum number of satellites is **Saturn**
12. Fastest revolution in solar system is by **Mercury**
13. Hottest Planet is **Venus**
14. Densest Planet is **Earth**
15. Fastest Rotation in Solar System by **Jupiter**
16. Morning Star is Venus
17. Nearest Planet to Earth is **Venus**
18. Nearest Planet to Sun is **Mercury**
19. Red Planet is **Mars**
20. Slowest Revolution in Solar System is by **Neptune**
21. Slowest Rotation in Solar System is by **Venus**
22. Smallest Planet is **Mercury**
23. Smallest Satellite is **Deimos**
24. Earth's Twin-is **Venus**
25. Atmosphere like Earth is on **Titan**

Moon

- The Moon is the Earth's only natural satellite.
- The Moon revolves around the Earth in 27 days 7 hours 43 minutes and 11.47 seconds and rotates on its own axis exactly the same time. That is why only one face of the Moon is seen from Earth.
- The total forces of the Moon and the Sun are in the ratio of 9 : 4.
- Study of the Moon is known as **Selenology**.

Statistics of Moon
- Diameter- 3500 km
- Mass- 7.35×10^{22} kg
- Distance from Earth- 384,400 km
- Circumference- 11,000 km
- Revolution time- 27.3 days
- Gravitational pull- 1/6th of that of the Earth

Asteroids, Meteoroids and Comets

- **Asteroids** or **Planetoids** are rocky bodies up to 800 km in diameter, although most are much smaller in diameter less than a km, i.e. Asteroids are the minor planets which especially belong to the inner solar system.
- They orbit the Sun in the asteroid belt, which lies between the **orbits of Mars and Jupiter**.
- **Meteoroids** are small fragments of rock and metal travelling through the space.
- Upon reaching the Earth's surface they are called **Meteorites**.
- **Comets :** They are the smallest units of the cosmic bodies which is made up of frozen gases, rocks and dusts.
- The tail of the comet always points away from the Sun because of the force exerted by solar wind and the radiation pressure.
- The most common comet is **Halley's comet** which is spotted every 76 years.

PHYSICAL GEOGRAPHY

Planet Earth

- The Earth is the **fifth biggest** planet in the solar system.
- The form of Earth is '**Oblate spheroid'**.
- The axis of the earth is inclined to the plane of Earth's orbit at an angle of 66 1/2°giving rise to different seasons and varying lengths of day and night.
- At equator, day and night are of equal length throughout the year.
- The Mid-day Sun shines vertically overhead at least once a year between the Tropic of Cancer and the Tropic of Capricorn. Thus, this region receiving the maximum heat is called **Torrid Zone**.
- **Temperate Zones** are the areas where climatic condition is not extreme. The area lies between the tropics and polar region (23½° × 66½°) having moderate climate.
- **Frigid Zones:** These are the two extremely cold zones situated in the Polar regions extending to the Arctic circle in the North and to the Antarctic circle in the South.
- **Equinox:** It is a day of the year when the duration of day and night is equal and the position of the Sun is in its zenith. In a year there are two equinoxes. September Equinox, i.e. **September 23rd**, and March Equinox **(March 21st)**.
- **Solstice**: Like equinoxes there are two solstices also, June 21st and December 21st. This is the time when Sun reaches either its highest or lowest point at noon resulting into shortest and longest day of the year in a hemisphere.
- Earth rotates on its own axis from west to east once in every 24 hours causing day and night.
- It revolves round the Sun in an orbit once in every 365 ¼ days causing the seasons of the year.

Latitudes and Longitudes

- **Latitude** is the angular distance of a point on the Earth's surface measured in degrees from the centre of the Earth.
- **Longitude** is the angular distance, measured in degrees along the equator, east or west of **Prime Meridian** (Prime Meridian that passes through **Greenwich** near **London**). It is also considered as **0°** longitude.
- **Equator**, i.e. **0°** is the biggest latitude that divides Earth into two equal hemispheres (North and South).
- **Tropic of Cancer** is 23.5° N
- **Tropic of Capricorn** is 23.5° S
- **Arctic Circle** is 66.5° N
- **Antarctic Circle** is 66.5° S
- This is the Prime Meridian from which all other meridians radiate eastwards and westwards up to 180°.

Standard Time and Time Zones

- The whole world has been divided into **24 standard** time zones.
- Each zone is separated by **15° longitu-des** or by **1 hour** or by **1° for 4 minutes**.
- In India, the longitude of **82° 30° E**, passing through the area near **Allahabad** is considered as the **Standard Meridian**. This is known as **Indian Standard Time** (IST). IST is 5 hours 30 minutes ahead of **GMT**.

  Tropic of Cancer passes through 8 states of India : Gujarat, Rajasthan, Madhya Pradesh, Chhattisgarh, West Bengal, Tripura and Mizoram.

International Date Line

- A traveller going eastward gains time from Greenwich where he will be 12 hours ahead of GMT.
- Similarly, going westwards, he loses 12 hours till he reaches 180° W.

The Earth's position with respect to the Moon

- **Apogee:** Period of the farthest distance between the Moon and the Earth (407,000 km).
- **Perigee:** Period of nearest distance between the Moon and the Earth (356,000 km).

Earth's position with respect to Sun

- **Perihelion:** Period of the nearest distance between Earth and the Sun (a 147 million km). The date of perihelion varies between 3rd to 5th Jan.
- **Apehelion:** Period of the farthest distance between the Earth and the Sun (appr. 152 km). The date of Apehelion varies between 4th to 6th July.

Lithosphere (Earth's Interior)

- **The Crust** is the outer most part of the Earth which is **solid**, **cool** and **brittle**. The thickness of the Earth's crust varies between 8 and 60 km which is divided into two parts: upper crust and lower crust. The density of crust varies between 2.8 to 3.0 g/cm^3. The temperature of crust varies between 200°C to 400°C from top to bottom.
- **The Mantle** -The mantle extends from 60 km to 2900 km of depth.

- **The Core-** Inner solid core also known as **Barysphere** having temperature up to 6000°C, goes up to a depth of 6371 km at the centre of the Earth. The average density of core ranges between 13.3 to 13.6 g/cm^3.

ROCKS AND MINERALS

- **Rocks** are naturally occuring hard substances made up of either single or multiple minerals compactly held together by cement like mineral matrix.
- As many as 87% of the minerals in the Earth's crust are **silicates**.

Types of Rocks

On the basis of modes of formation there are three types of rocks.

- **Igneous Rocks:** Igneous rock is formed through the cooling and solidification of **magma or lava** such as granite and diorite.
- **Sedimentary Rocks:** Sedimentary rocks are derived from the process of deposition and solidification of sediments after the process of **denudation**. For instance; Sandstone, limestone and chalk rock salts, gypsum or calcium sulphate, etc.
- **Metamorphic Rocks:** Metamorphic rocks arise from the transformation of existing rock types, in a process called **metamorphism**, which means "change in form". Gneiss phyllite, slate, schist, marble, quartzite, etc belongs to the category of metamorphic rocks.

Whole Earth's Composition

Elements	Percentage
Iron	35
Oxygen	30
Silicon	15
Magnesium	13
Nickel	2.4
Sulphur	1.9
Calcium	1.1
Aluminium	1.1
Others	1.0

Earth's Crust

Elements	Percentage
Oxygen	46
Silicon	28
Aluminium	8
Iron	6
Magnesium	2
Calcium	4
Potassium	2.3
Sodium	3.0
Others	1.0

GEOGRAPHICAL FEATURES

- Geographical features are the components of the Earth.
- **Landform:** Land forms are the recognizable unit of natural features on the earth's surface with varying shape, size and structure. It could be mountains, plateaus, valleys or small features like hills, eskers or canyons.
- **Landscape:** Large track of earth's surface or many related landforms with an aesthetic appeal together make up landscape.
- **Topography:** The arrangement of natural or artificial physical features of an area on the earth's surface, their inter relationship and configuration of structural entity is known as **topography**.
- **Terrain:** It is the physical characteristics of natural feature of an area, i.e. its landforms, vegetation and soils.

Classification of Landforms

Mountains: It is a naturally uplifted portion of earth's surface from its surroundings.

1. **Fold Mountains:** Folded mountains were developed due to the **tectonic activities** where the upper part of the earth's crust are folded and warped to produce rocky outcrops, hills or mountain. **Alps** in Europe, **Rockies** of North America, **Andes** of South America, **Himalayas** of Asia and **Atlantic** of North Africa.
2. **Block Mountains:** Block mountains have developed due to swelling of earth's crust bound by tectonic fault and characterised by massiveness, stup slopes, and comparatively smooth topography. **Varger** in France, **Black forest** mountains in Germany and **Salt Range** in Pakistan.
3. **Volcanic Mountains:** Mountain formed due to the accumulation of molten lava flowing out from a volcanic eruption. Hence they are generally cone shaped mountains with a depression at the top. **Mount Mauna Loa** in Hawai Islands, **Mt. Fuji Yoma** of Japan and **Mount Popa** in Central Myanmar.
4. **Residual or Dissected Mountains:** Nilgiris, Parasnath, Girnar and Rajmahal.

Plateau

- Plateaus are extensive area characterized by flat and rough top surface, steep sidewalls which rise above the neighbouring ground surface at least for 300 metres.
- Causes about 33% of the total earth's area.

Classification of plateau

1. **Plateau formed by exogenetic processes. These are–**
   (i) **Glacial Plateau,** e.g. Garhwal plateau, Greenland, Antarctica.
   (ii) **Fluvial Plateau,** e.g. Kaimur plateau, Bhander plateau, Rewa Plateau, Rohtas Plateau.
   (iii) **Aeolian Plateau,** e.g. Potwar Plateau (Pak), Loess plateau (China).

2. **Plateau formed by endogenetic processes. These are–**

(i) **Intermontane Plateau:** The plateaus which are partly or fully enclosed by mountains are known as intermontane plateaus. These are the results of the mountain-building process which was accompanied by a vertical uplift of the adjoining enclosed lands, e.g. Tibetan plateau, Bolivian plateau, Péruvien plateau, Columbian plateau and Mexican plateau.

(ii) **Piedmont Plateau :** It is situated at the foot of a mountain, it is bounded on the opposite sides by a plain or an ocean. It is also called the plateau of **denudation** because areas which were formerly high have now been reduced in elevation by various agents of erosion, e.g. **Appalachian** plateau, **Patagonien** plateau (Argentina).

(iii) **Dome Plateau :** It is formed when land mass is uplifted, e.g. Ozark Plateau (USA), Chota-nagapur plateau (Jharkhand).

(iv) **Lava Plateau :** It is formed due to accumulation of thick layers of basaltic lava, e.g. Columbia plateau (USA), Mahabaleshwar plateau, Panchgani tableland.

(v) **Continental Plateau :** They rise abruptly from the lowlands or from the sea, e.g. Deccan plateau of India, Ranchi plateau, Shillong plateau, Columbia plateau (USA), Mexican plateau, etc.

(vi) **Coastal Plateau:** Example–Coromandel coastal upland of India.

(vii) **Desert Plateau:** Example– Arabian Plateau.

(viii) **Humid Plateau:** Example– Shillong Plateau, Assam Plateau, Mahabaleshwar Plateau etc.

(ix) **Young Plateau:** Example– Idaho Plateau (USA), Colorado Plateau (USA), Mahabaleshwar Plateau, Khandala Upland (Maharashtra).

(x) **Mature Plateau:** Example– Ranchi Plateau, Hazaribagh Plateau (Jharkhand), Appalachian Plateau (USA).

(xi) **Rejuvenated Plateau:** Example Missouri Plateau (USA).

Plains: A relatively flat and a low-lying land surface with least difference between its highest and lowest points is called a plain. These are–

1. **Structural Plains** are resulted due to the upliftment of a part of sea floor bordered by a continent, generally called as continental shelf. Plains of Russian platform, Great Plains of USA and central lowlands of Australia.
2. **Erosional Plains** are formed when an erect tract of physical feature such as mountains, hills, etc. are worn down by the process of erosion. Northern Canada, Northern Europe and West Siberia are examples of ice - eroded plains.
3. **Depositional plains** are formed due to the massive deposition of sediments. It occured due to action of various agents, rivers, glaciers, winds, sea, waves, etc. The Indo-Ganga in the Indian subcontinent, the Huang Ho Plains of North China, the Po River plains in Italy and Nile river plains.

Delta: The depositional feature of almost triangular shape at the mouth of a river debouching either in lake or a sea is called Delta.

1. **Arcuate delta:** Nile, Ganga, Rhine, Niger, Irrawady, Volga, Indus, Danube, Mekong, Po, Rhone, rivers make such delta.
2. **Bird Foot Delta**: Mississippi and Omo river makes such delta.
3. **Eustarine delta:** Narmada, Tapi, Amazon, Mackenzie, Vistuala, Elb, Seine, Hudson rivers make such delta.
4. **Cuspate delta:** Ebro river makes such delta.
5. **Estuaries:** The surrounding where fresh water from the land meets salt water from the ocean are called Estuaries. Narmada, Tapi rivers make estuaries.

GEOGRAPHICAL PHENOMENA

Plate Tectonics

- The theory of plate tectonics states that lithosphere consists of several individual segments called **plates**.
- **Major Plates on Earth are.**
  (i) Antarctic plate
  (ii) North American and South American
  (iii) Pacific plate
  (iv) Indian – Australian – New Zealand plate
  (v) Africa/Eastern Atlantic Plate
  (vi) Eurasian plate
- **Pacific plate** is the largest plate while Juan de Fucaplate (off Western coast of North America) is the **smallest**.
- The collision of the Indian plate against the Eurasian plate, leading to the formation of the Himalayas.

Earthquakes

- An **earthquake** is basically the vibration of Earth produced by rapid release of energy, along a fault.
- **Focus:** Place of occurrence of an Earthquake inside the earth, where the energy is released. The ground ruptures at this spot, then seismic waves radiates outward in all direction.
- **Epicenter:** The point on the earth's surface is located directly above the focus of an earthquake.
- Seismic sensors called **Seismographs**, are located throughout the world can record the event.
- **Earthquake waves:** Earthquakes generate pulses of energy called **Seismic waves** that can pass through the entire Earth. These are –

1. **Primary(P) Waves :** These waves travel both through solid crust and mantle and liquid part of the Earth's core.
2. **Secondary (S) waves:** Travels only through solid parts of the Earth.
3. **Long (L) Waves:** It is confined mostly to the skin of the Earth's crust, thereby, causing most of the structural damage.
4. The magnitude as the intensity of energy released by an earthquake is measured by **Richter scale**. It ranges between 0 and 9.

Seismic Zones of India–

India is divided into 5 seismic zones.

- Zone 1 - Intensity V or below
- Zone 2 - Intensity VI
- Zone 3 - Intensity VII
- Zone 4 - Intensity VIII
- Zone 5 - Intensity IX and above

Volcano

- A volcano is an opening or rupture in planet's crust through which hot magma, volcanic ash and gases escape from the magma chamber below the surface.
- Volcanic eruptions cause earthquakes when they erupt and sometimes earthquakes can cause volcanic eruptions.They mainly happen by the edges of tectonic plates.
- **Products of Volcanic eruption**

➢ Ash
➢ Flying Rocks
➢ Poisonous gases
➢ Lava
➢ Pyroclastic flows
➢ Floods and Mudslides

- **Active Volcanoes**

On the basis of frequency of eruption the volcanoes can be divided into–

Active volcano: It has the capacity to erupt at regular basis and its frequency is quite more.

Dormant volcano: Though it has the capacity to erupt but frequency of eruption is almost nil.

Inactive volcanos don't have the capacity to erupt.

ATMOSPHERE

- **Composition:** The atmosphere is a mixture of many discrete gases as Nitrogen (78%), Oxygen (21%), Argon (0.93), Carbon dioxide (0.03)%, and others are Hydrogen, Helium, Krypton, yenon, Methane, Neon and ozone.
- **Troposphere:** Lower most part of the atmosphere. All weather phenomena takes place in this layer. Height of troposphere at poles is about 8 km while at equator is about 16 km due to greater heating at the equator.
- **Stratosphere:** Above troposphere is the stratosphere, which is primarily important because of the presence of **ozone**. This layer absorbs and scatters the solar ultraviolet radiation. It varies from 18–50 km.
- **Mesosphere:** It is a transitional layer. This is the coldest region of the atmosphere. Its height varies from 50–85 km. **Meteors** burn up in this layer.
- **Thermosphere:** It starts just above the mesosphere and extends to 600 km high. Aurora and satellites occur in this layer.
- **Ionosphere:** It is a layer of electrons and ionized atoms and molecules from 48 km to 965 km which has electrically conducting layers that help in Radio Communication. It overlaps into the mesosphere and thermosphere.
- **Exosphere:** The outermost layer of the Earth's atmosphere is known as Exosphere. It extends from the top of the thermosphere upto 10,000 km.

Structure of the Atmosphere

- Energy transfer in the atmosphere takes place in 3 ways: **radiation**, **conduction** and **convection**.
- The Earth's surface receives solar radiation at the rate of 1.94 calories per square centimetre per minute. This is called **Insolation (Incoming Solar Radiation)**.
- The vast amount of energy coming to and leaving the Earth's surface is through radiation.

Atmospheric Pressure

- Atmospheric pressure is the force per unit area exerted on a surface by the weight of air above that surface.
- Mean Sea level pressure of the atmosphere is **1013.2 mb**.
- Air pressure at sea level is higher than it is at the top of a mountain.
- Air pressure increases when air descends.
- Air pressure always decreases with increase in altitude.
- Similarly, when air rises, its volume increases and its pressure decreases.
- The temperature of air rises when its pressure rises and temperature of air falls when its pressure falls.
- The pressure of air falls when its temperature rises.
- The pressure of air rises when its temperature falls.
- High temperature along the equator causes the air to expand low pressure, it is called **Doldrums,** low pressure develops.
- Atmospheric pressure is measured with **Barometer**.

Pressure belts

- Atmospheric pressure is distributed across the latitudes in the form of pressure belts.
- These belts are seven in number: Polar High, Sub Polar Low, Sub Tropical High, Equatorial low, Sub Tropical High, Sub Polar Low and Polar High.

Wind

Because of horizontal differences in air pressure, air flows from the areas of high pressure to the areas of low pressure, *the horizontal movement of the air is called wind***.**

- **Planetary Winds** are the surface air flow in global scale which affects the climate acoss pressure belts.
  Some of the well known planetary winds are :
  Doldrums: Between 5° N to 5° S Latitude.
  Equatorial Westerlies: They blow from 15° N to 35° N Latitude.
- **Trade Winds:** They blow from the sub-tropical High Pressure Belt to the Equatorial Low Pressure Belt in the tropics between 30° North and 30° South latitudes.
- **Polar Winds:** They blow from the Polar High Pressure Belt to the Sub-polar Low Pressure Belt between 60° latitude and the Pole on both sides of the equator.
- **Westerlies:** The Westerlies, anti-trades, or Prevailing Westerlies, are prevailing winds from the west towards the east in the middle latitudes between 30 and 60° latitude. They originate from the high-pressure areas in the horse latitudes and tend towards the poles. These are :
  (i) **Roaring forties** - blow between 40°S to 50°S, it is known as roaring forties latitude winds.

(ii) **Furious fifties** have its location around 50° to 60°s latitude.
(iii) **Screaming (shrieking) Sixties** wind blows 60° Onwords in southern hemisphere.

- **Periodic Winds:** They reversed their direction periodically with season. E.g. Monsoon, land and sea breeze, mountain and valley breeze.
- **Local Winds:** They develop as a result of local differences in temperature and pressure. **Loo** is an example of local wind.

Cyclone

Cyclones: The system of wind rotating inward to an area of low pressure zone from its surrounding high pressure area.

- It is characterized by inward spiralling winds that rotate anti-clockwise in Northern hemisphere and clockwise in Southern hemisphere.

On the basis of the location cyclone are of two types.

Tropical Cyclone: Tropical cyclones are intense storm which follows circular tract over tropical oceans.

Temperate Cyclone: Temperate cyclones are formed in the middle and high latitude where there is large temperature variation owing to front genesis.

Anti-Cyclone

- Rapid outward movement of air masses with a high pressure at centre. The relation of wind is clockwise in northern hemisphere and anti-clock wise in southern hemisphere.

Hurricane

- Also called tropical cyclone. It is a disturbance of about 600 km across, spinning around a central area of very low pressure with wind speed above 118 km/hr.

Precipitation

This is the process when the atmosphere moisture which are previously in gaseous forms get condensed and comes down to earth's surface in the form of tiny droplets.

Precipitation are of three types **convectional**, **orographic** and **cyclonic**.

Humidity

- The amount of water vapour in the air is called **humidity**.
- The humidity of air depends upon the temperature, e.g. if the temperature rises then air can hold more water vapour.

Clouds

- A cloud is a mass of small water droplets or thin ice crystals.
- Different types of clouds are as follow:
- **Cirrus**: Feather like.
- **Cirrocumulus**: Ripples like.
- **Cirrostratus**: Transparent sheet like causes the Sun and the Moon to have '**halos**'.
- **Altocumulus**: Have bumpy-look
- **Altostratus**: Sheet like.
- **Stratocumulus**: Large globular masses.
- **Nimbostratus**: Dark grey and rainy looking, gives continuous rain.
- **Stratus**: Low clouds foggy in appearance.
- **Cumulus**: Round topped and flat based.
- **Cumulonimbus**: Special type of cumulous clouds spread out in form of an anvil. Often indicate convectional **rain**, **lightening** and **thunder**.

WORLD CLIMATIC TYPES

The Hot, Wet Equatorial Climate

- It is found between 5° and 10° north and south of the equator.
- Dominantly found in the lowlands of the Amazon,Congo, Malaysia and East Indies.
- The mean monthly temperature is always around 24 to 27°C.
- There is no winter.
- These regions are generally sparsely populated.
- Some plantation crops are also practised like natural rubber, cocoa, etc.

The Tropical Monsoon and Tropical Marine Climates

- It is found between 5° and 30° latitudes on either side of the equator.
- Best developed in the Indian subcontinent, Burma, Thailand, Laos, Cambodia, parts of Vietnam, South China and northern Australia.
- Tropical Marine climate is found in Central America, West Indies, Philippines, parts of East Africa, Madagascar, Guyana coast and eastern Brazil.
- Average temperature of warm dry summer months range between 27°C and 32°C.
- Trees are normally deciduous.
- Forests yields valuable timber like teak and sal.
- Agro-crops are rice, cane sugar, jute, etc.

The Savanna or Sudan Climate

- Found between 5°–20° latitudes on either side of the equator.
- It is found in Llanos of Orinico valley, the campus of Brazil, Central America, Southern Zaire, etc.
- Mean temperature in between 24°C and 27°C.
- Rainfall in between 100 cm and 150 cm.
- Trees are deciduous and hard.
- Tribes like Masai and Hausa are found in this region.

The Hot Desert and Mid-latitude Desert Climates

- It is located on western coasts of the continents between 15° and 30° N and S.
- Saharan desert, Great Australian desert, Arabian desert, Iranian desert, Thar, Namib, Atacama are some of the greatest deserts of the world.
- The hot deserts lie astride the Horse Latitude or Subtropical High Pressure Belts.
- Bushmen of Kalahari and Bindibu or Aborigines of Australia are nomadic hunters and food gatherers.
- Bedoium of Arabia, Tuaregs of Sahara, Gobi Mongols are some of the examples of Tribal groups.

Mediterranean climate

- Climate is characterized by hot, dry summer and cool, wet winter.
- Vegetation includes cork oak, eucalyptus, Jarrah and Karri.
- Evergreen coniferous trees are pines, firs, cedars.
- Viticulture is widely followed in the Mediterranean lands.

Temperate Continental (Steppe) Climate

- Bordering the deserts, away from the Mediterranean regions and in the interiors of the continents are the temperate grasslands.
- In N. America, they are known as **Prairies**.
- In Argentina and Urugway **Pampas**.
- In South Africa – **Veld**
- In Hungary - **Pustaz**.
- Summers are very warm and winters are very cold.
- Average rainfall range between 10 to 30 inches.

The China type Climate

- This type of climate is found on the eastern margins of continents in warm temperate latitudes just outside the tropics.
- Rainfall is more than moderate, anything from 25 inches to 60 inches.
- Vegetation includes pines, cypresses, bamboo, palms.

The Cool Temperate Eastern Margin (Laurentian type)

- The cool temperate Eastern Margin Climate feature both the maritime and continental climates.
- It is found in Canada, north east USA, Siberia, North China, Mancharia, Korea and northern Japan.
- Important crops includes soyabeans, groundnuts, sesame, rapeseeds, tung oil and mulberry.

The Arctic or Polar Climate

- Polar type climate and vegetation is found mainly north of the Arctic circle in the Northern Hemisphere.
- Winters are long and very severe, summers are cool and brief. Main vegetation includes mosses, lichens and sedges.
- In Green land, northern Canada and Alaska there is **Eskimos**.
- In the Eurasian tundra there are other nomadic tribes such as the **Lapps** of northern Finland and Scandinavia, the Samoyeds of Siberia, Yakuts, Koryaks and Chukchi of north-eastern Asia.

HYDROSPHERE

Oceans and Seas

- The Oceans comprise more than 70% of the earth's surface.
- The Seas receive almost 71% of all incoming solar energy due to its surface area.
- Oceans are the primary source of moisture in the atmosphere and much of the rain over the continents.
- Oceans are repository of a large number of useful metallic and non-metallic minerals such as petroleum, gas, salt, manganese, gold, diamonds, tin and Iron.
- Most characteristic feature of oceans and seas is their salinity.
- Salinity varies both horizontally and vertically and is maximum at tropics and decreases towards the equator and poles.

Continental shelves

- Continental shelf in the seaward extension of the continent from the shoreline to the continental edge.
- Continental shelves are rich in plankton, on which millions of fish thrive.
- The continental shelves are therefore the richest fishing grounds in the world, e.g. the Grand Banks of Newfound land, North Sea and Sunda Shelf.

Composition of Sea Water

Salt	Percentage
Sodium Chloride (NaCl)	77.8
Magnesium Chloride ($MgCl_2$)	10.9
Magnesium Sulphate ($MgSO_4$)	4.7
Calcium Sulphate ($CaSO_4$)	3.6
Potassium Sulphate (KSO_4)	2.5
Others	0.5

- Average temperature of surface water of the oceans is 26.7° C and temperature gradually decreases from equator towards the poles.

Ocean Ridge

- **Pacific Ocean** is the largest of all water bodies.
- **Mariana**, Tonga, Kuril, Philippine, Japan are the trench of Pacific ocean.
- Most striking feature of the Atlantic Ocean is the presence of mid-Atlantic Ridge. It extends from the north to the south paralleling the'S' shape of the ocean itself.
- Java or Sunda, Mauritius, Amirante trench are some of the important trench of the Indian Ocean.

Continental Slope: It is a steep slope, situated beyond continental shelf towards ocean and the slope generally varies between 2° to 5°. The average depth of water near continental slope varies between 200 m to 2000 m.

Deep Sea /Abyssal Plain: The extensive plain covering around 80% of the total area of ocean basin is known as **Abyssal plain**. The average depth varies between 3000 m to 6000 m. Some of the famous plains under this category are **Alaska plain**, Ameresian plain, Barracuda plain, Canary basin, Green land plain, etc.

Occan Deep: The long, narrow topographic depressions or trenches are called as **Ocean deep**. They generally run parallel to the coast. Ocean deeps are considered on the boundaries between two lithospheric plate. The challenger Deep in **Mariana Trench** is the greatest known deep in this world (10,994 meters/36070 feet).

Other major physical features

Associated with Ocean and Sea.

Bay: Bay are the small water bodies separated from the large water bodies by an inward curved piece of land. The

famous bays of the world are, Hudson Bay, Bay of pig, Chesapeake Bay, Bay of Bengal, etc.

Gulf : These are the large part of ocean or sea partially land locked and opens up through straits only. The world famous gulfs are Gulf of Mexico, the southern coast of United State and Cuba, Gulf of California, Gulf of Arizona.

Tides

- The periodic phenomenon of alternate rise and fall in the sea levels is known as **Tide**.
- It is produced due to gravitational interaction of the Earth, the Moon and the Sun.
- **Spring tides:** On the full moon and the new moon, tides are highest which are called **Spring tides**.
- **Neap tides:** A tide just after the first or third quarters of the moon when there is least difference between high and low water is called **Neap tides**.

Waves

- Waves are the oscillatory movements in water mainly produced by winds, manifested by an alternate rise and fall in the entire sea surface.
- This movement may include event such as slippage of the sea floor along the earth quake fault, underwater volcanic explosion or under water landslides.

INDIAN GEOGRAPHY

- **India is the seventh largest** country in the world.
- It covers an area of 32,87,2631 sq. km. Lying entirely in the Northern Hemisphere, the mainland extends measuring 3214 km from the north to the south between extreme latitudes and about 2933 km from east to west between extreme longitudes.
- It has a land frontier of about 15200 km.
- India is situated North of the Equator between 8°4' and 37°6' north latitude and 68°7' and 97°25' east longitude and is surrounded by the Bay of Bengal in the East, the Arabian Sea in the West and the Indian Ocean to the South.
- The **Gulf of Mannar** and the **Palk Straits** separate India from Sri Lanka.
- There are as many as 200 islands in Andaman alone.

Four end points of India:

Eastern most point - Kibithu in Arunanchal pradesh (On River-Lohit)
Western most point - Ghuar Mota of kutch in Gujarat
Northern most point - Siachen glacier in state of Jammu and Kashmir
Southern most point :
Mainland- Kanyakumari (Cape Comorin)
India's Territory - India Point (Andoman & Nicobar

Mountain Ranges in India

- The Himalayan Range is the world's highest mountain range.
- The tallest peak of the world, **Mt. Everest**, is also a part of it.
- **Karakoram Range** lies in Jammu and Kashmir and comprises more than 60 peaks.
- **K2** (Mount Godwin Austen) is the second highest peak of the world, also a part of this range. Its height is 8611m or 28,251 fit.
- **Shivalik Hills** extend from the Arunachal Pradesh to West Bengal and from Uttarakhand to Kashmir and Himachal Pradesh. Jammu, Kangra and Vaishno Devi are a part of this range.
- **Vindhya Range** spreads across central India and extends across 1,050 km.
- **Aravalli Range** is India's oldest mountain range and spreads across the parts of Rajasthan, Delhi and Haryana. **Guru Shikhar** in **Mount Abu** is the highest peak of this range.
- **Satpura Range** stretches from Gujarat and runs to Maharashtra, Madhya Pradesh and Chhattisgarh.

Some important facts about peaks

- Highest Mt. Peak in India: K_2 *or Godwin Austin*
- Highest peak in Aravalli: Gurushikhar (in Mt. Abu)
- Highest peak in Satpura: Dhupgarh (Mahadeo Hills)
- Highest peak in E. Ghats: Mahendragiri (Orissa)
- Highest peak in W. Ghats: Anaimudi (Annamalai Hills - Kerala)
- Highest peak in Nilgiris: Doda Betta
- Hills in Southern Hill complex : Nilgiri, Annamalai, Cardamom & Palani
- Hills in Eastern Ghats: Shevaroy, Javadi, Palkonda, Nallamalai, Northern Circars
- Oblique ranges to Western Ghats in Maharashtra: Ajanta, Satmala, Harishchandra, Balaghat
- Satpura range from East to West: Amarkantak - Maikal- Mahadeo - Gawilgarh - Rajpipala
- Highest peak in Andaman and Nicobar islands : *Saddle Peak*
- The highest peak of Naga hills is Saramati peak.

Western Ghats: This is the north Eastern part of Deccan plateau and lies parallel to the western edge of **Deccan plateau**. The extensive stretch is 1600 km long and stretches from Maharashtra to Kanyakumari.
Eastern Ghats: On the contrary eastern ghats are discontinuous and irregular as they are dissected by rivers. The average height is 300-600 m along the 600 m length.

Difference between Eastern Ghats and Western Ghats

Western Ghats	Eastern Ghats
Form a continuous water divide.	Discontinuous and dissected by rivers.
Can be crossed through passes	Series of detached hills

Higher than Eastern Ghats	Lower than Western Ghats
Face Arabian sea and run along the western plateau	Face Bay of Bengal and run along the Eastern Plateau
Comparatively narrow	Comparatively broader
Highest Peak-Anaimudi	Highest Peak-Mahendragiri

International Boundaries with India

- India shares its international boundaries with Pakistan in the West, Nepal, China and Bhutan in the North-East.
- It is surrounded by Burma and Bangladesh to the East.
- **Sri Lanka** is located in the South of India.
- **Radcliffe** line separates India and Pakistan.
- The **McMahan Line** is the effective boundary between India and China.
- The **Durand Line** is boundary between India–Afghanistan and Pakistan–Afghanistan.

Indo-Gangetic Plains

- The Indo-Gangetic plain is dominated by three major rivers - the Ganges, Indus and Brahmaputra.
- It covers a large area, about 7,00,000 sq km in Northern and Eastern India.
- The plain consists of four divisions:

1. **The Bhabar Belt:** It is a narrow belt which is located in the foothills of the Himalayas.
2. **The Terai Belt:** It is located in the southern part of the Bhabar region and made up of newer alluvium.
3. **The Bangar Belt:** It includes older alluvium and has a low hill in the Gangetic plain, which is covered by the laterite deposits.
4. **The Khader Belt:** It is located on the lower side of the Bhabar belt and made up of new alluvium, which is brought by the rivers which flow down the plain.

The Peninsular Plateau

- Peninsular plateau with its characteristic features includes shallow valleys and rounded hills. It is divided into three different plateaus:
  1. **The Deccan Plateau:** The plateau area is triangular in shape and surrounded by the Vindhyas and the Western and Eastern Ghats.
  2. **The Malwa Plateau:** The Malwa plateau is distributed in parts of Gujarat, Rajasthan and Madhya Pradesh.
  3. **The Chota Nagpur plateau:** It is located in Eastern India. Chota Nagpur plateau covers part of Jharkhand, Bihar, Odisha and Chhattisgarh.

The Thar Desert

- The Thar desert extends across Gujarat, Haryana and Punjab; and covers more than 60% of the geographical area of Rajasthan. The region is also called as '**MARUSTHALI**'
- **Luni** is the seasonal river and gets very little rainfall.
- It has an arid climate and vegetation is sparse.
- **Ghaggar** flows through Rajasthan and disappears at the heart of the Thar Desert.

Major Island Group

- Two major island groups are situated on either side of Indian peninsula. **Andaman and Nicobar** island group lies on the eastern part, i.e. in **Bay of Bengal** and **Lakshadweep** island group lies on the western part of India, i.e. in Arabian Sea.
- Altogether there are **247** smaller islands from which **204** are in Bay of Bengal and **43** islands are in Arabian Sea.

Rainfall in India

- More than 80% of annual rainfall is received in the four rainy months, from June to September.
- The average annual rainfall is about 125 cm.

Important lakes in India

Lakes Name	State
Kolleru Lake, Pulicat Lake	Andhra Pradesh
Deepor Beel, Chandubi Lake, Haflong Lake, Son Beel	Assam
Kanwar Lake	Bihar
Hamirsar Lake, Kankaria Lake, Nal Sarovar, Sursagar Lake	Gujarat
Brighu Lake, Dashir Lake, Dhankar Lake, Kareri (Kumarwah) Lake, Khajjiar Lake, Macchial Lake, Maharana Pratap Sagar, Manimahesh Lake, Nako Lake, Pandoh Lake,	Himachal Pradesh
Prashar Lake, Renuka Lake, Suraj Taal, Chandra Taal	Himachal Pradesh
Badkhal Lake, Brahma Sarovar, Karna Lake, Sannihit Sarovar, Surajkund Lake, Tilyar Lake, Blue Bird Lake	Haryana
Dal Lake, Pangong Tso, Sheshnag Lake	Jammu & Kashmir

Bellandur Lake, Ulsoor Lake, Sankey Lake, Agara Lake, Karanji lake, Kukkarahalli lake, Lingambudhi Lake, Pampa Sarovar	Karnataka
Ashtamudi Lake, Maanaanchira Lake	Kerala
Upper Lake, Lower Lake	Madhya Pradesh
Moti Jheel	Uttar Pradesh
Gorewada Lake, Lonar Lake	Maharashtra
Umiam Lake	Meghalaya
Loktak Lake	Manipur
Palak Dil Lake, Tam Dil Lake	Mizoram
Anshupa Lake, Chilka Lake, Kanjia Lake	Odisha
Kanjli Wetland, Harike Wetland, Ropar Wetland	Punjab

Important Rivers of India

Name	Origin From	Fall into	Length (km)
Ganges	Combined Sources	Bay of Bengal	2525
Satluj	Mansarovar Rakas Lakes	Chenab	1050
Indus	Near Mansarovar Lake	Arabian Sea	2880
Ravi	Kullu Hills near Rohtang Pass	Chenab	720
Beas	Near Rohtang Pass	Satluj	470
Jhelum	Verinag in Kashmir	Chenab	725
Yamuna	Yamunotri	Ganga	1375
Chambal	M.P.	Yamuna	1050
Ghagra	Matsatung Glacier	Ganga	1080
Kosi	Near Gosain Dham Park	Ganga	730
Betwa	Vindhyanchal	Yamuna	480
Son	Amarkantak	Ganga	780
Brahmaputra	Near Mansarovar Lake	Bay of Bengal	2900
Narmada	Amarkantak	Gulf of Khambat	1057
Tapti	Betul Distt. of M.P.	Gulf of Khambat	724
Mahanadi	Raipur Distt. in Chattisgarh	Bay of Bengal	858
Luni	Aravallis	Rann of Kuchchh	450
Ghaggar	Himalayas	Near Fatehabad	494
Sabarmati	Aravallis	Gulf of Khambat	416
Krishna	Western ghats	Bay of Bengal	1327
Godavari	Nasik distt. in Maharashtra	Bay of Bengal	1465
Cauvery	Brahmagir Range of Western Ghats	Bay of Bengal	805
Tungabhadra	Western Ghats	Krishna River	640

Important River Valley Projects in India

Bhakra Nangal Project	Situated on Sutlej in Punjab. Highest in India. Ht. 226m. Reservoir is called Gobind Sagar Lake.
Mandi Project	On Beas in HP
Chambal Valley Project	On Chambal in MP & Rajasthan, 3 dams include Gandhi Sagar Dam, Rana Pratap Sagar Dam and Jawahar Sagar Dam

Damodar Valley Project	On Damodar in Bihar, based on Tennessee Valley Project USA
Hirakud Project	On Mahanadi in Odisha, World's Longest Dam: 4801m
Rihand Project	On Son in Mirzapur, Reservoir is called Gobind Vallabh Pant reservoir
Kosi Project	On Kosi in N. Bihar
Mayurkashi Project	On Mayurkashi in West Bengal
Kakrapara Project	On Tapi in Gujarat
Nizamsagar Project	On Manjra in Andhra Pradesh
Nagarjuna Sagar Project	On Krishna in Andhra Pradesh
Tungabhadra Project	On Tungabhadra in Andhra Pradesh & Karnataka
Shivasamudram Project	On Cauvery in Karnataka. One of the oldest river valley projects in India.
Tata Hydel Scheme	On Bhima in Maharashtra
Sharavathi Hydel Project	On Jog Falls in Karnataka
Kundah & Periyar Project	In Tamil Nadu
Farakka Project	On Ganga in WB. Apart from power and irrigation, also helps to remove silt for easy navigation.
Ukai Project	On Tapti in Gujarat
Mahi Project	On Mahi in Gujarat
Salal Project	On Chenab in J&K
Mata Tila Multipurpose Project	On Betwa in Uttar Pradesh and Madhya Pradesh
Thein Project	On Ravi, Punjab.
Pong Dam	On Beas, Punjab
Tehri Dam	On Bhgirathi, Uttarakhand
Sardar Sarovar Project	On Narmada, Gujarat/MP.

Types of Natural Vegetation (Forest) in India.

Based on the predominant type of vegetation and climatic condition the forest type can be categorised into–

A. Tropical Evergreen and Semi Deciduous forest

Predominant in western slope of western ghats, hills of north-eastern region and the Andaman and Nicobar island.

- These areas experience annual precipitation of 200 cm and mean annual temperature of these region is 22°C.
- Major species of these type of forests are rose wood, Mahigony, aini, abony.

B. Tropical Deciduous Forest

- These are the wide spread forests of India and also called as **Monsoon forests**.
- The rainfall requirement of these type of forests ranges between 70–200m. On the basis of rainfall availability these forests are further divided into **moist** and **dry** deciduous forests. The **moist** deciduous forests receive recorded rainfall of 100-200 cm and mostly found in the north eastern state, along the foothills of Himalayas, eastern slopes of western ghats and Odisha.

  On the other hand dry deciduous forest receive rainfall of 70 cm to 100 cm and found in the rainier areas of Peninsula and the plains of Uttar Pradesh and Bihar. One of the importand properties of these forests that the trees shed leaves during dry season.
- Major species of moist deciduous forest are teak, sal, shisham, hurra, Mahua, amla, Semul, Kusum and sandal wood, etc.

  Major species of dry deciduous forest are Tendu, Palas, Amaltas, Bel, Khair, Axlewood, etc.

C. Tropical Thorn Forest:

- They are found in the semi-arid regions of southwest Punjab, Haryana, Rajasthan, Gujarat, Madhya Pradesh and Uttar Pradesh.

  These areas receives seasonal rain fall of 25 cm to 50 cm. The plant species of these kind of forests are date, Palm , Khair, Neem, Khejri, Palas, etc. The height of the plants in these areas are not more than 2 m.

D. Montane forest:

These type of forest are predominant in the higher altitude where there is decrease in Temperature. These can be subdivided into 3 categories:

(i) Wet Temperate Forest

(ii) Temperate forest

(iii) Alpine forest

(i) Wet Temperate Forest:

- They are generally found at an altitude of 1800 to 3000 cm above sea level and generally experience a rainfall 150 cm to 300 cm. The mean annual temperature required is 11° to 14° C.

- They have mainly occupied, high hills of Tamil Nadu and Kerala, Eastern Himalayan Region including hills of West Bengal, Assam, Arunachal Pradesh, Sikkim, Nagaland.
- Important plant species are Deodar, Chilauni, Indian chestnut, Birch, Plum, Cinnamomum, Listea, Mongolia, Blue Pine, Oak , Hemlock, etc.

(ii) Himalayan Moist Temperature Forest:

- They are found at an altitude of 1500 m to 3300 m. They receives 150 cm to 250 cm of rainfall.
- They occupy the areas such as Kashmir, Himachal Pradesh, Uttaranchal, Darjeeling and Sikkim.
- Important plant species of these forests are pines, Cedars, silver.

(iii) Alpine Forest Himalayan Dry Temperates :

(a) These forest grows in the areas where the south-west monsoon are weak and the precipitation is less than 100 cm.

(b) They grow in the inner dry ranges of Himalaya such as Ladakh, Lahut, Chamba, Kinnaur, Garhwal, and Sikkim.

E. Littoral & Swamp Forest

They are further divided into:

(a) Beach forest
(b) Tidal forest or Mangrove forest
(c) Fresh Water Swamp.

(a) Beach forest

(i) It requires 75 cm to 500 cm of rainfall.
(ii) Generally found in sea beaches and river delta.
(iii) Important plant species
are callophylum littoralis
Pandanus, Thespesia,
Barringtonia, Pongamia, cocos Mucifera, Spinzfix littoreus etc.

(b) Tidal or Mangrove Forest

- These are mainly found on both east and west sea coast of India and the soil of these forest is formed of silt, Silt-loam, silt clay and sand.
- Sundari tree is the famous plant species of this region. Other than this Palm, Coconut, Keora, Agar are also grown in some parts of this delta.

(c) Fresh Water Swamp:

Primarily occupied the area where rain or swollen river water is collected for sometime.

Important plant species are solia tetrasperma, Acer, Putrajiva, Holoptdia, Cepha lanthus, Borring tonia, Olea, phoeba, Ficus, Murraya, Adhatoda, and canna.

Features of Sunderbans

- **State**: West Bengal
- **Area**: 9630 sq.km
- **Endemic flora**: Sundari, passur, Nypa
- **Endemic fauna**: Bengal tiger, Bengal monitor lizard, Salvator lizard.
- The main threat includes excess fishing, aquaculture practices and harvesting of timber and firewood.

Climate of India

- India has 'Tropical Monsoon' type of climate.
- The word monsoon has been derived from the Arabic word '**Mausam**' which means seasonal reversal of the winds during the course of the year.
- The whole of India has a tropical monsoonal climate.
- Alternating seasons is the chief characteristic of India's climate.

Factors Affecting the Climate of India Latitude (8°0′ N and 37°0′ N latitudes), Himalaya Mountains, Altitude, Distance from the sea.

- Western disturbances are responsible for the winter rain in Northern India.
- Air currents in the upper layers of the atmosphere known as jet steams could determine the arrival of the monsoons and departure of the monsoons.

CENSUS 2011

- It is the 15th National Census survey conducted by the Census Organization of India.
- Mr. C. Chandramouli -Commissioner & Registrar General of the Census 2011.
- Survey has been conducted in 2 phases - house listing and population.

MOST POPULATED METROS		
1	Mumbai	18,414,288
2	Delhi	16,314,838
3	Kolkata	14,112,536
4	Chennai	8,696,010
5	Bangalore	8,499,399

TOP GROWTH RATE		
1	Dadra and Nagar Haveli	55.88 %
2	Daman and Diu	53.76 %
3	Puducherry	28.08 %
4	Meghalaya	27.95 %
5	Arunachal Pradesh	26.03 %

TOP LITERATE STATES		
1	Kerala	94.00 %
2	Lakshadweep	91.85 %
3	Mizoram	91.33 %
4	Goa	88.70 %
5	Tripura	87.22 %

BEST SEX RATIO		
1	Kerala	1084
2	Puducherry	1037
3	Tamil Nadu	996
4	Andhra Pradesh	993
5	Manipur	992

Indian Population Census 2011 covered a number of parameters during the survey like population, growth rate in population, rate of literacy, density of population, sex ratio and child sex ratio (0-6 years).

- **Population of India** – 1,210,193,422 with 623, 724, 248 males and 586,469, 174 females.
- **Total literacy rate:** 74.04%.
- **Density of population:** 382 persons/sq.km
- **Sex ratio:** 940 females per 1000 males
- **Child sex ratio:** 914 females per 1000 males

HIGH POPULATION		
1	Uttar Pradesh	199,812,341
2	Maharashtra	112,374,333
3	Bihar	104,099,452
4	West Bengal	91,276,115
5	Andhra Pradesh	84,580,777

WORLD GEOGRAPHY

Asia

- Largest of all continents.
- Stretches from 10°S and 8°N latitude and 25°E to 170°W longitude.
- World's highest point- **Mt. Everest**.
- World's lowest point- **Dead Sea**.
- **Important Mountains** - Himalayas, Karakoram, Kunlun Tienshan, Altai, Elbruz, Sulaiman, Zagros, Urals, Yablonovy,Hindukush.
- **Important Lakes:** Lake Baikal Onega, Ladoga and Peipus in Russia, Lake Akan, Mashu, Bima, Shikotsu in Japan, Qinghai and Khanka in China, Dal, Chilka, Vembanad, Pulicat and Sukhna in India, Lake Matano and Toba in Indonesia, etc.
- **Important Plateaus:** Anatolia plateau, Plateau of Iran, Arabia, Tibet, Tarim Basin, Mongolia, Deccan, etc.
- **Rivers:** Salween, Hwang-Ho, Amur, Ganga, Indus, Brahmaputra, Mekong, Yangtse, Si-Kiang, Lena, Ob, Irrawady.
- **Deserts:** Gobi, Taklamakan, Ordos, Karakum, Kyzyl kum, Thar, Dash-e-Lut, Dash-e-kavir.

Climate:

- In summer the Sun shines directly over the Tropic of Cancer, making the interiors of Asia very hot.
- Because of the warm rising air, low pressure develops over vast area.
- Moist winds from the sea all around are sucked into these low pressure centres. These are the '**Summer Monsoon**' winds which bring rain to most parts of South and South East Asia.
- In Winter the Sun shines over the Tropic of Capricorn.

Natural Vegetation

- **Equatorial Forests:** Mahogany, ebony, rosewood and palms.
- **Tropical Forests:** Teak, sal, rosewood, banyan.
- **Deserts:** Cacti, shrubs and thorny bushes.
- **Steppes:** Dry grasslands(from Ukraine to Lake Balkash and Siberia).
- Mediterranean Woodlands (Cedars, grapes and citrus fruits)
- Temperate forests (Oak, Camellia, Camphor, Bamboo and Mulberry)
- Taiga(temperate grasslands): spruce, fir, cedar, larch and pine.
- **Tundra:** Snow covers most of the time; grass, shrub, moss, lichens.
- **Minerals:** Oil, Natural gas.
- Iron ore, Tin, Coal, Mica, Lead, Bauxite and Chromite.

Races

- The **Arabian groups** - includes Arabs, Iranians, Jews, Turks.
- The **Indian groups** - include people of Indian subcontinent.
- The **Mongoloid group** - includes Chinese, Japanese, Koreans and people of South East Asia.

Africa

- Second largest continent.
- Stretches from 37°N to 35°S latitude.
- The Equator passes through almost the middle of the continent.
- Special feature is its **Great Rift Valley**.
- Important **mountains** - Atlas, Tibesti, East African mountains, Ahaggar mountains, Drakensberg, Mt. Kenya, **Kilimanjaro** (highest mountain in Africa).
- **Sahara**, the largest hot desert in the world, stretches across the entire width of North Africa.
- Other **deserts** are Kalahari, Namib, Nubian desert.
- Important **rivers** - River **Nile** (longest in the world).
- River Congo, River Niger, River Zambezi, River Limpopo (crosses the tropic of Capricorn twice), River orange.

Important Dams

- Aswan Dam -River Nile
- Kariba Dam - Zambezi
- Kainji Dam - Niger
- Cabora Bassa Dam – Zambezi

Important lakes of Africa: Lake Victoria, Taaganyika, Nyasa, Chad, Nasser, Kariba, Assal, etc.

Climate

As a large continent, Africa experiences a variety of climate. They are tropical monsoon, humid and sub humid tropical climate, mediterranean hot summer, hot desert climate, tropical wet/dry climate.

Natural Vegetation

Tropical Rain Forest: Mahogany, ebony and teak, oil palms, rubber-producing trees, orchid and lilic.
Tropical Savannas: Oil palms, rubber tree and african Abony.
Tropical Steppes and Deserts: Thorny Acacia euphorbias, dwarf palm, and juice tree.
Mediterranean Forest: Cork oak, olive tree, cedar pine and iron wood.
Montane forest: bamboo, wild variety of coffee and banana.
Mangrove forest: Papyrus, tall grasses, and lotus.

Races

Pygmies: A short height tribal community predominant in Rwanda, Burundi, Uganda, the Democratic Republic of Congo (DRC), the Republic of Congo (ROC), the central African Republic Cameroon, the Equatorial Guinea, Gabon, Angola, Botswana, etc.
Bushmen: A group of yellow skinned nomads spreads along Botswana, Namibia South Africa, Zambia, Zimbabwe and Angola.
Zalus: They are the typical African tribes and descendants of Nguni speaking people who occupied, kwazulu-Natal province of Africa.
Yosai: The semi nomadic tribe concentrated in Kenya.
Bantus: A community Bantu spoken people concentrated in Rwanda, Angola, Burundi, Zimbabwe and South Africa.
Tropical wet and dry climate zone which further divided into equatorial, Tropical and Sub tropical, etc.

South America

- South America is a long triangular shaped continent. It is **4th largest** continent.
- Stretches from 12°N to 55°S latitude.
- **Mountains- The Andes** (longest mountain range in the world.), Aconcagua, Ojendal Salado, Chimborazo, Cotopaxi,
- **Lakes- Titicaca** (highest navigable lake in world), Poopo, Argentino, Junin, Buenos Aires,Nahuel Huapi.
- **Angel falls** (on Orinoco River) is the highest in the world.
- **Deserts:** Patagonia (Argentina), Atacama (Western Coast), Monte desert (Argentina)
- **Climate and Vegetation:** Hot wet Equatorial Climate, **Selvas** (Dense rainforests), **Savanaa** (grasslands), **Pampas** (grasslands of Argentina), **Patagonia** (temperate desert).
- The Pacific Coastlands lie between Andes and the Pacific Ocean.

Important Crops

- Coffee – Brazil
- Cotton – Brazil
- Soybean – Brazil
- Wheat – Argentina
- Sugarcane – Argentina
- Sunflower – Argentina
- Beef – Argentina
- Fisheries – Peru

Minerals

- Petroleum – Venezuela (Maracaibo lake), Trinidad
- Gold – Ecuador, Brazil
- Silver – Peru
- Copper – Peru
- Tin – Bolivia
- Diamonds – Guyana
- Emeralds – Colombia
- Iron ore – Brazil
- Nitrates – Atacama desert
- Aluminium – Brazil
- Lead – Peru
- Zinc – Peru
- Coal – Colombia

Tribes

- **Bantu** – Central and Southern Africa
- **Berbers** – Algeria, Morocco, Tunisia
- **Masais** – East Africa
- **Hottentots** – Kalahari
- **Bushmen** – Kalahari
- **Pygmies** – Congo
- **Zulu** – South Africa
- **Tuaregs** – Sahara
- **Wolof** – Senegal
- **Fon** – Benin
- **Demba** – Zambia
- **Bambara** – Mali
- **Ashanti** – Ghana
- **Amhara** – Ethiopia

North America

- **Third largest continent** after Asia and Africa.
- Extends from **7°N to 85°N latitude** and east to west from 20°W to 179°W. Spreads over an area of 24 million sq. km.
- The Tropic of Cancer and the North circle pass through the continent.
- Includes three large countries - USA, Canada, and Mexico.
- **The Western Cordilleras:** Young Fold mountains (Alaska to South America).
- **Mountain Ranges-** Rocky Mountains, Alaska Range, Coast Mountains, Mt. Logan.
- Cascades, Sierra Nevada and Sierra Madre, **Mt. McKinley** (highest peak of North America in Alaska).
- **Lakes -** Superior, Michigan, Huron, Erie and Ontario, Memphremagog, St. Clair, Champlain.
- **Deserts:** Great Basin desert, Painted desert.
- **Mojave desert -** Yuha desert.
- **Chihuahuan desert -** Baja California desert.
- **Sonoran desert-** Tehuacan desert.
- **Moab desert-** Mohave desert.
- **Important Rivers:** Mississippi, Missouri, St. Lawrence, Mackenzie, Colorado, Hudson, Potomac, Ohio, etc.
- **Death valley** in California is the lowest point (– 86 m below sea level)
- **Dam:** Colorado river (Davis dam, Hoover dam, Parker dam and Buchanan dam)

Climate and Vegetation

- **Tundra :** Arctic Circle, Arctic Ocean and Hudson Bay.
- Summers and Winters are cool and long; Lichens, mosses and Low berry.
- **Taiga :** Winters (long and cold), Summer(short and warm.)
- **Trees:** Pine, Fir, larch.

Temperate Eastern Margin

- Northern part of this region is influenced by cold labrador current and southern is influenced by trade wind.
- Major plant species includes Maple, Oak, Elm and Ash tree.

Cool Temperate West Margin

Influenced by warm Alaska current Westerly rain through out the year and warm summers and wild winters.
Coniferous trees are predominant here.

Mediterranean Climate

Influenced by trade wind in summer which make hot dry summer. As the climate is unfavourable for plant growth only scrub like vegetations are common here.

Hot Desert: Great deserts like Mohave and Sonora are present on the South Western part of North America. Because the mountains to the east act as a rain shadow for Trade wind.
Common plant species are Cacti, Sage, Thorn bushes, and Coarse Grasses. The Joshua tree is a taller cactus.

Grasslands: Prairies

- **Winds:** Chinook, Blizzards, Hurricanes, Tornadoes.
- **Minerals:** Gold, Iron, Copper, Silver, Nickel, etc.

Tribes

- Abenaki – Alent
- Apache – Arawak
- Aymara – Caddo
- Cayuga – Ponca
- Crow – Seneca
- Innu – Shoshone
- Yurok – Wichita

Australia

- World's **largest island** and **smallest continent**.
- The tropic of **Capricorn** cuts the continent almost into half.

- The **Great Barrier Reef** (largest coral reef in the world) is situated in Australia.

The location of Australia is in between India and Pacific Ocean and it stretches west to east from 114° E longitude to 154° E longitude and from 10°S to 40°S Latitude.
The island was discovered by **Captain cook** in 1770.

- **River-** Murray and Darling.
- **Deserts-** Gibson Desert, Great Sandy Desert, Great Victoria Desert, Simpson Desert, Tittle sandy desert. Strzelecki Desert, Tanami Desert, Rangipo Desert.
- Both temperate and tropical climate is experienced in Australia.
- The winter lands of New South Wales of victoria, Tasmania, the south-eastern Australia, South west port of Australia comes within this temperate zone where 4 prominent seasons dominate the whole year. They are
  - Summer
  - Autumn
  - Winter
  - Spring
- Tropical wet and dry climate zone which is further divided into equatorial, tropical and sub tropical etc.

Climate and Vegetation
Natural Vegetation:
The Predominant vegetation types are –
Tropical rain forest region with dense cover of coconut and palms, mangrove growing near shoreline
The deciduous forest region with tall and short tree , shrubs, small plants and mosses.
The dry desert and desert scrub: It is the region with vegetation such as cactic. **Grassland –** Prominent Grasslands of Australia are Savanna and Downs.

- **Crops-** Wheat, Barley, oats, maize, sugarcane, tobacco and cotton.
- **Largest** number of **sheep** in the world.
- **Largest** producer of **bauxite** in the world.
- **Industries-** iron and steel, agricultural machinery, motor vehicles, electrical goods, chemical, ships, etc.
- **Metals-** Uranium (Kalgoorlie and Koolgardie), Lead, Zinc, Silver and Manganese.
- **Original Inhabitants.** Aborigines.

Antarctica

- It is the **fifth** largest continent.
- It is completely covered by permanent ice and snow.
- **Temperature:** falling to – 90°C.
- **Mosses** and **lichens** are found all over clinging to rocky surfaces.
- **Animals-** krill, whales, seals, sea birds and penguins.
- **Highest peak-** Vinson Massif.
- **Mountain range-** Queen Maud Range (Longest mountain range).
- **Volcano-** Mount Sidley (highest volcano).
- **Aurora Australia** (Southern Hemisphere) and **Aurora Borealis** (Northern hemisphere) are fantastic display of lights in winters.

Europe

- It is the **second** smallest continent.
- Stretches from 35°N to 80°N latitude and from 10°W to 60°E longitude.
- Separated from Asia by Russia's **Ural** mountains and the Caspian and Black sea.
- **Highest point-** Mt. Elbrus.
- **Lowest point-** Caspian sea (28 m below sea level).
- **Mountains-** Ural Mt. Scandinavian, Mt. Old Block. The Alpine Alps, Jura.
- Carpathian Balkan.
- **Deserts-** Halendi, Bedowska, Deliblatska Pescara, Oltenian Sahara, Tabernas Desert.
- **Rivers-** Rhone, Ebro, Po, Danube, Dnieper, Don, Rhine, Seine, Thames, Elbe.
- Mild climate , moderate rain.
- Tundra, Taiga, Steppes (temperate grasslands).
- **Trees-** Elm, Oak, Beech Ash, Olive(most important tree)
- **Minerals-** Iron ore, Petroleum, Mercury, Sulphur, Copper, Coal.
- European belong to white race known as **Caucasian race**.
- There are three distinct **branches**: **Nordic people** (tall, fair with very light hair and eyes.) **Mediterranean people** (shorter with dark skin, hair and eyes) and **Mongoloid people** (heavily built, as Lapps and Finns).

EXERCISE

1. The Indian subcontinent was originally part of a huge mass called
(a) Indian (b) Aryavarta
(c) Angaraland (d) Gondwana land

2. Which one of the following is the dominant element of the earth crust?
(a) Aluminium (b) Iron
(c) Oxygen (d) Silicon

3. The highest salinity is found in which of the following lakes?
(a) Van Lake (b) Dead sea
(c) Balkash lake (d) Baikal lake

4. The deepest lake of the world is
(a) Baikal (b) Crater
(c) Nyasa (d) Tanganyika

5. Which one of the following sea is the largest in area?
(a) Sea of Okhotsk (b) Sea of Japan
(c) Sea of China (d) Bering Sea

6. The biggest island of the Indian Ocean is
(a) Maldives (b) Madagascar
(c) Lakshadweep (d) Sumatra

7. Which one of the following ocean currents is different from others?
(a) Gulf stream (b) Kuroshivo
(c) North Atlantic Drift (d) Labrador

8. Earth's Albedo is largely affected by
(a) Cloudiness
(b) Dust particles in atmosphere
(c) Atmospheric layer
(d) Nature of the earth's surface

9. The largest volume and mass of the earth is found in
(a) Crust (b) Mantle
(c) Outer core (d) Inner core

10. The clockwise movement of winds in the cyclones of southern hemisphere is mainly caused by
(a) Centrifugal force (b) Deflective force
(c) Frictional force (d) Pressure force

11. Which one of the following currents has a warming influence on the neighbouring coast?
(a) Benguela (b) Agulhas
(c) Canaries (d) Oyasio

12. Which one of the following local winds is different from the other three?
(a) Khamsin (b) Foehn
(c) Sirocco (d) Mistral

13. Atmospheric layer which reflects radio waves is called
(a) Exosphere (b) Ionosphere
(c) Stratosphere (d) Troposphere

14. The layer of the atmosphere which contains dust particles and water vapour is called
(a) Stratosphere (b) Troposphere
(c) Ionosphere (d) Mesosphere

15. Gulf stream is
(a) A river in the Gulf
(b) An ocean current
(c) A second name of jet stream
(d) A local wind

16. Which of the following is not igneous rock?
(a) Granite (b) Conglomerate
(c) Basalt (d) Rhyolite

17. Jet stream is
(a) Fast blowing westerlies in upper part of Troposphere.
(b) Ocean current
(c) Monsoon winds
(d) None of these

18. Peanuts are the main crop of
(a) Georgia (b) Gambia
(c) Ghana (d) Guatemala

19. The leading producer of both rice and wheat in the world is
(a) China (b) India (c) Russia (d) U.S.A.

20. Which one of the following is a fossil source of energy?
(a) Wood (b) Solar radiation
(c) Tidal waves (d) Petroleum

21. The largest exporter of steel in the world is
(a) China (b) Japan (c) Russia (d) Ukraine

22. In which of the following crops the international trade is low in comparison to total produce?
(a) Coffee (b) Rice (c) Rubber (d) Wheat

23. Which of the following countries is the greatest producer of bauxite in the world?
(a) Argentina (b) India
(c) South Africa (d) Brazil

24. The neighbouring country of India which has the largest area is
(a) Bangladesh (b) China
(c) Pakistan (d) Nepal

25. Which one of the following countries has the longest international boundary with India?
(a) China (b) Pakistan
(c) Bangladesh (d) Myanmar

26. How many countries share land boundaries with India?
(a) Five (b) Six (c) Seven (d) Nine

27. Which is the world's largest delta?
(a) Sunderbans delta (b) Ganga-Brahmaputra delta
(c) Beas-Chenab delta (d) Godavari delta

28. In which part of India does the Great Indian Desert lie?
(a) Western (b) Eastern
(c) Northern (d) Southern

29. Lakshadweep Islands are _____ Islands located in the Arabian Sea
(a) Coral (b) Maldives
(c) Both 'a' and 'b' (d) None of them

30. Which of the following is the largest state of India?
(a) Bihar (b) Rajasthan
(c) Madhya Pradesh (d) None of these

31. Which of the following rivers does not drain into the Bay of Bengal?
(a) Mahanadi (b) Krishna
(c) Yamuna (d) Ganga

32. Which is the coldest inhabited place of the world?
(a) Kargil (b) Srinagar (c) Leh (d) Drass

33. What do you call the hot and dry winds?
(a) Hawa (b) Zoo
(c) Loo (d) None of them

34. What do you mean by Natural Vegetation?
(a) Small plants
(b) Plants which grow on their own without interference or help from human beings
(c) Forests
(d) None of them

35. Which are the monsoon forests?
(a) Tropical evergreen forests (b) Tropical deciduous forests
(c) Tropical rain forests (d) None of them

36. In Brazil, Tropical Grasslands are called
(a) Savannah (b) Campos
(c) Llanos (d) Pampas

37. Tafilalet Oasis is found in
(a) Morocco (b) Libya
(c) Egypt (d) Algeria

38. Where is the Ganga-Brahmaputra basin situated?
(a) It lies in the sub-tropical region
(b) It lies in the north-temperate region
(c) It lies beside the Nile river
(d) None of them

39. Name one of the important rivers which flows through Ladakh?
(a) Ganga (b) Yamuna
(c) Brahmaputra (d) Indus

40. In which continent is the world's largest desert situated?
(a) Asia (b) Africa
(c) Australia (d) South America

41. How many countries does the Sahara desert touch?
(a) 10 (b) 8 (c) 11 (d) 5

42. Which of the following is the largest river basin in the world?
(a) Nile basin (b) Yamuna basin
(c) Amazon basin (d) Hwang-Ho basin

43. Which of the following is known as the gold capital of the world?
(a) Egypt (b) South Africa
(c) Kimberley (d) Johannesburg

44. Merino is a species of
(a) sheep (b) elephant
(c) fish (d) cow

45. How many layers does the earth have?
(a) 5 layers (b) 3 layers
(c) 2 layers (d) 1 layer

46. The continental masses are mainly composed of
(a) silica (b) alumina
(c) (a) and (b) both (d) None of these

47. The oceanic crust is mainly composed of :
(a) silica (b) magnesium
(c) (a) and (b) both (d) None of these

48. Mantle extends up to a depth of :
(a) 1900 km (b) 2900 km
(c) 3900 km (d) 4900 km

49. What are fossils?
(a) The remains of the dead plants and animals
(b) Molten magma
(c) Igneous rocks
(d) All the above

50. The movement of earth plates occurs due to :
(a) molten magma (b) crust
(c) mantle (d) None of these

51. Earthquake occurs because
(a) When magma inside earth comes out
(b) High pressure wind blows
(c) Lithosphere plates move, causing the earth's surface to vibrate.
(d) None of these

52. The radius of the earth is _____km.
(a) 6000 (b) 6371
(c) 6800 (d) 7000

53. Igneous rocks are characterised by
(a) full of fossils and fauna (b) stratification
(c) deposition of sediments (d) None of these

54. A volcano is a
(a) vent in the earth's crust through which molten material erupts suddenly.
(b) opening in the earth's surface through which water comes out.
(c) force that works on the surface of the earth.
(d) None of these

55. Which of the following is a cold desert ?
(a) Thar (b) Sahara
(c) Ladakh (d) None of these

56. What does Khapa-Chan mean ?
(a) Sand land (b) Snow land
(c) Water area (d) All of these

57. What do you mean by a 'reserve'?
(a) It is that portion of the actual resource, which can be developed profitably with the available technology
(b) This is a resource that cannot be developed further
(c) It requires a lot of time and energy of human beings
(d) None of them

58. Physical factors responsible for soil erosion is /are
(a) slope of the land
(b) intensity of rainfall
(c) velocity of wind blowing in that area
(d) All of them

59. Bauxite is an ore of _____
(a) aluminum (b) iron
(c) gold (d) copper

60. What is Geothermal Energy?
(a) It is muscular energy
(b) It is energy produced by human beings
(c) It is the natural heat found in the interiors of the earth
(d) None of them

61. Atmospheric pressure depends on
1. Altitude 2. Temperature
3. Earth rotation4.Moon's pull
(a) 1, 2 and 3 (b) 2 and 3
(c) 1 and 2 (d) 1, 2, 3 and 4

Hints & Solutions

1. (d) **2.** (c) **3.** (a) **4.** (a) **5.** (a) **6.** (b)
7. (d) **8.** (a) **9.** (b) **10.** (b) **11.** (b) **12.** (d)
13. (b) **14.** (b) **15.** (b) **16.** (b) **17.** (a) **18.** (b)
19. (a) **20.** (d) **21.** (a) **22.** (b) **23.** (d) **24.** (b)
25. (c) **26.** (c) **27.** (b) **28.** (a) **29.** (a) **30.** (b)
31. (c) **32.** (d) **33.** (c) **34.** (b) **35.** (b) **36.** (b)
37. (a) **38.** (a) **39.** (d) **40.** (b) **41.** (c) **42.** (c)
43. (d) **44.** (a) **45.** (b) **46.** (c) **47.** (c) **48.** (b)
49. (a) **50.** (a) **51.** (c) **52.** (b) **53.** (b) **54.** (a)
55. (c) **56.** (b) **57.** (a) **58.** (d) **59.** (a) **60.** (c)
61. (a)