

## ASTRONOMY

NASA defines astronomy as “the study of stars, planets and space.”

**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 stellar & 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.
- **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**.
- Stars account for most of the **Galactic Mass**.
- They tend to form groups called **Constellations**.

## The Life Cycle of a Star

- A star goes through various stages of evolution.
- 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. 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 Chandrasekhar 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**.
- **Parsec** is the unit of measurement of interstellar distance that is equal to 3.26 light years.

## The Solar System

- The Sun, the eight 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**.
- Above 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<sub>2</sub> - 71%, He - 26.5% and other 2.5%
- Mass –  $1.99 \times 10^{33}$  kg

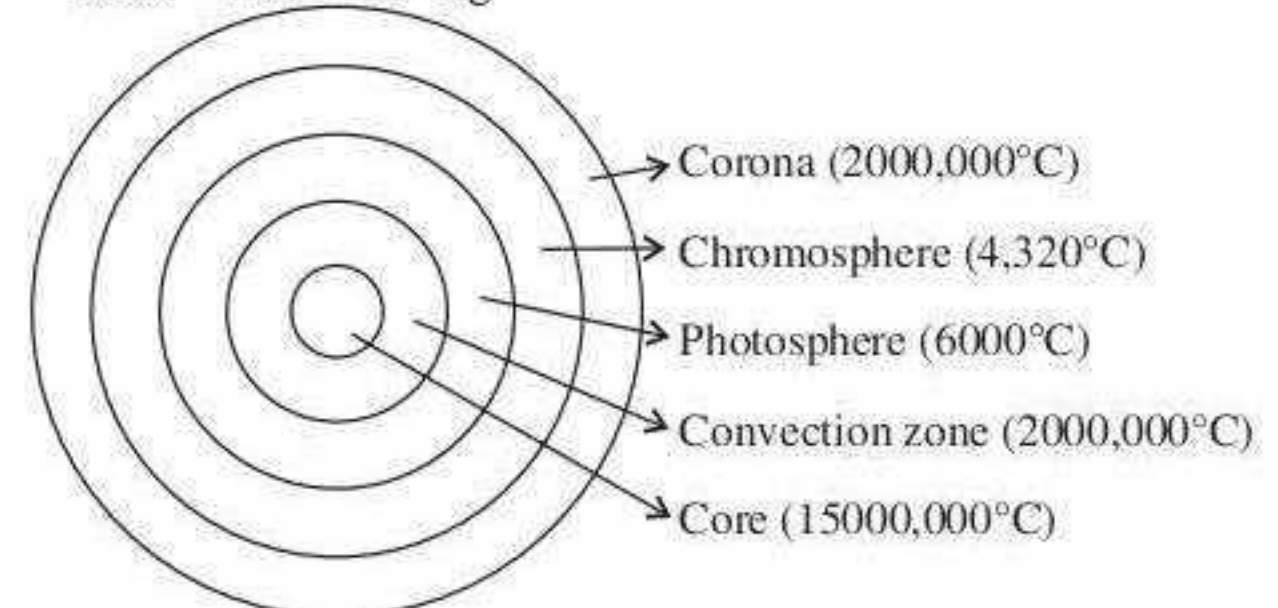


Fig. Layers of the Sun

## 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, when Earth 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 reflect sunlight.
- **Earth** - It is the third planet from the Sun with one moon. Perfect place for life. Its atmosphere consists of 78% nitrogen, 21% oxygen, and 1% other gases. **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 dune fields.
- **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 primordial dust and ice particles. 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 sized 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, largest of its known moons.

**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-  $7.35 \times 10^{22}$  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.

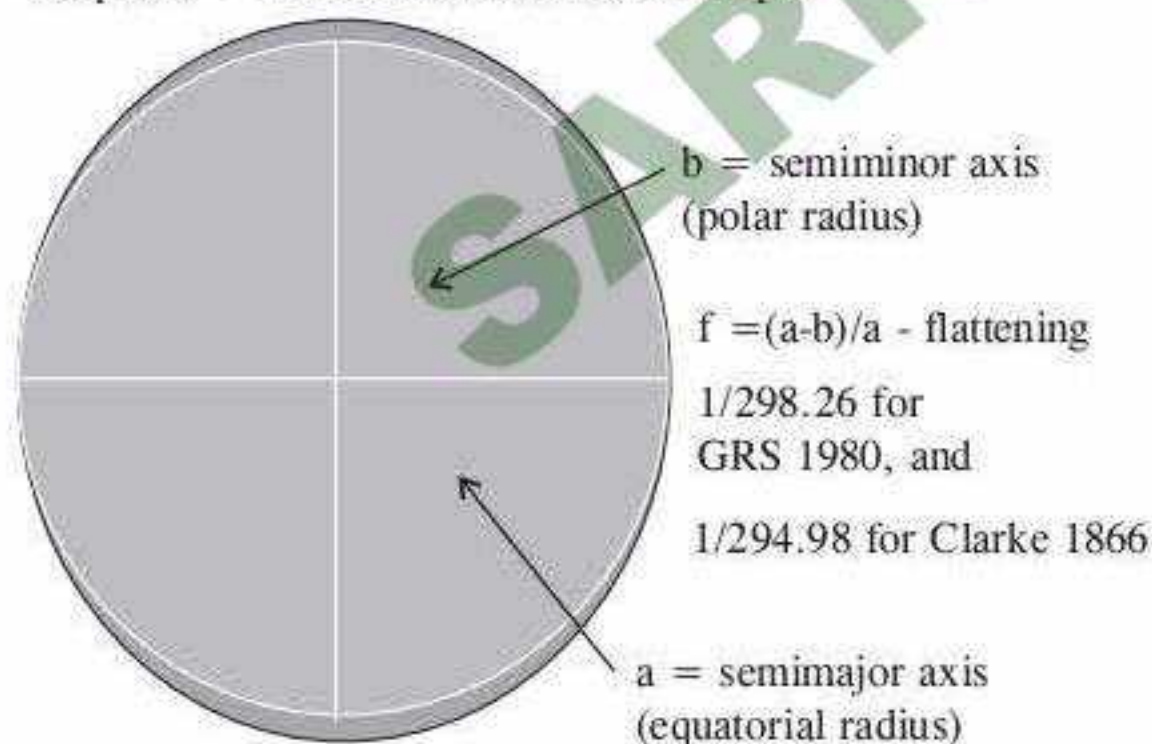
## PHYSICAL GEOGRAPHY

### 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  $66\frac{1}{2}^\circ$  giving rise to different seasons and varying lengths of day and night.
- At equator, day and night are of equal length throughout the year.

### Size and Shape of the Earth

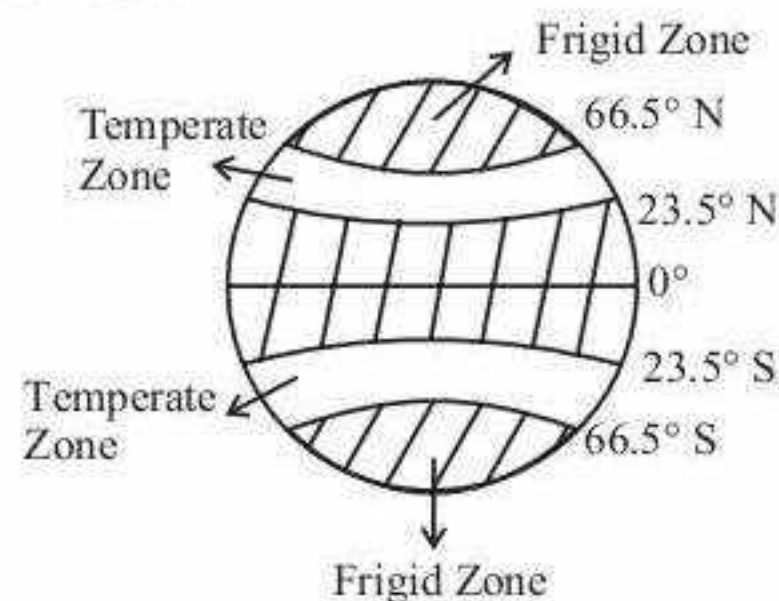
- Shape of the Earth is called "geoid"
- The sciences of earth measurement is called "Geodesy"
- "ellipsoid" - reference to the Earth shape.



The geoid bulges at the North Pole and is depressed at the South Pole

- Earth shape is affected by two main facts:
- It bulges in midriff, because of pliability of Earth's lithosphere;
- Its shape is therefore an oblate spheroid.
- It has topographical irregularities.
- 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 Zone



- **Temperate Zones** are the areas where climatic condition is not extreme. The area lies between the tropics and polar region ( $23\frac{1}{2}^\circ \times 66\frac{1}{2}^\circ$ ) 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 23<sup>rd</sup>**, and March Equinox (**March 21<sup>st</sup>**).
- **Solstice:** Like equinoxes there are two solstices also, June 21<sup>st</sup> and December 21<sup>st</sup>. 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  $365\frac{1}{4}$  days causing the seasons of the year.

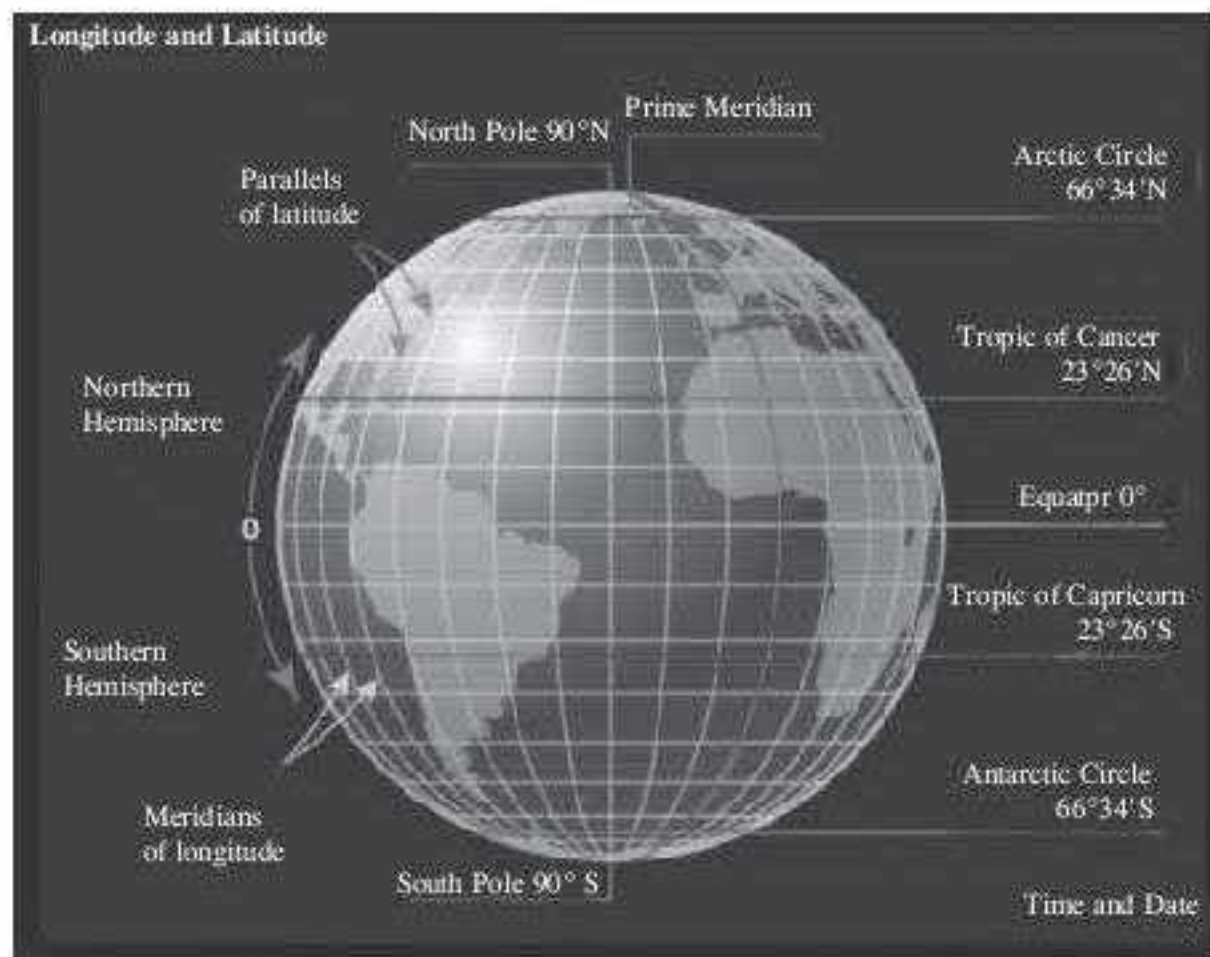
### Latitudes and Longitudes

- **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  $0^\circ$  longitude.
- **Equator**, i.e.  $0^\circ$  is the biggest latitude that divides Earth into two equal hemispheres (North and South).
- **Tropic of Cancer** is  $23.5^\circ$  N
- **Tropic of Capricorn** is  $23.5^\circ$  S
- **Arctic Circle** is  $66.5^\circ$  N
- **Antarctic Circle** is  $66.5^\circ$  S
- This is the Prime Meridian from which all other meridians radiate eastwards and westwards up to  $180^\circ$ .

### Longitudes and Latitudes

Together, longitudes and latitudes form the Earth's geographical coordinates, and represent the angular distance of any location on the Earth from the Earth's Equator. Both latitudes and longitudes are measured in degrees.





FACTS	ABOUT	LATITUDE
LATITUDES	MAJOR CONTINENTS	MAJOR COUNTRIES
Tropic of Cancer	North America, Africa and Asia	Bahamas, Mexico, Mauritania, Mali, Western Sahara, Algeria, Niger, Libya, Egypt, Saudi Arabia, India, China, Abudhabi, Oman, Bangladesh, Burma, and Taiwan.
Equator	South America, Africa, Asia	Equador, Colombia Brazil, Sao Tome & Prince, Gobon Republic of Congo Democratic Republic of Congo, Uganda, Kenya, Somalia, Maldives, Indonesia.
Tropics of Capricorn	South America, Africa, Asia	Chile, Argentina, Paraguay, Brazil, Namibia, Botswana, South Africa, Mozambique, Madagascar, Australia, French Polynesia, Caledonia, Fiji, Tonga and Coolis Island, etc.

### Standard Time and Time Zones

- The whole world has been divided into **24 standard** time zones.
- Each zone is separated by **15° longitudes** 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

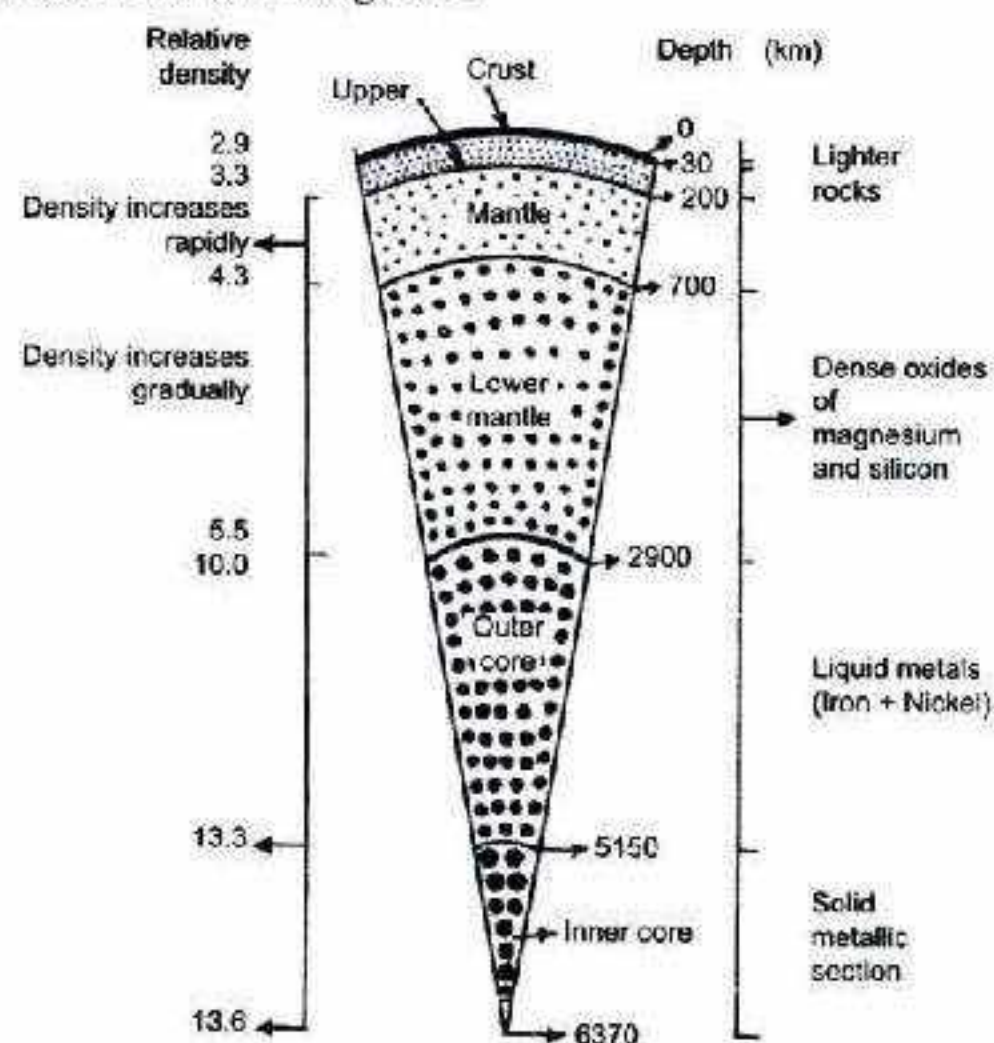
- Apogee:** Period of the farthest distance between the Moon and the Earth (407,000 km).
- Perigee:** Period of nearest distance between the Moon and the Earth (356,000 km).

### 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 million 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<sup>3</sup>. 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<sup>3</sup>.



Section through Earth  
(Relation between Density, Section and Depth)



## ROCKS AND MINERALS

- **Rocks** are naturally occurring 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

- **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.

### Basic rocks Metamorphosed

1. Limestone to Marbles
2. Sand stones to Quartzites
3. Shales/Clays to Slates / Schist
4. Granite to Gneisses
5. Gabro to Serpentine
6. Coal to Graphite

### 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

- **Landform:** Landforms 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 **Atlas** of North Africa are examples.

2. **Block Mountains:** Block mountains have developed due to swelling of earth's crust bound by tectonic fault and characterised by massiveness, steep slopes, and comparatively smooth topography.

**Vosges** in France, **Black forest** mountains in Germany and **Salt Range** in Pakistan are examples.

3. **Volcanic Mountains:** Mountain formed due to the accumulation of molten lava flowing out from a volcanic eruption.

**Mount Mauna Loa** in Hawaii Islands, **Mt. Fuji Yama** of Japan and **Mount Popa** in Central Myanmar are examples.

4. **Residual or Dissected Mountains:** Nilgiris, Parasnath, Girnar and Rajmahal are examples.

### 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.
- Covers 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, Bhandar 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 e.g. Tibetan plateau, Bolivian plateau, Peruvian 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. **Appalachian** plateau, **Patagonian** plateau (Argentina).



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

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 are examples.
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 are examples.
3. **Depositional plains** are formed due to the massive deposition of sediments. It occurred 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 make such delta.
3. **Eustarinedelta:** Narmada, Tapi, Amazon, Mackenzie, Vistula, 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.

#### Major Land Forms on the Basis of Geomorphic Agents

Name of the land form	Agent	Erosional	Depositional
Fluvial land form	River	V shaped valley, canyons, waterfall, potholes, plunges, river terraces.	Alluvial fan, cones, delta, meanders, flood plains, natural levees, point bars braided channels.
KARST	Ground Water	Pools, sinkholes, lapics and limestone pavements caves.	stalactites, stalagmites and pillars.
Glacial Land form	Glacier	Cirque, horns, serrated ridge, U-shaped valley troughs.	moraines, eskers outwash plains, drumlins.
Coastal Land form	Waves and Currents	cliffs, terraces, caves and stacks.	beaches and dunes bar, barriers, spits.
Aeoline Land form	wind	pediments and pediplains, playa deflation hollows, and covers, mushroom table and pedestal rock.	Sand dunes, barchanes parabolic dunes, seif.

## GEOGRAPHICAL PHENOMENA

### Plate Tectonics

- The theory of plate tectonics state 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.
- **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.
  - The magnitude as the intensity of energy released by an earthquake is measured by **Richter scale**. It ranges between 0 and 9.

### The Earthquake Zones in India

On the basis of intensity of the earthquakes a map of India has been published by the Meteorological Department in collaboration of the Indian Standard Institution. The map shows the five seismic zones based on modified Mercalli scale.

Zone I - Intensity V or below (feeble, slight, moderate rather strong)

Zone II - Intensity VI (strong)

Zone III - Intensity VII (very strong)

Zone IV - Intensity VIII (Destructive Zone)

Zone V - Intensity more than VIII (Disastrous, Catastrophic)

Zone I - Comprises some parts of Punjab and Haryana, plains of Uttar Pradesh, Coastal plains of Maharashtra and Kerala.

Zone II - Includes Southern Punjab and Haryana, certain parts of Plains of Uttar Pradesh, Eastern Rajasthan, Coastal areas of Odisha and Tamilnadu. This is the low damage rests zone.

Zone III: Covers Southern and South Eastern parts of Rajasthan, larger parts of Madhya Pradesh, Maharashtra, Karnataka, Jharkhand and Northern and North-Western parts of Orissa.

Zone IV: Covers Jammu and Kashmir, Himachal Pradesh, Northern parts of Punjab, Haryana, Delhi, Eastern Uttar Pradesh, Tasai and Bhabhat regions, the Himalayan areas of Uttaranchal, Bihar and Sikkim

Zone V: Covers certain parts of Jammu and Kashmir, Himachal Pradesh, Uttranchal, Monghy, and Darbhanga districts of Bihar, Northern part of India and Kutchh region of Gujarat.

Some specific areas where the waves are not reported, such zone is called the 'shadow zone'.

### 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

#### Types of Volcanoes

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

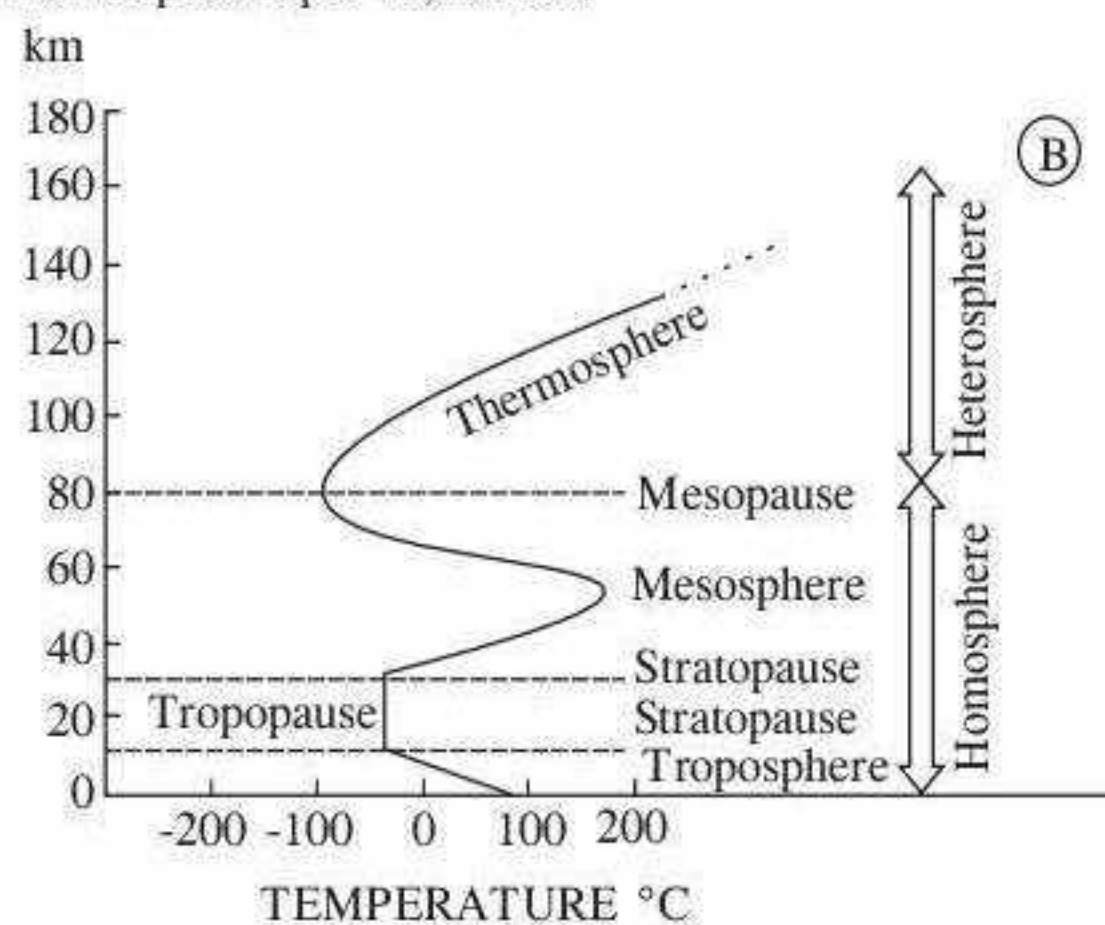
**Active volcano:** It has the capacity to erupt at regular basis and its frequency is quite more.

**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, xenon, 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.



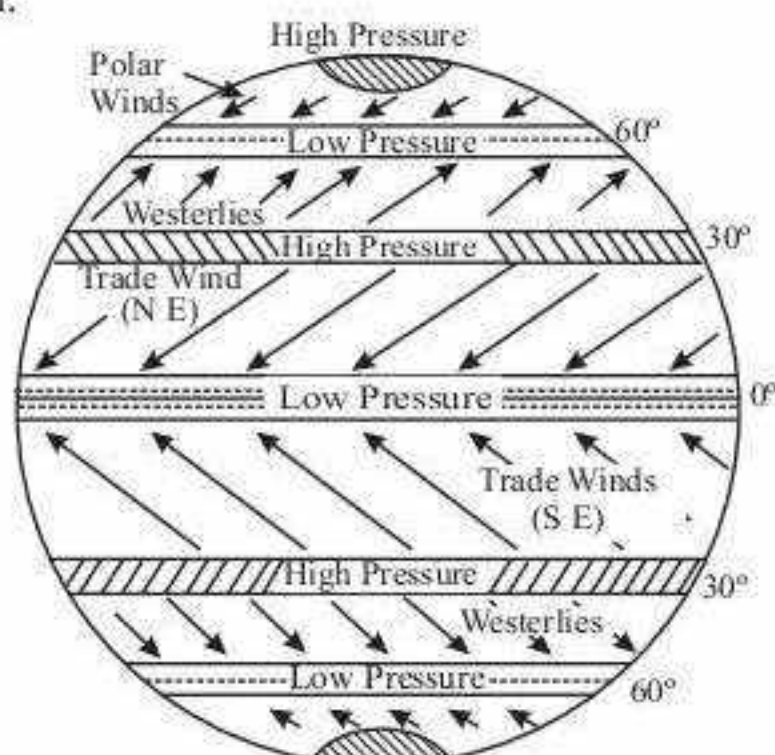
- Energy transfer in the atmosphere takes place in 3 ways: **radiation, conduction** and **convection**.
- The Earth's surface receives solar radiation at the rate of 1.94 calories per square centimetre per minute. This is called **Insolation (Incoming Solar Radiation)**.



- 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 and 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 across 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 :

- Roaring forties** - blow between 40°S to 50°S, it is known as roaring forties latitude winds.
  - Furious fifties** have its location around 50° to 60°s latitude.
  - Screaming (shrieking) Sixties** wind blows 60° Onwards 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.

### Local Winds

Names	Nature	Region
Fohn	Warm	Alps
Chinook	Warm	Rockies (Snow eater)
Kalbaisakhi	Warm	North India
Berg	Warm	S. Africa
Zonda	Warm	Andes
Santa Ana	Warm	Coastal Southern California
Khamsin	Warm	Egypt
Harmattan	Warm	Guinea Coast (doctor)
Mistral	Cold	S. E. France
Purga	Cold	Russia
Levanter	Cold	France
Pampero	Cold	S. America
Southerly	Cold	New South
Norwester	Warm, Dry	New Zealand

### Cyclone

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

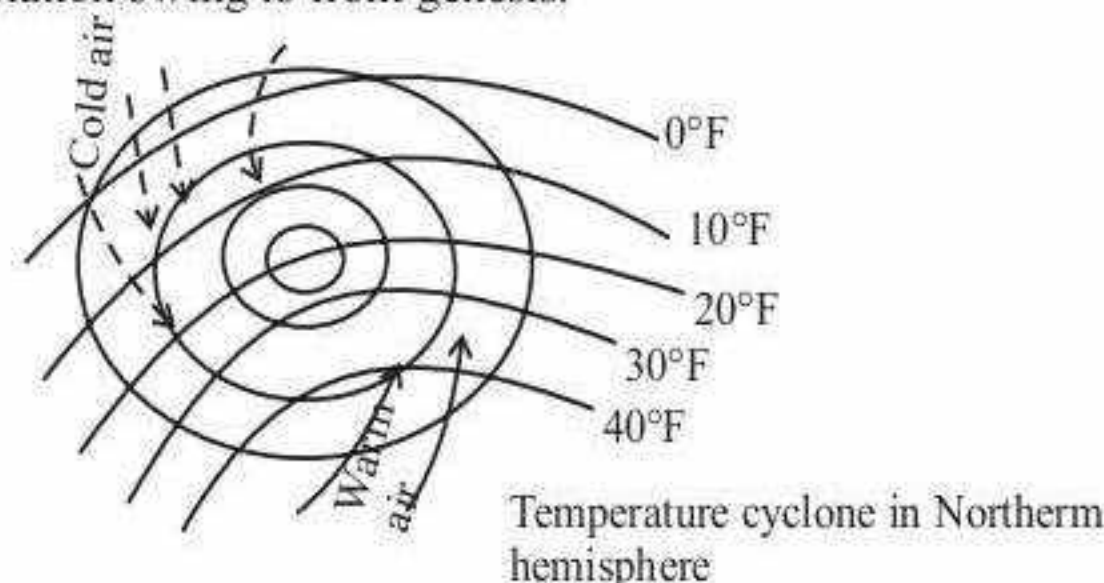
- It is characterized by inward spiralling winds that rotate anti-clockwise in Northern hemisphere and clockwise in Southern hemisphere.

Cyclones	Region
Typhoons	China
Tropical	Indian Ocean
Hurricanes	Caribbean sea
Tornadoes	USA
Willy-Willy	Australia
Taifu	Japan

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 rotation 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 come down to earth's surface in the form of tiny droplets.
- Precipitation are of three types **convectonal**, **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'.
  - **Alto cumulus**: 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 convectonal **rain**, **lightening** and **thunder**.

## WORLD CLIMATIC ZONES

### 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.
- Bedouin 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 Uruguay **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, Manchuria, 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 are **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 Newfoundland, North Sea and Sunda Shelf.

### Composition of Sea Water

Salt	Percentage
Sodium Chloride (NaCl)	77.8
Magnesium Chloride (MgCl <sub>2</sub> )	10.9
Magnesium Sulphate (MgSO <sub>4</sub> )	4.7
Calcium Sulphate (CaSO <sub>4</sub> )	3.6
Potassium Sulphate (KSO <sub>4</sub> )	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.

- Average salinity of the sea water: **35%**
- Average salinity of Atlantic Ocean: **35.67%**
- Maximum salinity occurs between: **20° N and 40° N and 10° S, and 30° S**
- Highest salinity is found: **Lake Van (330%)**
- Average temperature of Pacific Ocean: **19.10°C**
- Average temperature of Indian Ocean: **17°C**
- Average temperature of Atlantic Ocean: **16.91°C**
- Average annual temperature of oceans: **17.2°C**
- Average temperature of surface water: **26.7°C**

### Pacific Ocean Currents

Name	Nature
Kuroshio	Warm
Alaskan	Warm
East Australian	Warm
Oyashio	Cold
Okhotsk	Cold
California	Cold
Peruvian / Humboldt	Cold

### Atlantic Ocean Currents

Antilles	Warm
Florida	Warm
North Atlantic drift	Warm
Gulf Stream	Warm
Labrador	Cold
Brazil	Warm
Falkland	Cold
Benguela	Cold

### Indian Ocean Currents

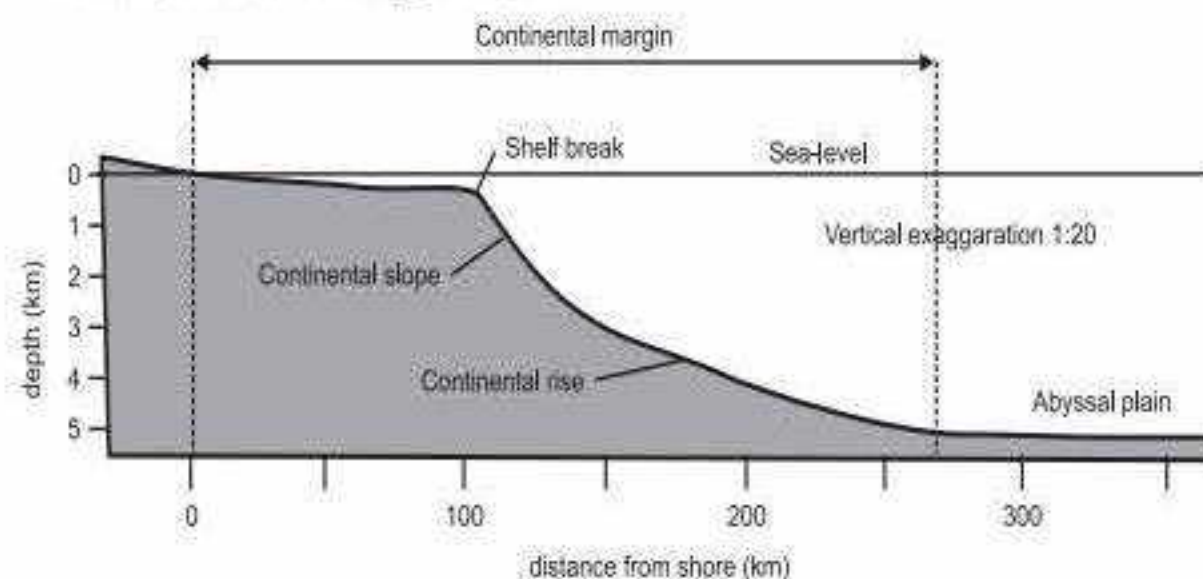
Mozambique	Warm
Agulhas	Warm
West Australian	Cold

### 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.





**Ocean 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).

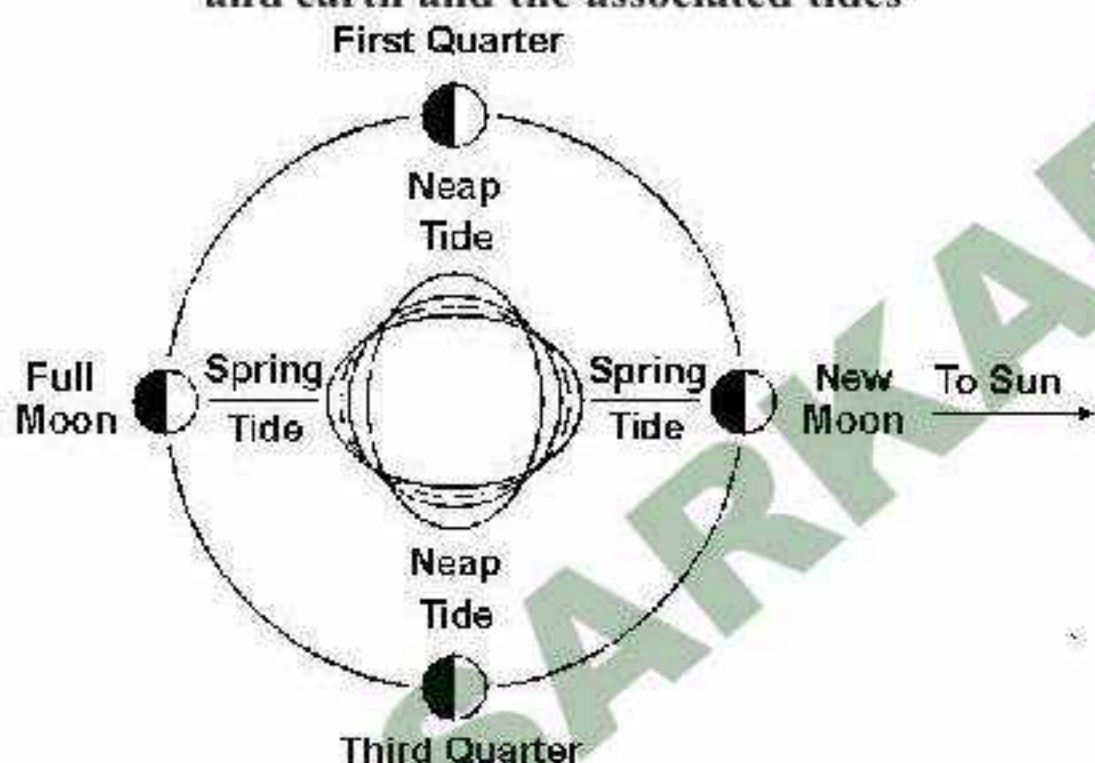
**Bay:** Bay are the small water bodies separated from the large water bodies by an inward curved piece of land. The famous bays of the world are, Hudson Bay, Bay of pig, Chesapeake Bay, Bay of Bengal, etc.

**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**.

Interchanging position of Sun, moon and earth and the associated 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 Arunachal Pradesh

**Western most point - Ghuar Mota** of Kutch in Gujarat

**Northern most point - Siachen glacier** in state of Jammu and Kashmir

**Southern most point - Indira point** of Kanyakumari district in Tamilnadu.

## 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 ft.
- 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.

### Mountain Passes of India

#### Himalayan passes

- Banihal pass** — between Doda and Anantnag (Jawahar Tunnel), J & K.
- Shipki La** — River Sutlej enters India from Tibet, Himachal Pradesh.
- Bara Lachan La** — between Kyelang and Leh, Himachal Pradesh.
- Rohtang pass** — between Kullu and Kyelang, Himachal Pradesh.
- Bomdila pass** — between Tezpur and Tawang, Arunachal Pradesh.

#### Himalayan passes between India and China

- Shipki La** — Himachal Pradesh.
- Thaga La and Niti La** — Uttarakhand.
- Lipu Lakh La** — Tri-junction, India-Nepal-China, Uttarakhand.
- Jelep La** — Between India and China (Gangtok-Lhasa Road) Sikkim.
- Nathu La** — Between India and China (Entry to Chumbi Valley) Sikkim.

#### Trans Himalayan passes

- Karakoram pass and Aghil pass** — Jammu & Kashmir.

#### Passes in Western Ghats

- Palghat** — between Palakkad and Coimbatore.
- Shenkota** — between Kollam and Madurai.
- Thalghat** — between Mumbai and Pune.
- Bhorghat** — between Mumbai and Nasik.



**Some important facts about peaks**

- Highest Mt. Peak in India: *K<sub>2</sub> 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 **McMahon 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.



**Rain fall Distribution in India**

Amount of Rain fall	Heavy Rainfall (> 200cm)	Moderately Heavy Rainfall (100-200 cm)	Less Rainfall (50-100 cm)	Scanty Rainfall <50cms
States	West coasts, on the Western Ghats, Sub-Himalayan areas in North East and Meghalaya Hills, Assam, West Bengal, Southern slopes of Eastern Himalayas.	Southern parts of Gujarat, East Tamil Nadu, North-eastern Peninsula, Western Ghats, Eastern Maharashtra, Madhya Pradesh, Odisha, the middle Ganga valley.	Upper Ganga valley, eastern Rajasthan, Punjab, Southern Plateau of Karnataka, Andhra Pradesh and Tamil Nadu.	Northern part of Kashmir, Western Rajasthan, Punjab and Deccan Plateau.

**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
Lakes Name	State
Brighu Lake, Dashir Lake, Dhankar Lake, Kareri (Kumarwah) Lake, Khajjiar Lake, Macchial Lake, Maharana Pratap Sagar, Manimahesh Lake, Nako Lake, Pandoh Lake, Prashar Lake, Renuka Lake, Suraj Taal, Chandra Taal	Himachal Pradesh
Lakes Name	State
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
Lakes Name	State
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 Khambhat	1057
Tapti	Betul Distt. of M.P.	Gulf of Khambhat	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 Khambhat	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**

<b>Bhakra Nangal Project</b>	Situated on Sutlej in Punjab. Highest in India. Ht. 226m. Reservoir is called <b>Gobind Sagar Lake</b> .
<b>Mandi Project</b>	On Beas in Himachal Pradesh
<b>Chambal Valley Project</b>	On Chambal in MP & Rajasthan, 3 dams include Gandhi Sagar Dam, Rana Pratap Sagar Dam and Jawahar Sagar Dam
<b>Damodar Valley Project</b>	On Damodar in Bihar, based on Tennessee Valley Project USA
<b>Hirakud Project</b>	On Mahanadi in Odisha, World's Longest Dam: 4801m
<b>Rihand Project</b>	On Son in Mirzapur, Reservoir is called Gobind Vallabh Pant reservoir



<b>Kosi Project</b>	On Kosi in N. Bihar
<b>Mayurkashi Project</b>	On Mayurkashi in West Bengal
<b>Kakrapar Project</b>	On Tapi in Gujarat
<b>Nizamsagar Project</b>	On Manjra in Andhra Pradesh
<b>Nagarjuna Sagar Project</b>	On Krishna in Andhra Pradesh
<b>Tungabhadra Project</b>	On Tungabhadra in Andhra Pradesh & Karnataka
<b>Shivasamudram Project</b>	On Cauvery in Karnataka. One of the oldest river valley projects in India.
<b>Tata Hydel Scheme</b>	On Bhima in Maharashtra
<b>Sharavathi Hydel Project</b>	On Jog Falls in Karnataka
<b>Kundah &amp; Periyar Project</b>	In Tamil Nadu
<b>Farakka Project</b>	On Ganga in WB. Apart from power and irrigation, also helps to remove silt for easy navigation.
<b>Ukai Project</b>	On Tapti in Gujarat
<b>Mahi Project</b>	On Mahi in Gujarat
<b>Salal Project</b>	On Chenab in J&K
<b>Mata Tila Multipurpose Project</b>	On Betwa in Uttar Pradesh and Madhya Pradesh
<b>Thein Project</b>	On Ravi, Punjab.
<b>Pong Dam</b>	On Beas, Punjab
<b>Tehri Dam</b>	On Bhagirathi, Uttarakhand
<b>Sardar Sarovar Project</b>	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 70–200 m.
- 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.

- 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.

##### 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:

- Wet Temperate Forest
- Temperate forest
- 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 :

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

- Beach forest
- Tidal forest or Mangrove forest
- Fresh Water Swamp.

##### (a) Beach forest

- It requires 75 cm to 500 cm of rainfall.
- Generally found in sea beaches and river delta.
- Important plant species are *calophyllum littoralis*, *Pandanus*, *Thespesia*, *Barringtonia*, *Pongamia*, *cocos*, *Mucifera*, *Spinifex 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, phoebe, 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 streams could determine the arrival of the monsoons and departure of the monsoons.

### SOIL

As a prime natural resource soil plays an important role in the in the growth of human activities of a specific location. The type of soil found in India can be classified in number of ways but as per All India Soil Survey Committee of Indian Council of Agricultural Research there are 8 types of soil found in India.

#### Alluvial soil

- **Spatial Distribution:** wide spread in northern plains and river valleys such as Indus-Ganga- Brahmaputhra plain, Narmada-Tapi plain, deltas and estuaries of Peninsular India.
- **Property:** Mixture of Humus, lime and organic matters and hence highly fertile.
- **Colour:** Light Grey to Ash Grey.
- **Texture:** Sandy to silty loam or clay.
- **Suitable for:** Production of Wheat, rice, maize, sugarcane, pulses, oilseed.

#### Red soil

- **Spatial Distribution:** Mainly found in the areas of low rainfall. The states with red soils are Tamilnadu, Karnatake, South-east part of Maharashtra, Eastern Part of Andhra Pradesh and Madhya Pradesh, Chota Nagpur in Jharkhand, Orissa, Chhattishgarh Parts of South Bihar, Birbhum and Bankura districts of West Bengal, Mirzapur, Jhansi, Banda, Hamirpur district of UP, Aravali Hills and eastern half of Rajasthan.

- **Property:** Abundance of Ferric oxide Absence of lime matters and hence highly fertile.
- **Colour:** Red
- **Texture:** Sandy to clay and loamy.
- **Suitable for:** Production of Wheat, cotton, pulses, tobacco, oilseeds, potato.

#### Black / Regur soil

- **Spatial Distribution:** Most of the Deccan is occupied by Black soil.
- **Property:** Mature soil with high water retaining capacity, become sticky when wet and shrinks when dried. Iron, lime, calcium, potassium, aluminum and magnesium.
- **Colour:** Deep black to light black.
- **Texture:** Clayey.
- **Suitable for:** Best soil for cotton production.

#### Arid / Desert soil

- **Spatial Distribution:** Seen widely under Arid and Semi-Arid conditions such as Rajasthan, Parts of Haryana and Punjab.
- **Property:** Lack of moisture and Humus and contains impure Calcium Carbonate.
- **Colour:** Red to Brown.
- **Texture:** Sandy
- **Suitable for:** Salt tolerant crops like barley , rape, wheat , millet, maize.

#### Laterite soil

- **Spatial Distribution:** mostly found in Eastern Ghats, the Rajmahal Hills, Vidhyas, Satpura and Malwa Plateau.
- **Property:** Prone to leaching of lime and silica from soil, rich iron and aluminum,
- Deficient in Nitrogen, Potash, Potassium, Lime, Humus
- **Colour:** Red colour due to iron oxide
- **Texture:** Clayey rocky
- **Suitable for:** Rice, Ragi, Sugarcane and Cashew nuts are cultivated mainly.

#### Saline soil

- **Spatial Distribution:** mostly found Andhra Pradesh and Karnatak, in Drier parts of Bihar, Uttar Pradesh, Haryana, Punjab, Rajasthan and Maharashtra. In Gujrat the area around gulf of Khamart, vast estuaries of the Narmada, Tapi and Mahi river
- **Property:** mainly saline and alkaline in nature, rich in sodium, magnesium, and calcium salt, and sulphurous acid.
- Not Suitable for agricultural productivity.

#### Peaty/marshy soil

- **Spatial Distribution:** generally found Coastal areas of Orissa and Tamilnadu, Sunderbans of West Bengal, Bihar and Almora district of Uttaranchal
- **Property:** heavy and highly acidic in Nature, deficient in Potash and Phosphate.
- **Colour:** Black
- **Suitable for:** paddy Cultivation.

#### Forest soil and Mountain Soil

- **Spatial Distribution:** Mostly found in Himalayan Region mainly in valley basins, and Western and Eastern Ghats of Penninsular India
- **Property:** rich in humus, deficient in Potash, Phosphorous and lime.
- **Suitable for:** wheat, maize, barley in southern India and temperate fruit in Jammu & Kashmir, Himachal Pradesh and Uttaranchal



## Agriculture

- India holds the **second position** in the world in agricultural production.

### Salient features of agriculture in India

- 1. Subsistence Agriculture:** Usually the farmers, along with their family members, grow crops to feed themselves.
- 2. Pressure of Population on Agriculture:** The population in India is increasing at a high rate and this puts pressure on the agriculture sector. Agriculture has to provide food and employment to large sections of the society.
- 3. Dependency upon Monsoon** Agriculture in India mainly depends upon monsoon, which is unreliable, uncertain and irregular.
- 4. Variety of Crops:** India experiences both tropical and temperate climate and therefore supports the cultivation of crops suitable for both these climates.
- 5. Predominance of Food Crops** Farming is practised in almost every part of the country and about two-thirds of the total land is being used for agricultural purposes in India.
- 6. Seasonal Patterns:** There are three distinct agricultural or cropping seasons in India - **kharif**, **rabi** and **zaid**.

**Rabi Season :** Lasts from October to April.

- Crops are shown in October and harvested in March and April.
- Major crops grown, are Wheat, Barley, Mustard, Gram, Peas, Sunflower, Coriander, Onion, Potato, Oats, etc.

**Kharif Season:** It starts from the rain in July to October, (the entire monsoon season)

- Crops are shown in July and harvested in October.
- Major crops grown are, Rice, Millet, Bajra, Maize, Bean, Groundnut, Red Chills, Cotton, Soyabean, Sugarcane, Turmeric, Urad, etc.

**Zaid Season :**

It extends from March to June and major crops are Watermelon, Muskmelon, Bitter gourd, Pumpkin, Cucumber, etc.

- India produces about **10%** of the **fruits** produced in the world.
- The country holds the **first position** in the world for the production of **Papaya**, **Mangoes** and **Banana** etc.
- India ranks sixth in the world in the production of **coffee**.
- India has the **biggest** number of **livestock** in the world.

## Types of Farming

India is a vast country and had various climatic patterns and geographical condition, so these are different types of farming.

- 1. Subsistence Farming:** In this type of farming farmer produce for his own consumption. There is no surplus left for sale. This involves cultivation of food crops like rice, wheat, pulses etc.
- 2. Commercial Farming:** In this farming, food crops produced specifically for sale in the market by using improved variety of seeds and machinery. Cotton, sugarcane, tobacco, oil seeds, chillies etc. are commercial crops.
- 3. Shifting Cultivation:** Under this system, a plot of land is cultivated for few years and when the crop yield declines the plot of land is changed.

Dry paddy, buck wheat, maize, small millets, tobacco & sugarcane are the main crops grown under this type of agriculture.

It is known by different names in different parts of the country. It is "Jhumming" in north eastern states; 'podu' in Andhra Pradesh, 'Bewar' in M.P., 'Kumari' in Western Ghats.

- 4. Mixed Farming:** Mixed farming is raising of crops and rearing of cattle, poultry, bee keeping, seri culture etc. on the same cattle or poultry do not need extra expenditure as they thrive on the farm wastes.
- 5. Plantation Farming:** Predominance of a single crop (only for sale) farming in tropical regions is called plantation farming. Important crops grown under this type of farming are cotton, tea, rubber, spices, coconuts etc.
- 6. Intensive Agriculture:** System of cultivation using large amount of labour and capital with application of fertilizers and insecticides is called intensive agriculture.
- 7. Extensive Agriculture:** System of crop cultivation using small amounts of labour and capital in relation to area of land being farmed. The crop yield in extensive agriculture depends primarily on the natural fertility of the soil, terrain climate and the availability of water.

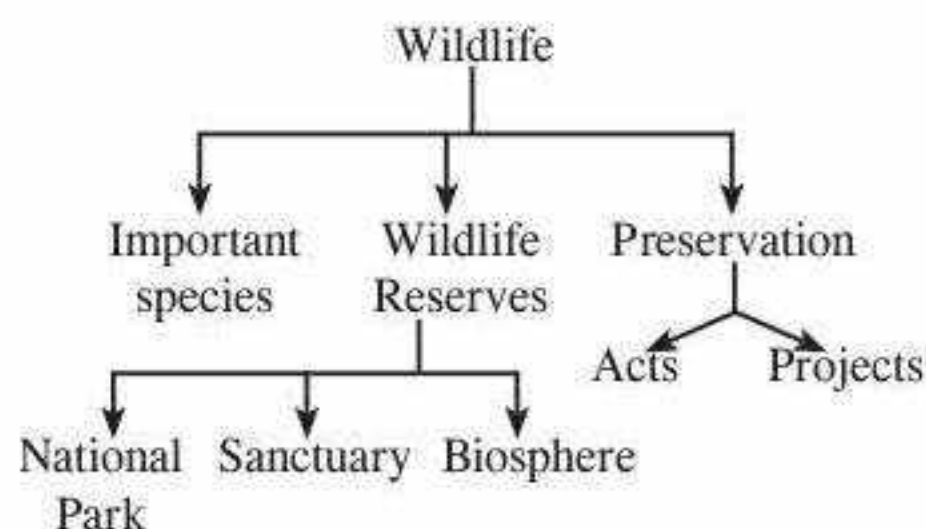
## Mineral Resources

Aluminium	- Kerala.
Antimony	- Antimony deposits are found in Punjab and Karnataka.
Asbestos	- Karnataka and Rajasthan.
Barytes (Barium Sulphate)	- Tamil Nadu, Andhra Pradesh, Manbhum and Singhbhum districts of Jharkhand.
Bauxite	- Ranchi and Palamau districts of Jharkhand, Belgaum, Jharia and Thana districts, Balaghat, Jabalpur, Mandya and Bilaspur districts.
Beryllium Sands	- Rajasthan, Tamil Nadu, Kashmir and Bihar.
Cement	- Katni (M.P.), Lakheri (Rajasthan), Jabalpur (M.P.), Guntur (Andhra Pradesh), Jhinkapani (Singhbhum district of Jharkhand), Surajpur (Haryana).
China Clay	- Rajmahal Hills, Singhbhum (district of Jharkhand), Kerala.
Chromite	- Singhbhum and Bhagalpur (Jharkhand), Ratnagiri, Salem (Tamil Nadu), Karnataka, Keonjhar (Odisha), Ladakh (Kashmir).
Coal	- Raniganj (West Bengal), Jharia, Bokaro (Jharkhand), Giridih, Karanpur, Panch Valley and Chanda (M.P.), Singareni (Andhra Pradesh) and Mukum (Assam).
Cobalt	- Rajasthan and Kerala.
Copper	- Jharkhand (Singhbhum and Barajamda), Chhattisgarh, Rajasthan ( <b>Khetri</b> ).
Diamond	- Diamond mines are found in <b>Panna</b> district of Madhya Pradesh, <b>Raipur</b> district of Chhattisgarh.
Feldspar	- Burdwan (West Bengal), Rewa (M.P.), Tiruchirapalli (Tamil Nadu), Alwar and Ajmer.



Gold	- Kolar gold-fields (Karnataka).
Graphite	- Rajasthan, Andhra Pradesh, Madhya Pradesh, Tamil Nadu, Karnataka, Odisha and Kerala.
Gypsum	- Bikaner and Jodhpur (Rajasthan), Tiruchirapalli (Tamil Nadu), Gujarat and Himachal Pradesh.
Iron Ore	- Singhbhum (Jharkhand), Chhattisgarh, Keonjhar and Mayurbhanj (Odisha).
Lac	- West Bengal.
Lead	- Zawar in Udaipur and at the Banjavi mines in Jaipur.
Lignite	- Neyveli in South Arcot district (Tamil Nadu).
Limestone	- Singareni and Singhbhum (Jharkhand), Panchmahals (Gujarat), Balaghat, Bhandara, Chhindwara, Nagpur, Indore, Vishakhapatnam, Sandur (Tamil Nadu).
Manganese	- Madhya Pradesh, Jharkhand and Chhattisgarh.
Marble	- Jaipur (Rajasthan).
Mica	<b>Koderma</b> in Hazaribagh district, Jharkhand, Monghyr (Bihar), <b>Nellore</b> in Andhra Pradesh.
Monazite Sands	- Found in abundance in Travancore Coast (Kerala).
Nitre	- Bihar, U.P., Tamil Nadu and Punjab.
Petroleum	<b>Digboi</b> , Badarpur, Musimpur and Patharia fields of Assam.
Pitchblende	- Gaya (Bihar).
Red Stone	- Jodhpur (Rajasthan).
Salt	- Sambhar Lake (Rajasthan), and is also obtained from ocean water in <b>Rann of Kutch</b> , on the north-western and south-eastern littoral (sea-shore) of India.
Saltpetre	- Punjab, U.P. and Bihar.
Silmanite	- Khasi Hills (Assam), Rewa (M.P.).
Silver	- Goldfields (Karnataka), Singhbhum and Manbhum (Jharkhand), Tamil Nadu and Rajasthan.
Tungsten	- Bihar, Nagpur (Maharashtra) and Marwar.
Uranium	- Bihar.
Zinc	- Zawar mines in Udaipur (Rajasthan).
Zircon	- Beach sands of Kerala and Cape Comorin.

## WILDLIFE



- Wildlife comprises animals, birds, and insects living in forests.
- Indian forests offer a wide range of habitat types, which is responsible for a large variety of wild life in India.

- **Elephant is the largest Indian mammal**, which only a few centuries ago, was found in large numbers in vast forest tracts of India.
- **The one-horned rhinoceros, India's second largest mammal** was once found throughout the Indo-Gangetic Plain as far west as Rajasthan. Now there are less than 1,500 rhinoceros in India, confined to the restricted locations in Assam and West Bengal.
- Rhinoceros are protected in Kaziranga and Manas sanctuaries of Assam and the Jaldapara sanctuary of West Bengal.
- The wild buffalo is found in Assam and in Bastar district of Chhattisgarh.
- The gaur or the Indian bison is one of the largest existing bovine and is found in the forests of Central India.
- There are about 3,000 tigers in India mainly found in the forests of eastern Himalayan foothills and in parts of the peninsular India.
- The number of Cheetahs had fallen to less than two hundred until successful breeding programme in the Gir sanctuary in Gujarat resulted in some recovery.
- The arboreal clouded leopard is found in northern Assam while the Black Panther is widely distributed predator.
- Brown, Black and Sloth Bear are found at high altitudes in the northwestern and central Himalayas.
- Yak, the ox of snows is largely found in Ladakh and is tamed to be used as a draught animal.
- Stag or barasingha is found in Assam and Madhya Pradesh.
- The Munjac or barking deer are found extensively in the lower wooded slopes of the Himalayas and in the forests of southern India.
- The kastura or the musk deer, much sought after for its musk pod, live in the birch woods in the higher forests of the Himalayas.
- India's first National Park is Jim Corbett Park in Uttarakhand, established in 1936
- Thamin is a pretty deer found in Manipur.
- There are about 2,000 species of birds in India.
- Although most of the bird has their origin in India, some birds such as ducks, cranes, swallows, ant flycatchers migrate from central Asia to the wetlands of Bharatpur every winter.
- Recently, some migratory birds have been seen near Mathura.

**National Park:** A reserved area meant for preserving its natural vegetation, wildlife and natural beauty.

**Sanctuary:** A reserved area meant for preservation and development of endangered species.

**Biosphere:** Multipurpose protected areas to preserve genetic diversity in representative ecosystems.

As of July 2015, there were 105 National Parks.

Number of wildlife Sanctuaries – 531

Number of Biosphere Reserves – 18.



## Preservation of Wildlife

- The fast dwindling forest cover in India has adversely affected wildlife in the country.
- The number of several species has been drastically reduced, some are endangered species, and the others are on the verge of extinction while some of them have already disappeared.
- Indian Board for Wildlife was constituted in 1952.** The main purpose of the board was to advise the Government on the means of conservation and protection of wildlife, construction of national parks, sanctuaries and zoological gardens as well as promoting public awareness regarding conservation of wildlife.
- The Wildlife (protection) Act, 1972 is a comprehensive law which gives firm status to the national parks and sanctuaries.

### National Parks in India

Name	State	Notability
Bandipur National Park (1974)	Karnataka	Chital, gray langurs, Indian giant squirrel, Gaur, leopard, Sambar deer, indian elephants, honey buzzard, red-headed vulture and other animals.
Bannerghatta National Park (Bannerghatta Biological Park) (1974)	Karnataka	White Tiger, Royal Bengal Tiger, Bear, other animals
Betla National Park (1986)	Jharkhand	Tiger, Sloth Bear, Peacock, Elephant, Sambar deer, mouse deer and other animals.
Bhitarkanika National Park (1988)	Odisha	Mangroves, Saltwater crocodile, white crocodile, Indian python, black ibis, wild pigs, rhesus monkeys, chital and other animals
Buxa Tiger Reserve (1992)	West Bengal	Tiger
Dachigam National Park (1981)	J&K	Only area where Kashmir stag is found
Dudhwa National Park (1977)	U.P	Swamp deer, sambar deer, barking deer, spotted deer, hog deer, tiger, Indian rhinoceros,
Gir Forest National Park (1965)	Gujarat	Asiatic lion
Great Himalayan National Park (1984)	Himachal Pradesh,	UNESCO World Heritage Site
Gulf of Mannar Marine National Park (1980)	Tamil Nadu	Green turtles and Olive Ridley turtles and whales.
Indravati National Park (1981)	Chhattisgarh	Wild Asian Buffalo, Tiger Reserve, Hill Mynas
Jaldapara National Park (2012)	West Bengal	Indian one horned rhinoceros
Jim Corbett National Park (1936)	Uttarakhand	Tiger
Kanha National Park (1955)	M. P.	Swamp Deer, Tigers
Kaziranga National Park (1905)	Assam	Indian rhinoceros, UNESCO World Heritage Site
Keibul Lamjao National Park (1977)	Manipur	only floating park in the world

Keoladeo National Park (1981)	Rajasthan	UNESCO World Heritage Site
Manas National Park (1990)	Assam	UNESCO World Heritage Site
Mandla Plant Fossils National Park (1983)	M. P.	Plant Fossils National Park
Marine National Park, Gulf of Kutch (1980)	Gujarat	70 species of sponges, Coral 52 species along with puffer fishes, sea horse and sting ray
Namdapha National Park (1974)	Arunachal Pradesh	Snow Leopards, Clouded Leopards, Common Leopards and Tigers
Nanda Devi National Park (1982)	Uttarakhand	UNESCO World Heritage Site
Neora Valley National Park (1986)	West Bengal	clouded leopard, red panda and musk deer
Nokrek National Park (1986)	Meghalaya	UNESCO World Biosphere Reserve
Periyar National Park (1982)	Kerala	Tigers
Ranthambore National Park (1981)	Rajasthan	Tigers, Leopards, Striped Hyenas, Sambar deer and Chital.
Sariska Tiger Reserve (1955)	Rajasthan	Tiger
Simlipal National Park (1980)	Odisha	Tiger, Leopard, Asian elephant, Sambar, Barking deer, Gaur, Jungle cat, Wild boar, and other animals.
Sultanpur National Park (1989)	Haryana	Siberian crane, greater flamingo, ruff, black-winged stilt, common teal, northern pintail, and yellow wagtail.
Sundarbans National Park (1984)	West Bengal	UNESCO World Heritage Site
Valley of Flowers National Park (1982)	Uttarakhand	Flying squirrel, Himalayan black bear, red fox, Himalayan weasel and Himalayan yellow-throated marten, and Himalayan goral

### WILD LIFE SANCTUARIES IN INDIA

Name of the Sanctuary	Location	Major Species
Gir Wild Life Sanctuary	Sasan Gir, Junagadh, Amreli	Lion, Leopard, Chausinga, Chital, Hyena, Sambar, Chinkara, Herpetofauna, Crocodiles and birds
Wild Ass Sanctuary	Little Rann of Kachchh	Wild Ass, Chinkara, Blue bull, Houbara bustard, Wolf, Waterfowls, Herpetofauna
Hingolghadh Sanctuary	Hingolghadh, Rajkot	Chinkara, Blue bull, Wolf, Hyena, Fox, Birds, Herpetofauna
Marine Sanctuary	Gulf of Kachchh, Jamnagar	Sponges, Corals, Jellyfish, Sea horse, Octopus, Oyster, Pearloyster, Starfish, Lobster, Dolphin, Dugong, waterfowls
Simlipal Sactuary	Odisha	Elephant, Tiger, Leopard, Gaur, Cheetal
Kutch Desert Sanctuary	Great Rann of Kachchh	Chinkara, Hyena, Fox, Flamingo, Pelicans & other waterfowls, Herpetofauna
Rampara Sanctuary	Rampara, Rajkot	Blue bull, Chinkara, Wolf, Fox, Jackal, Birds, Herpetofauna
Ghana Bird Sanctuary	Rajasthan	Water Bird, Black-buck, Cheetal, Sambar
Panchmarhi	Madhya Pradesh	Tiger, Panther, Sambhar, Nilgai, Baskeng, Deer



Dandeli Sanctuary	Karnataka	Tiger, Panther, Elephant, Cheetal, Sanbhar, Wild Boar
Kutch Bustard Sanctuary	Near Naliya, Kachchh	Great Indian Bustard, Lesser Flamingo, Houbara bustard, Chinkara, Blue bull, Herpetofauna

### Biosphere reserves in India Area-wise

Name	State	Key Fauna
Nilgiri Biosphere Reserve	Tamil Nadu, Kerala and Karnataka	Nilgiri tahr, lion-tailed macaque
Nanda Devi National Park & Biosphere Reserve	Uttarakhand	
Gulf of Mannar	Tamil Nadu	Dugong or sea cow
Nokrek	Meghalaya	Red panda
Sundarbans	West Bengal	Royal Bengal tiger
Manas	Assam	Golden langur, red panda
Simlipal	Odisha	Gaur, royal Bengal tiger, elephant
Dihang-Dibang	Arunachal Pradesh	
Pachmarhi Biosphere Reserve	Madhya Pradesh	Giant squirrel, flying squirrel
Achanakmar-Amrkanak Biosphere Reserve	Madhya Pradesh, Chhattisgarh	Four horned antelope (Tetracerus quadricornis), Indian wild dog (Cuon alpinus), Saras crane (Grus antigone), Asian white-backed vulture (Gyps bengalensis), Sacred grove bush frog (Philautus sanctisilvaticus)
Great Rann of Kutch	Gujarat	Indian wild ass
Cold Desert	Himachal Pradesh	Snow leopard
Khangchendzonga	Sikkim	Snow leopard, red panda
Agasthyamall Biosphere Reserve	Kerala, Tamil Nadu	Nilgiri tahr, elephants
Great Nicobar Biosphere Reserve	Andaman and Nicobar Islands	Saltwater crocodile
Dibru-Saikhowa	Assam	Golden langur
Seshachalam Hills	Andhra Pradesh	
Panna	Madhya Pradesh	Tiger, chital, chinkara, sambhar and sloth bear

## Transportation

### Railways

Indian Railways is the world's largest commercial or utility employer, with more than 1.4 million employees.

#### Indian Railways Zones and their Headquarters

Name	Route (km)	Headquarters
Southern (SR)	5098	Chennai
Central (CR)	3905	Mumbai
Western (WR)	6182	Mumbai
Eastern (ER)	2414	Kolkata
Northern (NR)	6968	Delhi
North Eastern (NER)	3667	Gorakhpur
South Eastern (SER)	2631	Kolkata
Northeast Frontier (NFR)	3907	Maligaon

South Central (SCR)	5951	Secunderabad
East Central (ECR)	3628	Hajipur
North Western (NWR)	5459	Jaipur
East Coast (ECoR)	2677	Bhubaneswar
North Central (NCR)	3151	Allahabad
South East Central (SECR)	2447	Bilaspur
South Western (SWR)	3177	Hubli
West Central (WCR)	2965	Jabalpur

### SCENARIO OF METRO RAIL IN FOUR METROPOLIS

City	Owner	Began Operation	Distance in Kms
Kolkata	Kolkata Metro Rail Corporation	24 October 1984	28.14 km
Delhi	Delhi Metro Rail Corporation Limited (DMRCL)	24 December 2002	213 km
Mumbai	Mumbai Metropolitan Region Development Authority (MMRDA)	8 June 2014	11.4 km
Chennai	Chennai Metro Rail Limited (CMRL)	29 June 2015	10 km

### Railway manufacturing Units

• Chittaranjan Locomotive Works	Chittaranjan
• Diesel Locomotive Works	Varanasi
• Diesel Loco Modernisation Works	Patiala
• Integral Coach Factory	Chennai
• Rail Coach Factory	Kapurthala
• Rail Wheel Factory	Bangalore

#### Other independent units of Indian Railway:

- Central Organization for Railway Electrification- Allahabad.
- Central Organization for Modernization of Workshops - New Delhi.

### Indian Road Networks

- India has a road network of over approx. 4,689,842 kilometers.
- The Central Government is responsible for development and maintenance of the National Highways system.
- The Ministry carries out development and maintenance work of National Highways through three agencies, viz. National Highways Authority of India (NHAI), State Public Works Department (PWDs) and Border Road Organization (BRO).
- **National Highways Development Project (NHDP)** is the largest highway project ever taken in the country.

#### Important National Highways

NH	Connects
NH 1	New Delhi-Ambala-Jalandhar-Amritsar.
NH 2	Delhi-Mathura-Agra-Kanpur-Allahabad-Varanasi-Kolkata.



NH 3	Agra-Gwalior-Nasik-Mumbai.
NH 4	Thane and Chennai via Pune and Belgaum.
NH 5	Kolkata-Chennai.
NH 6	Kolkata-Dhule.
NH 7	Varanasi-Kanyakumari (2369 km).
NH 8	Delhi-Mumbai (via Jaipur, Baroda & Ahmedabad).
NH 9	Mumbai-Vijaywada.
NH 10	Delhi-Fazilka.
NH 24	Delhi-Lucknow.
NH 26	Lucknow-Varanasi.

## Waterways

- India has about 14,500 km of navigable and potentially navigable waterways.
- India has an extensive network of inland waterways in the form of rivers, canals, backwaters and creeks.

There are six National Waterways in India:-

National waterways-1	- Allahabad to Haldia.
National waterways-2	- Sadiya to Dhubri
National waterways-3	- Kollam to Kottapuram.
National waterways-4	- Kakinada to Pondicherry.
National waterways-5	- Talcher to Dhamra.
National waterways-6	- Lakhimpur to Bhanga, (Proposed).

## Ports

Indian coastline is about **7516.6 kilometers** and it is one of the biggest peninsulas in the world. It is served by 12 major ports, 200 notified minor and intermediate ports. Maharashtra (48) has the maximum number of non-major ports followed by Gujarat (42) and Andaman & Nicobar Islands (23).

- The Major Ports are administered by the Central Government's shipping ministry.
- The Minor and Intermediate ports are administered by the relevant departments or ministries in the nine coastal states.

The Coastal States in India are Andhra Pradesh, Odisha, West Bengal, Tamil Nadu, Kerala, Karnataka, Goa, Maharashtra and Gujarat.

Name of the Port	Coast	State
Kandla	Western Coast	Gujarat
Mumbai	Western Coast	Maharashtra
Jawaharlal Nehru	Western Coast	Maharashtra
Marmugoa	Western Coast	Goa
Manglore	Western Coast	Karnataka
Kochi	Western Coast	Kerala
Haldia	Eastern Coast	West Bengal
Paradip	Eastern Coast	Odisha
Vishakapatnam	Eastern Coast	Andhra Pradesh
Chennai	Eastern Coast	Tamil Nadu
Ennore	Eastern Coast	Tamil Nadu
Tutikorin	Eastern Coast	Tamil Nadu

## Air Transport

- Air transportation in India made a humble beginning in **1911** when air mail operation commenced over a little distance of **10 km** between **Allahabad** and **Naini**.
- Indian National Airways** was formed in **1933** and it introduced air service between **Karachi** and **Lahore**.
- In **1953**, the air transport was **nationalised** and two corporations were formed: **Air India International** and the **Indian Airlines**.
- Air India** is responsible for international air services.
- Indian Airlines** handles domestic traffic and carries passengers, cargo and mail to different places in the country.
- Vayudoot** was set up in **1981** to augment the air transport in the country.
- Pawan Hans Limited** was established in 1985. It provides helicopter services to the petroleum sector.
- International Airports Authority of India** and **National Airports Authority** were merged on **1 April, 1995** to form **Airports Authority of India (AAI)**.
- The International Airports Division (IAD) of AAI operates and develops international airports.
- Private taxis** started their services in **1990**.

Some important International and Domestic airline operate in India.

International Airlines	Domestic Airlines
Air Arabia, Qatar Airways, Lufthansa, Cathay Pacific, etc.	Indigo, Indian Airlines, Spicejet, Jet Konnect.

## Tribes of India

**Tribe** - A group of people, or a community with similar values or interests, a group with a common ancestor, or a common leader is called **Tribe**.

**Scheduled Tribes** - Article 366 (25) defined scheduled tribes as "such tribes or tribal communities or parts of or groups within such tribes or tribal communities as are deemed under Article 342 to be Scheduled Tribes for the purposes of this Constitution".

Tribal Groups of India			
Tribal Group	Found in	Tribal Group	Found in
Abhor	Arunachal Pradesh	Khond	Jharkhand
Adivasi	AP, Bihar, Odisha, Jharkhand, Madhya Pradesh, Maharashtra, Rajasthan, Tamilnadu, Some Northeastern States, West Bengal, Andaman and Nicobar	Khasi	Meghalaya
Ahgani	Manipur	Kharia	Jharkhand, Odisha
Apatani	Arunachal Pradesh	Kol	Madhya Pradesh



Baiga	Madhya Pradesh	Kolam	Maharashtra, Andhra Pradesh, Telengana, MP
Bakarwal	Jammu and Kashmir	Kota	Karnataka
Bhil	M.P and Rajasthan	Kuki	Mizoram
Birhor	M.P and Bihar	Lahaula	Himachal Pradesh
Chang	Nagaland	Lepcha	Sikkim
Chenchuas	Telengana, Karnataka	Lushai	Mizoram, Manipur
Sutiya	Assam	Muria	Chhattisgarh
Gaddis	Himachal Pradesh	Miha	Rajasthan
Gallong	Arunachal Pradesh	Moplah	Malabar
Garo	Meghalaya	Munda	West Bengal, Jharkhand, Odisha, Chhattisgarh
Gond	M.P and Bihar	Nishi	Assam
Gujjar	Rajasthan	Naga	Nagaland
Irula	Tamil Nadu	Oraon	MP, Bihar and Odisha, Chhotanagpur, WB,
Jaintia	Meghalaya	Onges	Andaman & Nicobar
Jarawa	Andamans	Singpho	Assam, Arunachal Pradesh
Kanikar	Tamil Nadu and Kerala	Santhal	WB, Odisha & Bihar, Jharkhand, Assam
Kalkari	Maharashtra	Sangtam	Nagaland
Kharia	Maharashtra	Sema	Nagaland
		Sentinelese	Andaman & Nicobar
		Shompen	Andaman & Nicobar
		Toda	Tamil Nadu
		Uralis	Kerala
		Wancho	Arunachal Pradesh
		Warli	Maharashtra, Daman and Diu, Bihar, Madhya Pradesh, West Bengal Dadra, Nagar Haveli

## 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, Yangtze, 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 lily.

**Tropical Savannas:** Oil palms, rubber tree and African Acacia.

**Tropical Steppes and Deserts:** Thorny Acacia euphorbias, dwarf palm, and baobab 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.

**Zulus:** 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 of 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), **Savanna** (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

#### 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.
- **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 include 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 mild 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 are 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 cactus.

**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

## LEVEL 1

- The term 'demographic gap' signifies the difference
  - in sex ratio
  - in age
  - in child / woman ratio
  - between the birth and the death rate
- Most of the communication satellites today are placed in a geostationary orbit. In order to stay over the same spot on the Earth, a geostationary satellite has to be directly above the
  - Tropic of Cancer
  - Either North or South Pole
  - Equator
  - Tropic of Capricorn
- The angular speed of a whirlwind in a Tornado towards the centre
  - decreases rapidly
  - increases
  - remains constant
  - slowly becomes zero
- Currently half of the world's population live in just 6 countries. Identify them from the following
  - India, China, Pakistan, Brazil, Bangladesh, Indonesia
  - India, China, Bangladesh, South Africa, Pakistan, Indonesia
  - China, India, United States, Indonesia, Brazil, Pakistan
  - China, India, Bangladesh, United States, Pakistan, Indonesia
- In the interior of the Earth
  - the temperature falls with increasing depth
  - the pressure falls with increasing depth
  - the temperature rises with increasing depth
  - both temperature and pressure fall with increasing depth
- Asia has large areas of inland drainage. Why is it so?
  - Rainfall is seasonal and scanty
  - There is a number of intermontane plateaus
  - River channels are obstructed by lava flows
  - It is a very large continent
- The Earth revolves around the Sun in an elliptical path and the Sun is located at one focus of the ellipse. Imagine a situation in which the Earth goes around the Sun on a circular path. Which one among the following would result in under that situation?
  - It would not make any difference
  - Difference between seasons will be reduced
  - The earth would become very hot
  - The earth would become very cold
- Which one among the following best explains the reason for the Eastern and Western boundaries of the Pacific Ocean experiencing frequent earth-quake?
  - There are deep ocean trenches along these margins
  - High mountain stretch along the continental margins adjacent to this ocean
  - The currents of the vast Pacific Ocean continue to dash against the continental margins
  - These margins coincide with the plate margins
- The Vindhyan system of rocks is important for the production of
  - precious stones and building materials
  - iron ore and manganese
  - bauxite and mica
  - copper and uranium
- Horse latitudes lie within the atmospheric pressure belts of
  - Polar high
  - Equatorial low
  - Sub-tropical high
  - Sub-polar low
- A nautical mile is equal to
  - 5060 feet
  - 5280 feet
  - 6060 feet
  - 6076 feet
- 'El Nino' associated with the formation of the South West Monsoon of India is
  - an abnormally warm ocean current
  - a periodic warm air-mass
  - a periodic warm wind
  - a periodic low pressure centre
- Kanha National Park belongs to which one among the following biogeographical areas in the world?
  - Tropical Sub-humid Forests
  - Tropical Humid Forests
  - Tropical Dry Forests
  - Tropical Moist Forests
- The broken hills famous for zinc and lead are located in
  - Turkey
  - France
  - Germany
  - Australia
- When we consider 15° meridian on a world map or globe and count them in an Eastward direction starting with Greenwich meridian (0°), we find that the time of this meridian is
  - same as Greenwich
  - 1 hour fast
  - 1 hour slow
  - 12 hours fast
- Climate change resulting in the rise of temperature may benefit which of the countries/regions?
  - South Africa
  - East Indies islands comprising of Java, Sumatra and Borneo
  - The Western coasts of South America
  - Russia and Northern Europe
- Which one among the following rivers does not flow into the Bay of Bengal?
  - Mahanadi
  - Cauveri
  - Tapti
  - Godavari
- Duncan Passage is located between
  - South and little Andaman
  - Little and Great Nicobar
  - North and Middle Andaman
  - Middle and South Andaman



19. In wildlife conservation which one among the following best defines an 'endemic species'?
  - (a) When the critical number of a species declines in a forest due to parasitic attack
  - (b) A species which is cosmopolitan and can be commonly found in biosphere
  - (c) An endangered species which is found in a few restricted areas on the Earth
  - (d) A species confined to a particular region and not found anywhere else
20. The country that shares longest border with India is
  - (a) China
  - (b) Bangladesh
  - (c) Nepal
  - (d) Pakistan
21. Which one among the following is not a landlocked country in Africa?
  - (a) Botswana
  - (b) Zambia
  - (c) Lesotho
  - (d) Nigeria
22. The imaginary line on the Earth's surface that closely follows the 180° Meridian is
  - (a) Prime Meridian
  - (b) Equator
  - (c) International Date Line
  - (d) Tropic of Cancer
23. Carbon dioxide is called a greenhouse gas because
  - (a) its concentration remains always higher than other gases
  - (b) it is used in photosynthesis
  - (c) it absorbs infrared radiation
  - (d) it emits visible radiation
24. Which one among the following is a source of methane emission into the atmosphere?
  - (a) Automobile exhaust fume
  - (b) Industrial chimney
  - (c) Mining
  - (d) Wetland
25. Over 90% of the world's biomass is in
  - (a) tropical rain forests
  - (b) freshwater wetlands
  - (c) topsoils
  - (d) oceans
26. Logically, what does a continually rising air pressure indicate?
  - (a) Advent of unsettled and cloudy weather
  - (b) Advent of a cyclone
  - (c) Fine and settled weather
  - (d) Fine and unsettled weather
27. The soil formed by wind dust in and around hot deserts is called
  - (a) silty soil
  - (b) loamy soil
  - (c) sandy soil
  - (d) loess soil
28. If news is broadcast from London at 10 : 30 am, at what time it will be heard at Baghdad (45° E)?
  - (a) 7 : 30 am
  - (b) 9 : 00 am
  - (c) 1 : 30 pm
  - (d) 12 : 00 noon
29. Which one among the following sequences of water bodies, from lower to higher salinity concentration, is correct?
  - (a) Gulf of California-Baltic Sea-Red Sea-Arctic sea
  - (b) Baltic Sea-Arctic Sea-Gulf of California-Red Sea
  - (c) Red Sea-Gulf of California-Arctic Sea-Baltic Sea
  - (d) Arctic Sea-Gulf of California-Baltic Sea-Red Sea
30. Rain bearing clouds look black because
  - (a) all light is scattered by them
  - (b) the large number of water droplets in them absorb all the sunlight
  - (c) they reflect the sunlight back into the atmosphere
  - (d) there is a lot of dust condensed on the water vapour in such clouds
31. The riverbank is weakest where the river turns. This is because water
  - (a) gets concentrated on the inner bank of the turn, making it denser
  - (b) effectively bounces off the outer bank as it turns exerting an extra pressure on the bank
  - (c) flows faster as it turns
  - (d) reacts more effectively with the bank at a turn
32. The main aim of watershed management strategy of India is
  - (a) promoting silviculture
  - (b) hillslope management
  - (c) arid land management
  - (d) soil conservation
33. Which one among the following statements regarding Chinook winds is not correct?
  - (a) These are local winds
  - (b) They descend along the Eastern slopes of the rocky mountain in mid-latitudes
  - (c) They bring lots of rain with them
  - (d) They benefit agriculture
34. Ozone holes are more pronounced at the
  - (a) Equator
  - (b) Tropic of Cancer
  - (c) Tropic of Capricorn
  - (d) Poles
35. The expression South Asia usually includes
  - (a) Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka
  - (b) Nepal, Bhutan, India, Afghanistan, China, Pakistan and Sri Lanka
  - (c) Bangladesh, India, China, Nepal, Japan, Pakistan and Maldives
  - (d) Bangladesh, Bhutan, China, Maldives, Nepal, Pakistan and Sri Lanka
36. The variability among living organisms from all sources including terrestrial, marine and other ecosystems and the ecological complexes of which they are part which includes diversity within species, between species of ecosystems refers to
  - (a) geographical diversity
  - (b) zoological diversity
  - (c) ecological diversity
  - (d) biological diversity
37. Gaddis are
  - (a) fishermen of Kerala
  - (b) pastoralists of Arunachal Pradesh
  - (c) shepherds Himachal Pradesh
  - (d) nomads of Rajasthan desert
38. The waves that help scientists to understand the internal structure of the Earth are
  - (a) primary waves
  - (b) secondary waves
  - (c) surface waves
  - (d) longitudinal waves
39. Which one among the following is called terrestrial planet?
  - (a) Mercury
  - (b) Jupiter
  - (c) saturn
  - (d) Uranus
40. Veliconda hills, which is a part of Eastern Ghats, is situated in
  - (a) Odisha
  - (b) Tamil Nadu
  - (c) Karnataka
  - (d) Andhra Pradesh
41. Which one among the following is not an igneous rock?
  - (a) Granite
  - (b) Basalt
  - (c) Gabbro
  - (d) Gneiss



42. Which one among the following statements about the International Date Line is not correct ?  
 (a) The International Date Line is largely based on the 180° meridian  
 (b) The difference in time between the places just either side of the International Date Line is almost 1 day  
 (c) The difference in time to the extent of 1 day on either side of the International Date Line is caused by inclined axis of the Earth  
 (d) The International Date Line mostly passes through the Pacific Ocean
43. Which one among the following is not a cause of generation of ocean currents ?  
 (a) Planetary winds  
 (b) Variation in ocean water temperature  
 (c) Revolution of the Earth  
 (d) Shape and configuration of the coastliness
44. The highest of all spring tides occurs at the time of  
 (a) full or new moon in association with winter solstice  
 (b) full or new moon in association with equinox  
 (c) full or new moon in association with summer solstice  
 (d) winter as well as summer solstices
45. Which one among the following is a cold ocean current?  
 (a) Canary current (b) Brazil current  
 (c) Gulf stream (d) Kuroshio current
46. The planetary winds that blow from the sub-tropical high pressure belts to the equator are known as  
 (a) westerlies (b) doldrums  
 (c) polar winds (d) trade winds
47. Nearly 30% of the solar radiations return back to the space without contributing anything to the Earth's surface temperature. This amount of radiation is known as  
 (a) Black body (b) Tropopause  
 (c) Earth's albedo (d) Mesopause
48. Confirmation of the presence of Higgs Boson will justify  
 (a) both the standard model and superstring theory  
 (b) the unification of all the four fundamental forces  
 (c) the steady-state model of the universe  
 (d) the mass of the fundamental particles
49. 'Global Dimming' means  
 (a) gradual increase of the temperature of ionosphere  
 (b) gradual loss of biodiversity hot spots  
 (c) gradual reduction in the amount of global direct irradiance at the Earth surface  
 (d) gradual increase in the melting of ice in polar regions
50. Oil is found in petroliferous rock. Which one among the following structures demonstrates an ideal trap?  
 (a) Horizontal structure (b) Fault structure  
 (c) Synclinal structure (d) Anticlinal structure
51. Amarkantak plateau in the Maikal hills marks the origin of the river  
 (a) Gandak (b) Chambal  
 (c) Narmada (d) Ghaggar
52. The westerlies have their origin in the  
 (a) polar highs (b) subtropical highs  
 (c) equatorial lows (d) sub polar lows
53. Mid-latitude cyclones  
 (a) usually move across North-America from East to West  
 (b) are generally found only over the ocean  
 (c) generally bring clear skies and little precipitation  
 (d) are formed in regions of strong temperature contrasts
54. Red soil colour is caused by  
 (a) aluminium compounds (b) mercury compounds  
 (c) iron compound (d) clay
55. Which one among the following is a sea without having a coastline?  
 (a) North sea (b) Sargasso sea  
 (c) Baltic sea (d) Bering sea
56. Which one among the following is the correct sequence of the rivers from North to South?  
 (a) Damodar-Brahmani-Mahanadi-Tungabhadra  
 (b) Damodar-Mahanadi-Brahmani-Tungabhadra  
 (c) Brahmani-Tungabhadra-Damodar-Mahanadi  
 (d) Damodar-Brahmani-Tungabhadra-Mahanadi
57. Which one among the following states does not form part of the Narmada basin ?  
 (a) Madhya Pradesh (b) Gujrat  
 (c) Rajasthan (d) Maharashtra
58. The Circle of illumination divides Earth into two hemispheres known as  
 (a) East and West (b) North and South  
 (c) Day and night (d) Summer and Winter
59. Which one among the following African countries is not landlocked?  
 (a) Zambia (b) Uganda  
 (c) Angola (d) Zimbabwe
60. Which one among the following is responsible for formation of Ozone Holes' in the stratosphere?  
 (a) Benzopyrene (b) Hydrocarbons  
 (c) Chloro Fluoro Carbons (d) UV radiation
61. Albedo effect would be relatively higher in  
 (a) early morning and late evening  
 (b) early morning only  
 (c) noon  
 (d) late evening only
62. Composite volcanic cone is also called strata cone because of the  
 (a) alternating sheets of lava and pyroclastic materials  
 (b) uneven streams of lava flow  
 (c) cataclysmic eruption  
 (d) eruption of lava flow from a fissure
63. Cordillera in North America is a  
 (a) river basin (b) high plateau  
 (c) inland lake (d) mountain system
64. The humidity of air measured in percentage is called  
 (a) absolute humidity (b) specific humidity  
 (c) relative humidity (d) all of these
65. Chinook is a  
 (a) cold wind in Europe  
 (b) tropical desert storm in West Asia  
 (c) warm wind in North-America  
 (d) depression to South Africa



66. Which one of the following dams is constructed across Krishna River?  
 (a) Ukai Dam (b) Krishna Sagar Dam  
 (c) Srisailem Dam (d) Mettur Dam
67. Biodiversity is richer in  
 (a) tropical regions (b) polar regions  
 (c) temperate regions (d) oceans
68. Which one of the following is a land-locked harbour?  
 (a) Vishakhapatnam (b) Ennore  
 (c) Mumbai (d) Haldia
69. Which of the following statements regarding the duration of day and night is correct?  
 (a) Difference is least near the Equator and progressively increases away from it  
 (b) Difference is maximum at the Equator and progressively decreases away from it  
 (c) Difference is least at the Tropics and progressively increases towards the Equator and Poles  
 (d) Difference is maximum at the Tropics and progressively decreases towards the Equator and Poles
70. Arrange the locations of four oil refineries of India from west to East.  
 (a) Koyali, Kochi, Panipat, Mathura  
 (b) Kochi, Koyali, Panipat, Mathura  
 (c) Koyali, Panipat, Kochi, Mathura  
 (d) Koyali, Panipat, Mathura, Kochi
71. Which one of the following is depositional landform ?  
 (a) Stalagmite (b) Lapis  
 (c) Sinkhole (d) Cave
72. 'Population dividend' refers to  
 (a) total number of population  
 (b) youthful age structure of a population  
 (c) relatively high proportion of experienced aged people  
 (d) migration from richer region to poorer region
73. The vegetation type characterised by (i) a large expanse of grassland with scattered trees and shrubs, (ii) lying between tropical rain forest and tropical steppes and deserts and (iii) flat-topped trees, is called  
 (a) mid-latitude broad-leaf mixed forest  
 (b) temperate rain forest  
 (c) tropical savanna  
 (d) mid-latitude grassland
74. A typical black hole is always specified by  
 (a) a (curvature) singularity  
 (b) a horizon  
 (c) either a (curvature) singularity or a horizon  
 (d) a charge
75. Which one of the following is the example of subsistence farming?  
 (a) Shifting cultivation  
 (b) Commercial farming  
 (c) Extensive and intensive farming  
 (d) Organic farming
76. Plate tectonics is a scientific theory that describes the large scale motions of Earth's lithosphere. Which one among the following statements regarding Plate tectonics is **not** correct?  
 (a) Tectonic plates are composed of Oceanic lithosphere and thicker Continental lithosphere  
 (b) Tectonic plates are able to move because the Earth's lithosphere has a higher strength than the underlying asthenosphere  
 (c) The Earth's lithosphere is broken up into Tectonic Plates  
 (d) Along divergent plate boundaries, subduction carries plates into the mantle
77. Which one of the following would have happened if the Himalayas did **not** exist?  
 (a) Monsoon rains would have taken place in winter months  
 (b) Coastal India would have experienced Mediterranean climate  
 (c) North Indian plain would have been much cooler in winter  
 (d) North western part of India would have experienced humid condition
78. Seismic gaps are  
 (a) parts of plate boundaries in oceans where tsunamis occur frequently.  
 (b) sections of plate boundaries that have ruptured repeatedly in the recent past.  
 (c) sections of plate boundaries that have not ruptured in the recent past.  
 (d) plate boundaries having no volcanic activity.
79. In the absence of Cold Labrador Current, which one among the following would happen ?  
 (a) There will be no North-East Atlantic fishing grounds  
 (b) There will be no North-West Atlantic fishing grounds  
 (c) There will be no fishing ground in the North Atlantic Ocean  
 (d) Semi-arid condition of the Atlantic coast of the USA and Canada would prevail
80. If  $82^{\circ} 30'$  east longitude (Allahabad) shows 6 : 00 am of Sunday (local time), what would be the local time of Florida (USA) located on  $82^{\circ}$  west longitude ?  
 (a) 6 : 58 pm of Saturday  
 (b) 7 : 02 pm of Sunday  
 (c) 6 : 58 am of Sunday  
 (d) 7 : 02 am of Saturday
81. Which one of the following statements regarding water cycle is correct ?  
 (a) Transpiration by plants does contribute to cloud formation.  
 (b) Only evaporation of surface water of rivers and oceans is responsible for cloud formation.  
 (c) Rainfall does not contribute in maintenance of underground water table.  
 (d) Underground water may also be connected to surface water.
82. Inclusion strategy does **not** focus on  
 (a) reduction of inequality  
 (b) reduction of poverty  
 (c) diversifying livelihood for tribal population  
 (d) getting poorer countries close



83. Rain shadow effect is associated with  
(a) Cyclonic rainfall (b) Orographic rainfall  
(c) Convectional rainfall (d) Frontal rainfall
84. Which one of the following Indian states has the highest proportion of area under forest cover ?  
(a) Madhya Pradesh (b) Sikkim  
(c) Meghalaya (d) Mizoram
85. To a perpendicular to the plane of ecliptic, Earth's axis of rotation makes an angle of  $23\frac{1}{2}$  degrees. Had this angle been zero degree, which one among the following would result ?  
(a) There would have been no season  
(b) The length of day and night would have been the same throughout the year  
(c) The length of the day and night would have been the same all over the earth  
(d) All of the above
86. 'Yakuts' are the nomadic herders of  
(a) Gobi (b) Sahara  
(c) Tundra (d) Kalahari
87. Which one of the following weather conditions indicates a sudden fall in barometer reading ?  
(a) Stormy weather (b) Calm weather  
(c) Cold and dry weather (d) Hot and sunny weather
88. Which one among the following is the coral group of islands of India?  
(a) Andaman (b) Nicobar  
(c) Minicoy (d) Lakshadweep
89. Taungup Pass is a mountain corridor connecting India with  
(a) Afghanistan (b) China  
(c) Pakistan (d) Myanmar
90. Considering the locations of mountains in India, which one among the following is in right sequence from south to north?  
(a) Doddabetta, Kailash, Dhaulagiri, Vindhychal  
(b) Doddabetta, Vindhychal, Dhaulagiri, Kailash  
(c) Dhaulagiri, Kailash, Doddabetta, Vindhychal  
(d) Dhaulagiri, Vindhychal, Doddabetta, Kailash
91. The Faroe is a group of islands lying in the Atlantic Ocean between Scotland and Iceland. This island group is also known as  
(a) Island of Sheep (b) Island of Goats  
(c) Island of Cows (d) Island of Buffaloes
92. Tuareg is a pastoral nomad living in the desert of  
(a) Kalahari (b) Sahara  
(c) Arabia (d) Patagonia
93. Under which of the following Acts is the National Population Register being created?  
(a) The Citizenship Act of India, 1955 as amended in 2004  
(b) The Census Act, 1948  
(c) The UID Act, 2010  
(d) None of the above
94. Rotterdam of Netherlands is largely famous for  
(a) textiles (b) dairying  
(c) shipbuilding (d) paper industry
95. A topographical map with scale 1 : 50000 indicates 1 cm to  
(a) 50 km (b) 500 m  
(c) 50 m (d) 5 km
96. The permanent wind that blows from the horse latitude to the equatorial region is known as  
(a) westerly (b) trade wind  
(c) doldrum (d) easterly
97. Which one of the following is a warm ocean current?  
(a) Labrador current (b) Kuroshio current  
(c) Peru current (d) Benguela current
98. Which one of the following pairs of power projects is **not** correctly matched?  
(a) Papanasam-Hydropower  
(b) Neyveli-Hydropower  
(c) Ukai-Thermal power  
(d) Rana Pratap Sagar-Hydropower
99. Which one of the following is the correct sequence of oil refineries in India in respect of their time of establishment (starting from the earliest)?  
(a) Barauni-Haldia (b) Barauni-Mathura  
- Guwahati-Mathura - Guwahati-Haldia  
(c) Guwahati-Haldia (d) Guwahati-Barauni  
- Mathura-Barauni - Haldia-Mathura
100. Movements of tides are mostly determined by  
(a) albedo effect (b) wind velocity  
(c) rotation of the Earth (d) revolution of the Earth
101. Which of the following sequences is correct for rainfall?  
(a) Slow ascent of air → slow condensation → heavy downpour  
(b) Rapid ascent of air → large raindrops → heavy downpour  
(c) Pressure decreased → air compressed → heavy downpour  
(d) Descent of air → air warmed → heavy downpour
102. 'Escher' is a geomorphic feature developed by  
(a) mechanical weathering  
(b) river action  
(c) glaciofluvial deposits  
(d) aeolian deposits
103. It is known that the atmosphere is divided into some layers. In which one among the following layers, is the percentage composition of Helium gas maximum?  
(a) Troposphere (b) Stratosphere  
(c) Exosphere (d) Ionosphere
104. Jawahar tunnel on Jammu-Srinagar highway passes through  
(a) Pir Panjal range (b) Karakoram range  
(c) Zaskar range (d) Dhauladhar range
105. Which of the following is the main characteristic of Mediterranean climate?  
(a) High temperature throughout the year  
(b) Rainfall throughout the year  
(c) Rain in winter season  
(d) Convectional rain
106. Which one among the following is not a factor that affects direction of wind?  
(a) Pressure gradient (b) Friction  
(c) Magnetism (d) Coriolis effect



107. The exceptionally high and low tides that occur at the time of the new moon or the full moon when the Sun, the Moon and the Earth are approximately aligned is called  
 (a) Spring (b) Fall  
 (c) Neap (d) Diurnal
108. No trees are found in Tundra biome near polar region of northern hemisphere. This is due to  
 (a) snowfall inhibits plant respiration  
 (b) frozen ice beneath the surface soil (permafrost) restricts root growth  
 (c) less wind movement and inadequate sunlight  
 (d) low temperature which restricts development reproductive organs
109. If the Earth's axis were perpendicular to the plane of its orbit, which one among the following would not have happened?  
 (a) The North Pole will always lie in dark  
 (b) Days and nights would be equal throughout the year  
 (c) No change of seasons will take place  
 (d) The sun will be perpendicular to the equator
110. The latitude is the angular distance of a point of the Earth surface, North or South, of the equator as measured from the  
 (a) centre of the Earth  
 (b) equator  
 (c) Tropic of Cancer or Capricorn  
 (d) Poles
111. Sirocco is a name used to mean  
 (a) a local wind (b) a volcano  
 (c) an island (d) an ocean current
112. Which one among the following statements relating to an anticyclone is correct?  
 (a) Anticyclone is a wind system with a high pressure centre  
 (b) In anticyclone the movement of wind is inward  
 (c) The contribution of an anticyclone towards determining weather of an area is quite significant  
 (d) The movement of wind is clockwise in an anticyclone of southern hemisphere
113. The current produced by upwelling of cold water off the coast of Chile and Peru is known as  
 (a) El Nino (b) Humboldt current  
 (c) Agulhas current (d) Canary current
114. Which one among the following is the largest temperate desert of the world?  
 (a) Patagonian desert (b) Taklamakan desert  
 (c) Iranian desert (d) Turkmen desert
115. Doldrums is a  
 (a) Tropical wind belt  
 (b) Tropical wind deflection belt  
 (c) Sub-tropical wind belt  
 (d) Tropical no-wind belt
116. Which one among the following agricultural crops/groups of crops may be grown in abundant in lowlands and river deltas of fertile alluvial soil where there is high summer temperature and rainfall varies from 180 cm to 250 cm?  
 (a) Wheat and sugarcane (b) Cotton  
 (c) Maize and coarse crops (d) Rice, jute and tea
117. The largest number of temperate cyclones originate mostly over the  
 (a) Indian Ocean (b) North Atlantic Ocean  
 (c) North Pacific Ocean (d) Arctic Ocean
118. Which one among the following statements regarding Chinook winds is **not** correct?  
 (a) They rise from the Pacific Ocean  
 (b) After crossing the Rockies, they descend to the east of the mountains  
 (c) They bring rainfall in the Prairies  
 (d) These winds are beneficial to wheat cultivation
119. The cyclonic storm occurring over Caribbean Sea is known as  
 (a) Typhoon (b) Willy-Willy  
 (c) Hurricane (d) Cyclone
120. The Suez Canal, the Strait of Hormuz and the Strait of Gibraltar are important because they  
 (a) prevent attacks on bordering nations  
 (b) prohibit the movement of ships carrying nuclear weapons  
 (c) unite Russian access to warm water points  
 (d) control access to vital trade routes
121. Which one among the following rocks does **not** belong to the same group?  
 (a) Shale (b) Limestone  
 (c) Slate (d) Sandstone
122. Ferrel's law is related to deflection of  
 (a) cold air-mass  
 (b) hot air-mass  
 (c) monsoon air-mass  
 (d) trade wind and ocean currents
123. Radioactive decay provides an internal source of heat for the earth. This helps in the formation of which type of rocks?  
 (a) Igneous (b) Sedimentary  
 (c) Metamorphic (d) All of the above
124. The Narmada river in the Peninsular plateau flows westward with a remarkably straight channel. It is because the  
 (a) slope gradient in this part controls the river channel pattern  
 (b) river carries a huge amount of water which has created a straight channel course  
 (c) river forms the boundary between the Central Highlands and the Deccan Plateau  
 (d) river flows through the trough of a rift valley inclined westward
125. Why the summer monsoon winds blow from south-western direction in the northern hemisphere?  
 (a) The general direction of wind from the Indian ocean is south-western  
 (b) The presence of the doldrums around the equator  
 (c) The low pressure conditions in north-west India  
 (d) Due to the effect of Coriolis force



126. Which one among the following is a correct sequence of the Indian ports from north to south?  
 (a) Haldia – Kandla – Paradeep – Kochi  
 (b) Kandla – Haldia – Paradeep – Kochi  
 (c) Kandla – Haldia – Kochi – Paradeep  
 (d) Kochi – Kandla – Haldia – Paradeep
127. Which one among the following is a correct sequence of production of coal in the Indian States in descending order?  
 (a) Jharkhand – Madhya Pradesh – West Bengal – Meghalaya  
 (b) West Bengal – Madhya Pradesh – Jharkhand – Meghalaya  
 (c) Jharkhand – West Bengal – Meghalaya – Madhya Pradesh  
 (d) Madhya Pradesh – Jharkhand – West Bengal – Meghalaya
128. The western coasts of India receive very high rainfall in summer mainly due to  
 (a) Tropical location (b) Nearness to sea  
 (c) Western Ghats (d) Himalayas
129. The Gulf of Mannar is situated along the coast of  
 (a) Tamil Nadu (b) Kerala  
 (c) Karnataka (d) Andhra Pradesh
130. The Deccan Trap Formation was caused by  
 (a) Shield eruption (b) Composite eruption  
 (c) Caldera eruption (d) Flood basalt eruption
131. In India, the Tropical Savanah (AW) type of climate prevails largely in  
 (a) Rajasthan desert region  
 (b) Peninsular plateau region  
 (c) Jammu & Kashmir region  
 (d) North-Eastern region
132. The Nokrek biosphere reserve is located in  
 (a) Arunachal Pradesh (b) Assam  
 (c) Sikkim (d) Meghalaya
133. Where is Aghil Pass located?  
 (a) Nepal Himalayas (b) Sikkim Himalayas  
 (c) Eastern Himalayas (d) Trans Himalayas
134. The 'Golden Quadrilateral' which connects Delhi, Mumbai, Chennai and Kolkata passes through  
 (a) Amritsar - Ahmedabad - Pune - Patna  
 (b) Jaipur - Porbandar - Hyderabad - Varanasi  
 (c) Vadodara - Pune - Visakhapatnam - Varanasi  
 (d) Nagpur - Bhopal - Surat - Amritsar
135. Which among the following areas is conducive for well irrigation?  
 (a) Rocky land uneven surface of Peninsular India  
 (b) Dry tracts of Rajasthan and Gujarat  
 (c) Brackish groundwater region of Uttar Pradesh  
 (d) Deltaic regions of Mahanadi, Godavari and Krishna
136. With which one of the following countries, India has signed an MoU under the International Cooperation on Brahmaputra and Sutluj rivers? (CDS)  
 (a) Pakistan (b) China  
 (c) Bangladesh (d) Nepal
137. Headquarters of which one among the following Railway Zones in India is situated at the highest elevation from the mean sea level? (CDS)  
 (a) East Central Railway (b) South Eastern Railway  
 (c) South western Railway (d) West Central Railway
138. Stalactites and stalagmites are features of : (CDS)  
 (a) glacial topography (b) volcanic topography  
 (c) karst topography (d) fluvial topography
139. Which one of the following is the correct sequence of the given planets in increasing order of their size (diameter)? (CDS)  
 (a) Mars - Venus - Earth - Mercury - Uranus  
 (b) Mercury - Mars - Venus - Earth - Uranus  
 (c) Mercury - Mars - Venus - Uranus - Earth  
 (d) Venus - Mercury - Mars - Earth - Uranus
140. Which one of the following islands is of volcanic origin? (CDS)  
 (a) Reunion island  
 (b) Andaman & Nicobar island  
 (c) Lakshadweep island  
 (d) Maldives
141. Which one of the following is the cause of long -term sea-level change? (CDS)  
 (a) Atmospheric disturbance  
 (b) Change in marine water density  
 (c) Melting of icebergs  
 (d) Melting of ice sheets
142. Which one of the following is the reason due to which the wind in the southern hemisphere is deflected towards its left? (CDS)  
 (a) Difference in the water masses of northern and southern hemisphere  
 (b) Temperature and pressure variations  
 (c) Inclined axis of the Earth  
 (d) Rotation of the Earth
143. The 'eye' of the cyclone has : (CDS)  
 (a) abnormally high temperature and lowest pressure  
 (b) abnormally low temperature and pressure  
 (c) clear sky and lowest temperature  
 (d) dense cloud cover and low pressure
144. Pir Panjal Range in the Himalayas is a part of : (CDS)  
 (a) Shiwalik (b) Trans Himalaya  
 (c) Central Himalaya (d) Lesser Himalaya
145. If a ship has to go from Chennai to Kochi, it has to go around Sri Lanka rather than crossing through the Palk Strait. Why? (CDS)  
 (a) The Palk Strait has disputed islands and the Sri Lankan Navy does not allow the ships to cross through  
 (b) It is too shallow for ships to cross  
 (c) Shipping is prohibited through the Strait due to its religious significance connected with the epic Ramayana  
 (d) The around Sri Lanka route is actually shorter than crossing through the Palk Strait
146. Which one of the following is the pattern of circulation around a low-pressure area in the northern hemisphere? (CDS)  
 (a) Counter-clockwise and away from the centre  
 (b) Clockwise and away from the centre  
 (c) Counter-clockwise and towards the centre  
 (d) Clockwise and towards the centre



147. Which one of the following statements about the atmosphere is correct? (CDS)
- (a) The atmosphere has definite upper limits but gradually thins until it becomes imperceptible.
  - (b) The atmosphere has no definite upper limits but gradually thins until it becomes imperceptible.
  - (c) The atmosphere has definite upper limits but gradually thickens until it becomes imperceptible.
  - (d) The atmosphere has no definite upper limits but gradually thickens until it becomes imperceptible.
148. Which one of the following statements is correct? (CDS)
- (a) Cold fronts move at slower rate than warm fronts and therefore cannot overtake the warm fronts.
  - (b) Cold fronts normally move faster than warm fronts and therefore frequently overtake the warm fronts.
  - (c) Cold fronts move at slower rate, and eventually they are overtaken by the warm fronts.
  - (d) Cold fronts move faster than warm fronts but they cannot overtake the warm fronts.
149. Which of the following elements are found in highest and lowest quantities respectively in the crust of the earth? (CDS)
- (a) Oxygen and silicon
  - (b) Calcium and sodium
  - (c) Sodium and magnesium
  - (d) Oxygen and magnesium
150. Which one of the following is a non-renewable resource? (CDS)
- (a) Solar energy
  - (b) Coal
  - (c) Water
  - (d) Fisheries

SARKARIPOST.IN



## LEVEL 2

1. Global Positioning System (GPS) is associated with
- determining latitude and longitude
  - constellation of satellites
  - US system of GPS and Russian system of GLONASS
  - navigation

Select the correct answer using the codes given below

- (a) 1, 2 and 4 (b) 1 and 4  
(c) 2 and 3 (d) All of these

2. Match the following

List I (Natural Vegetation of India)	List II (Annual Rainfall Received)
A. Tropical evergreen forests	1. 100 – 200 cm
B. Tropical deciduous forests	2. Above 200 cm
C. Tropical dry forests	3. Less than 50 cm
D. Arid forests	4. Above 300 cm
	5. 50 – 10 cm

Codes

- A B C D A B C D  
(a) 1 2 5 3 (b) 4 3 1 5  
(c) 2 1 5 3 (d) 2 1 3 4

3. Which among the following monoculture crops provide(s) immediate cash to the farmers?

- Rice in Assam
- Wheat in Africa
- Sugarcane in Malaysia
- Coffee in Brazil

- (a) Only 1 (b) 2 and 3  
(c) 3 and 4 (d) 1 and 4

4. Match the following

List I (Biosphere Reserve)	List II (Places)
A. Manas	1. Meghalaya
B. Pachmarhi	2. Assam
C. Nokrek	3. Madhya Pradesh
D. Achanakmer Amarkantak	4. Chhattishgarh

Codes

- A B C D A B C D  
(a) 4 3 1 2 (b) 2 1 3 4  
(c) 4 1 3 2 (d) 2 3 1 4

5. Which of the following best explain why the lower course of a river is sometimes choked with sediments?

- The valley of a river is widest in its lower course.
- The velocity of a river in its lower course is low.
- The delta sometimes develops in a river's lower course.
- Much of the river water is drawn for irrigation in the lower course

Select the correct answer using the codes given below.

- (a) 1, 2, 3 and 4 (b) 1, 3 and 4  
(c) 1, 2 and 3 (d) 2 and 4

6. Consider the following statements with regard to the mining industry of India

- The spatial distribution of minerals is uneven.
- The mining industry since colonial days has been export-oriented.

Which of the statements given above is/are correct?

- (a) Only 1 (b) Only 2  
(c) Both 1 and 2 (d) Neither 1 nor 2

7. Consider the following statements about black soil of India

- Black soil becomes sticky when it is wet.
- Black soil contains adequate nitrogen as well as phosphorus required for the growth of plants.

Which of the statements given above is/are correct?

- (a) Only 1 (b) Only 2  
(c) Both 1 and 2 (d) Neither 1 nor 2

8. Match the following

List I (Local wind)	List II (Area of Prevalence)
A. Chinook	1. North African desert
B. Foehn	2. Rocky mountain slopes of the USA
C. Sirocco	3. Northern slopes of Alps
D. Mistral	4. Southern slopes of Alps

Codes

- A B C D A B C D  
(a) 2 3 1 4 (b) 2 1 3 4  
(c) 4 1 3 2 (d) 4 3 1 2

9. Arrange the following oil refineries of India from west to East

- Koyali
- Bongaigaon
- Mathura
- Haldia

Select the correct answer using the code given below

Codes

- (a) 1, 2, 3, 4 (b) 1, 3, 4, 2  
(c) 3, 1, 2, 4 (d) 2, 4, 3, 1

10. Which of the following statements regarding red soils of India is/are correct?

- The colour of the soil is red due to ferric oxide content.
- Red soils are rich in lime, humous and potash.
- They are porous and have friable structure.

Select the correct answer using the code given below

- (a) Only 1 (b) 1 and 3  
(c) 2 and 3 (d) 1, 2 and 3

11. Which of the following statements regarding ozone layer within the atmosphere is/are correct?

- It absorbs most of the ultraviolet radiation found in the Sun's rays.
- Chlorofluorocarbons are serious threat to the ozone layer.

Select the correct answer using the codes given below

- (a) Only 1 (b) Only 2  
(c) Both 1 and 2 (d) Neither 1 nor 2

**DIRECTION (Q. Nos. 12-13) :** The following questions consist of two statements, Statement I and Statement II. You are to examine these two statements carefully and select the answers to these questions using the code given below



**Codes**

- (a) Both the statements are individually true and Statement II is the correct explanation of Statement I  
 (b) Both the statements are individually true, but Statement II is not the correct explanation of Statement I  
 (c) Statement I is true, but Statement II is false  
 (d) Statement I is false, but Statement II is true

12. **Statement I** Anticyclone, which is a high pressure wind system, does not bring about significant change in weather condition.

**Statement II** The outward movement of wind from the high pressure centre keeps limited scope for weather disturbance.

13. **Statement I** El Nino is a temperature rising phenomenon over the Pacific Ocean and usually causes dry monsoon in South Asia.

**Statement II** Tsunamis are usually not noticed as the massive ocean waves move silently but assume destructive form as these travel through shallow waters of continental shelves.

14. Consider the following statements

- Ozone is mostly found in the stratosphere.
- Ozone layer lies 25 to 30 km above the surface of the Earth.
- Ozone absorbs ultraviolet radiation from the Sun.
- Ozone layer has no significance for life on the Earth.

Which of the statements given above is/are correct?

- (a) 1 and 2 (b) 1 and 3  
 (c) 2 and 3 (d) 3 and 4

15. Match the following

List I (Tiger Reserve)	List II (State)
A. Indravati	1. Karnataka
B. Periyar	2. Odisha
C. Simlipal	3. Kerala
D. Bandipur	4. Chhattisgarh

**Codes**

- A B C D A B C D  
 (a) 1 2 3 4 (b) 1 3 2 4  
 (c) 4 3 2 1 (d) 4 2 3 1

16. Match the following

List I (Tribal Group)	List II (State where Predominantly Located)
A. Reang	1. Arunachal Pradesh
B. Dimas	2. Nagaland
C. Konyak	3. Tripura
D. Mishmi	4. Assam

**Codes**

- A B C D A B C D  
 (a) 1 2 4 3 (b) 1 4 2 3  
 (c) 3 2 4 1 (d) 3 4 2 1

17. Which of the following are responsible for the decrease of per capita holding of cultivated land in India?

- Low per capita income.
- Rapid rate of increase of population.
- Practice of dividing land equally among the heirs.
- Use of traditional techniques

Select the correct answer using the codes given below

- (a) 1 and 2 (b) 2 and 3  
 (c) 1 and 4 (d) 2, 3 and 4

18. Consider the following statements

- Rural forestry aims to raise the trees on community land and on privately owned land.
- Farm forestry encourages individual farmers to plant trees on their own farmland to meet the domestic need of the family.

Which of the statement(s) given above is/are correct?

- (a) Only 1 (b) Only 2  
 (c) Both 1 and 2 (d) Neither 1 nor 2

19. Tank irrigation is practised mainly in Peninsular India because

- undulating relief and hard rocks make it difficult to dig canals and wells
- rivers are rainfed
- of compact nature of population and agricultural fields

Select the correct answer using the codes given below

**Codes**

- (a) 1 and 2 (b) 2 and 3  
 (c) 1 and 3 (d) All of these

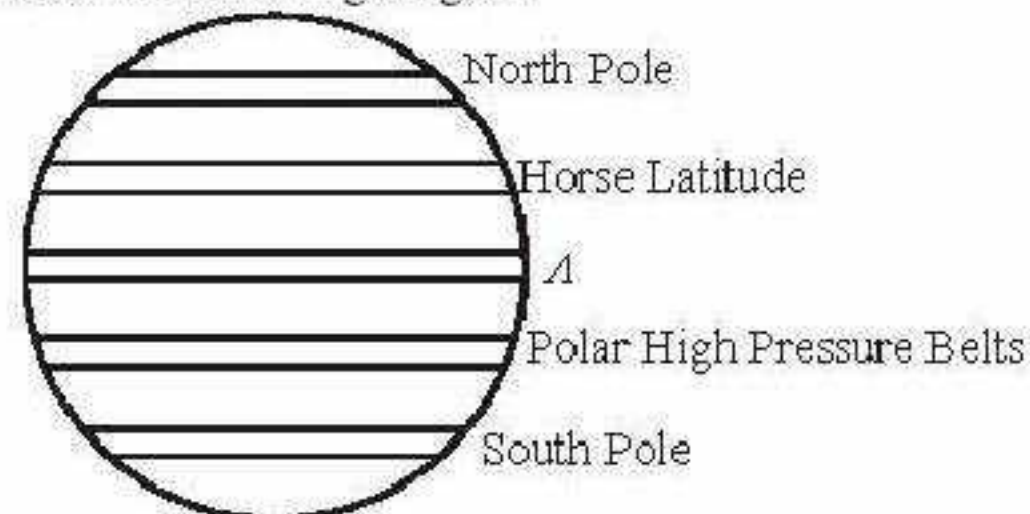
20. Match the following

List I (River)	List II (Tributary)
A. Ganga	1. Chambal and Ken
B. Indus	2. Wainganga and Indravati
C. Yamuna	3. Chenab and Sutlej
D. Godavari	4. Chenab and Sutlej

**Codes**

- A B C D A B C D  
 (a) 4 1 3 2 (b) 4 3 1 2  
 (c) 2 1 3 4 (d) 2 3 1 4

21. Consider the following diagram



In the diagram given above, what does A denote?

- (a) Doldrums (b) Trade winds  
 (c) Westerlies (d) Easterlies



22. Match the following

List I (Mineral)	List II (Producing Centre in Map)
A. Copper B. Mica C. Chromite D. Lignite	

List I (Mineral)	List II (Producing Centre in Map)
A. Copper B. Mica C. Chromite D. Lignite	

Codes

	A	B	C	D
(a)	2	4	1	3
(b)	2	1	4	3
(c)	3	1	4	2
(d)	3	4	1	2

**DIRECTIONS (Q. Nos. 23-25) :** The following questions consist of two statements, Statement I and Statement II. You are to examine these two statements carefully and select the answers to these questions using the codes given below.

- (a) Both the statements are individually true and Statement II is the correct explanation of Statement I  
 (b) Both the statements are individually true but Statement II is not the correct explanation of Statement I  
 (c) Statement I is true, but Statement II is false  
 (d) Statement I is false, but Statement II is true

23. **Statement I** Tsunami is small in open ocean yet may be over 30 m high when it reaches a coastline.

**Statement II** Tsunamis have long wavelength and they travel across the open ocean at high speed. As they approach shore, the wavelength decreases and the wave height increases.

24. **Statement I** The planet Neptune appears blue in colour.

**Statement II** The presence of methane gas in the atmosphere of Neptune is responsible for its colour

25. **Statement I** Comets revolve around the Sun only in long elliptical orbits.

**Statement II** A comet develops a tail when it gets close to the Sun

26. Match the following

List I (Hill Station)	List II (Location in Map)
A. Dharamsala B. Almora C. Nainital D. Darjeeling	

Codes

	A	B	C	D
(a)	1	2	3	4
(b)	1	3	2	4
(c)	2	1	4	3
(d)	2	4	1	3

27. Arrange the following tributaries of river Brahmaputra from West to East.

1. Lohit
2. Dibang
3. Subansiri
4. Tista

Select the correct answer using the codes given below

Codes

- (a) 4, 3, 2, 1 (b) 4, 3, 1, 2  
 (c) 3, 4, 2, 1 (d) 2, 4, 3, 1

28. Match the following

List I (Biosphere Reserve)	List II (State)
A. Nilgiri	1. Odisha
B. Manas	2. Madhya Pradesh
C. Panchmarhi	3. Tamil Nadu
D. Simeslipal	4. Assam

Codes

	A	B	C	D		A	B	C	D
(a)	3	2	4	1	(b)	1	4	2	3
(c)	3	4	2	1	(d)	1	2	4	3

29. Which among the following phenomenas can occur when very warm and humid air is rising over a mass of a very cold air?


1. Calm weather
2. Snowfall
3. Storms and cyclonic storms
4. Intense rain and hail

Select the correct answer using the codes given below

- (a) 1 and 2  
 (b) 2 and 3  
 (c) 3 and 4  
 (d) 1 and 4



30. Match the following lists

List I (Place)	List II (Location in Map)
A. Kollam	
B. Tuticorin	
C. Ongole	
D. Nellore	

Codes

	A	B	C	D
(a)	2	3	4	1
(b)	2	4	3	1
(c)	1	4	3	2
(d)	1	3	4	2

31. Match the following

List I (Dam)	List II (River)
A. Ukai dam	1. Beas
B. Bhakra dam	2. Krishna
C. Nagarjuna Sagar dam	3. Sutluj
4. Pandoh dam	4. Tapi (Tapti)

Codes

	A	B	C	D
(a)	1	3	2	4
(b)	1	2	3	4
(c)	4	3	2	1
(d)	4	2	3	1

32. Which of the following statements regarding recycling is/are correct?

1. Recycling is just the collection and separation of the waste materials.
2. Recycling is the collection and separation of the materials from the waste stream and their subsequent processing to produce a marketable product.
3. Recycling leads to reduction of waste disposal cost.

Select the correct answer using the codes given below

- (a) Only 1 (b) 1 and 2  
(c) 2 and 3 (d) 1 and 3

33. Which of the following gases in the atmosphere is/are responsible for acid rains?

1. Oxides of sulphur
2. Oxides of nitrogen
3. Oxides of carbon

Select the correct answer using the codes given below

- (a) 1 and 2 (b) 1 and 3  
(c) Only 2 (d) 1, 2 and 3

34. Which of the following statements about Nathu la Pass are correct?

1. It links Sikkim with Tibet.
2. It was the main artery of the ancient Silk Route.
3. It was reopened in the year 2006.

Select the correct answer using the codes given below

- (a) 1, 2 and 3 (b) 1 and 2  
(c) 2 and 3 (d) 1 and 3

35. Which of the following are true of matrilineal societies?

1. Newly married couple stays with the woman's parents.
2. As per the rules of inheritance, the property passes from mother to daughter.
3. Women play a dominant role in the family.
4. Examples of matrilineal societies are those of the Khasi and Jaintia tribes of Meghalaya.

Select the correct answer using the codes given below

- (a) 1, 2, 3 and 4 (b) 1 and 3  
(c) 2 and 4 (d) 1, 2 and 4

36. Consider the following sanctuaries of India

1. Periyar
2. Dachigam
3. Sariska
4. Kanha

Which one among the following is the correct sequence of location of the above sanctuaries from South to North?

- (a) 1, 4, 2, 3 (b) 4, 1, 3, 2  
(c) 1, 4, 3, 2 (d) 3, 1, 4, 2

**DIRECTIONS (Q. Nos. 37-38) :** The following questions consist of two statements. Statement I and statement II. You are to examine these two statements carefully and select the answers to these questions using the code given below.

Codes

- (a) Both the statements are individually true and Statement II is the correct explanation of Statement I  
(b) Both the statements are individually true, but Statement II is not the correct explanation of Statement I  
(c) Statement I is true, but Statement II is false  
(d) Statement I is false, but Statement II is true


37. **Statement I** Southern part of France is famous for wine making industry.

**Statement II** Southern part of France produces a variety of fruits due to Mediterranean climate.

38. **Statement I** Typical laterite soils in India are generally fertile.

**Statement II** Laterite soils generally experience leaching.

39. Match the following

List I (Hydroelectric power station)	List II (Location in map)
A. Nagarjuna Sagar	
B. Mettur	
C. Hirakund	
D. Sileru	

Codes :

	A	B	C	D
(a)	3	4	1	2
(b)	3	1	4	2
(c)	2	1	4	3
(d)	2	4	1	3



40. Which of the following are UNESCO recognised world heritage sites?

1. Caves of Ajanta.
2. Temple and Caves at Ellora.
3. Mandapas of Mahabalipuram.
4. Caves of Kanheri.

Select the correct answer using the codes given below

- (a) 1 and 4 (b) 1, 2 and 3  
(c) 1, 3 and 4 (d) 2, 3 and 4

41. Match the following

List I (Industrial Production)	List II (Place of production)
A. Brassware	1. Kanchipuram
B. Silk Sarees	2. Lucknow
C. Chikkan Embroidery	3. Muradabad
D. Sports Goods	4. Muradabad

Codes :

- A B C D  
(a) 3 1 2 4  
(b) 3 2 1 4  
(c) 4 2 1 3  
(d) 4 1 2 3

42. Match the following

List I (Irrigation/Power Projects)	List II (River)
A. Bhakra Nangal	1. Bhagirathi
B. Dul Has ti	2. Mahanadi
C. Hirakund	3. Chandra
D. Tehri	4. Sutlej

Codes

- A B C D  
(a) 4 2 3 1  
(b) 4 3 2 1  
(c) 1 3 2 4  
(d) 1 2 3 4

43. Match the following

List I (Hydroelectric power)	List II (Location in the map)
A. Srisaillam	
B. Sabarigiri	
C. Hirakud	
D. Sileru	

Codes

- A B C D  
(a) 3 1 4 2  
(b) 3 4 1 2  
(c) 2 4 1 3  
(d) 2 1 4 3

44. Which of the following is/are the stage(s) of demographic transition?

1. High death rate and birthrate, low growth rate.
2. Rapid decline in birthrate, very low
3. Rapid decline in birthrate continued decline in death rate.
4. Low death rate and birthrate, low growth rate.

Select the correct answer using the codes given below

- (a) Only 1 (b) 1, 2 and 3  
(c) 3 and 4 (d) 1 and 4

45. Which of the following is/are direct source(s) of information about the interior of the Earth?

1. Earthquake wave
2. Volcano
3. Gravitational force
4. Earth magnetism

Select the correct answer using the codes given below

- (a) 1 and 2 (b) Only 2  
(c) 3 and 4 (d) All of these

46. What would be the influence on the weather conditions when in mid-winter a feeble high pressure develops over the North-Western part of India?

1. High and dry winds would blow outward from this high pressure area.
2. The Northern plain would become cold.
3. Scorching winds (locally called loo) would blow during the day time.
4. There would be torrential rains brought by thunderstorms.

Select the correct answer using the codes given below

- (a) 1 and 2 (b) 2 and 3  
(c) 3 and 4 (d) All of these

47. Which of the following statements relating to Earthquakes is/are correct?

1. The point of origin of Earthquake is called epicenter.
2. The lines joining the places which were affected by Earthquake at the same point of time are called homoseismal lines.

Select the correct answer using the codes given below

- (a) Only 1 (b) Only 2  
(c) Both 1 and 2 (d) Neither 1 nor 2

48. Which of the following is/are West flowing river(s) of India?

1. Mahanadi
2. Krishna
3. Narmada
4. Cauvery

Select the correct answer using the codes given below

- (a) 1, 2 and 4 (b) 2 and 3  
(c) Only 3 (d) 1 and 3

49. Which of the following methods is/are suitable for soil conservation in hilly region?

1. Terracing and contour bunding
2. Shifting cultivation
3. Contour ploughing

Select the correct answer using the codes given below

- (a) 1 and 3 (b) Only 2  
(c) Only 3 (d) All of these

50. Arrange the following states of India on the basis of conferring statehood (starting from the earliest):

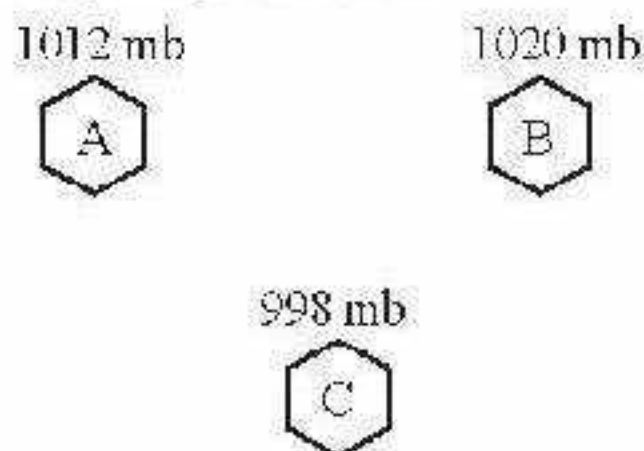
1. Arunachal Pradesh
2. Nagaland
3. Sikkim
4. Meghalaya

Select the correct answer using the code given below :

- (a) 2-4-3-1 (b) 2-1-4-3  
(c) 4-1-3-2 (d) 4-1-2-3



51. Consider the diagram given below:



The above diagram represents the pressure conditions of three different places, viz., A, B and C. Which of the following is the correct direction of movement of winds ?

- Blow from B towards A and C
- Blow from C towards A and B
- Blow from B to A and from A to C
- Blow from B to C and C to B

52. Consider the following statements regarding ground water in India :

- The large scale exploitation of ground water is done with the help of tube-wells.
- The demand for ground water started increasing with the advent of green revolution.
- The total replenishable ground water reserves is highest in the hilly tracts of Sikkim, Nagaland and Tripura.

Which of the statements given above is/are correct?

- 1 and 2 only
- 1 only
- 2 and 3 only
- 1, 2 and 3

53. Match List I with List II and select the correct answer using the code given below the Lists :

List I (Phenomenon)		List II (Date)	
A.	Summer solstice	1.	21st June
B.	Winter solstice	2.	22nd December
C.	Vernal Equinox	3.	23rd September
D.	Autumnal Equinox	4.	21st March

Code :

	A	B	C	D
(a)	1	4	2	3
(b)	1	2	4	3
(c)	3	2	4	1
(d)	3	4	2	1

54. Which of the following statements regarding jhum cultivation in India are correct ?

- It is largely practised in North-Eastern Indian states.
- It is referred to as 'slash and burn' technique.
- In it, the fertility of soil is exhausted in a few years.

Select the correct answer using the code given below :

- 1 and 2 only
- 2 and 3 only
- 1 and 3 only
- 1, 2 and 3

55. Arrange the following features formed by rivers in its course starting from upstream:

- Meanders
- Falls
- Delta
- Oxbow Lake

Select the correct answer using the code given below:

- 2 – 1 – 3 – 4
- 2 – 1 – 4 – 3
- 1 – 2 – 3 – 4
- 1 – 4 – 2 – 3

56. Which of the following statements relating to Indian agriculture is/are correct ?

- India has the World's largest cropped area.
- Cropping pattern is dominated by cereal crop.
- The average size of an Indian farm holding is too small for several agricultural operations.

Select the correct answer using the code given below :

- 1 only
- 1 and 2 only
- 2 and 3 only
- 1, 2 and 3

57. Arrange the following tiger reserves of India from North to South :

- Indravati
- Dudhwa
- Bandipur
- Similipal

Select the correct answer using the code given below :

- 3 – 4 – 1 – 2
- 4 – 2 – 3 – 1
- 2 – 4 – 1 – 3
- 2 – 1 – 4 – 3

58. Which of the following is/are basically meant to be deployed in the northern borders of India for monitoring the borders and also to stop smuggling and illegal immigration ?

- Assam Rifles
- Border Security Force
- Indo Tibet Border Police
- National Security Guards

Select the correct answer using the code given below :

- 2 and 3
- 1 and 2
- 3 only
- 4

59. Which of the following is/are the potential threat to safety of large dams ?

- Urbanisation near dam sites
- Flash floods in catchment area
- Seismic activities in surrounding area

Select the correct answer using the code given below :

- 1 only
- 1 and 3 only
- 2 and 3 only
- 1, 2 and 3

60. The Equatorial region has no other season except summer. What could be the reason ?

- The length of day and night is more or less equal over the year
- The Earth's rotational velocity is maximum at the Equator
- The coriolis force is zero at the Equator

Select the correct answer using the code given below :

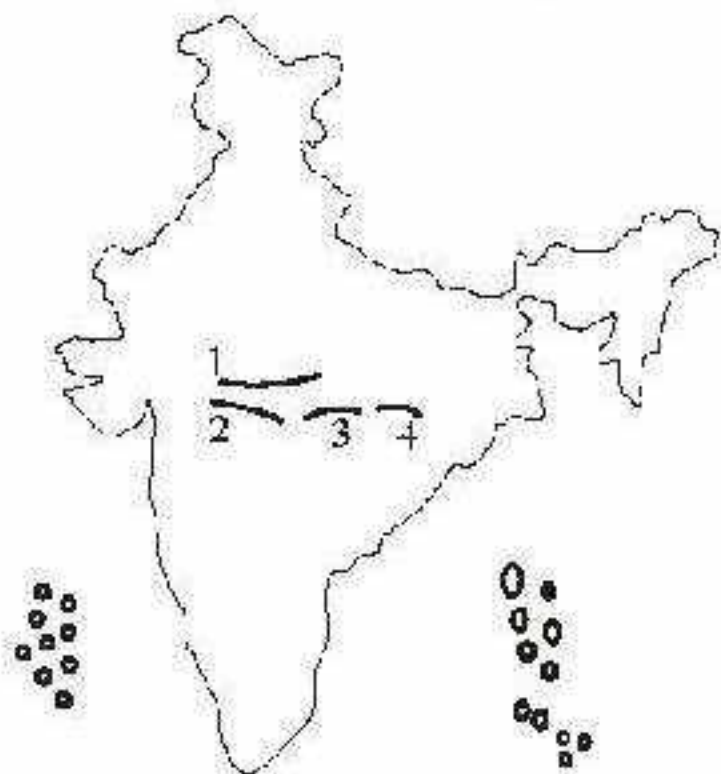
- 1 only
- 1 and 2 only
- 2 and 3 only
- 1, 2 and 3



61. Match List I with List II and select the correct answer using the code given below the Lists :

**List I****(Hill range of Central India)**

- A. Satpura  
B. Mahadeo  
C. Vindhya  
D. Maikala

**List II**  
**(Location in map)****Code :**

	A	B	C	D
(a)	4	3	1	2
(b)	4	1	3	2
(c)	2	1	3	4
(d)	2	3	1	4

62. Which among the following is/are correct statement about Malawi ?

1. Malawi is a landlocked country in southeast Africa that was formerly known as Nyasaland
2. It has presidential system with unitary form of government
3. Malawi's economy is highly dependent on agriculture and majority of the population is rural

Select the correct answer using the code given below :

- (a) 1 only (b) 2 and 3 only  
(c) 1, 2 and 3 (d) 1 and 3 only

**DIRECTIONS (Qs. 63-66):** The following questions consist of two statements, Statement I and Statement II. You are to examine these two statements carefully and select the answers to these questions using the code given below :

**Code :**

- (a) Both the statements are individually true and Statement II is the correct explanation of Statement I  
(b) Both the statements are individually true but Statement II is **not** the correct explanation of Statement I  
(c) Statement I is true but Statement II is false  
(d) Statement I is false but Statement II is true

63. **Statement I :** The Atacama is the driest among the deserts of the World.

**Statement II :** The aridity of the Atacama is explained by its location between two mountain chains of sufficient height to prevent moisture advection from either the Pacific or the Atlantic Ocean.

64. **Statement I :** Tides are the rise and fall of sea levels caused by the combined effects of the gravitational forces exerted by the Moon and the Sun, and the rotation of the Earth. (CDS)  
**Statement II :** Earth rotates from the West towards the East once in 24 hours with respect to the Sun.

65. **Statement I :** India's off shore and deep sea fish catch is very poor considering the marine potential. (CDS)

**Statement II :** Indian coast does not have many gulfs, bays, estuaries and backwaters. (CDS)

66. **Statement I :** Sidereal day is shorter than Solar day.

**Statement II :** The motion of the Earth in its orbit around the Sun is termed as revolution. (CDS)

67. The Earth without rotational movement would result into

1. no sun-rise and sun-set.
2. no occurrence of day and night cycle.
3. only one season.

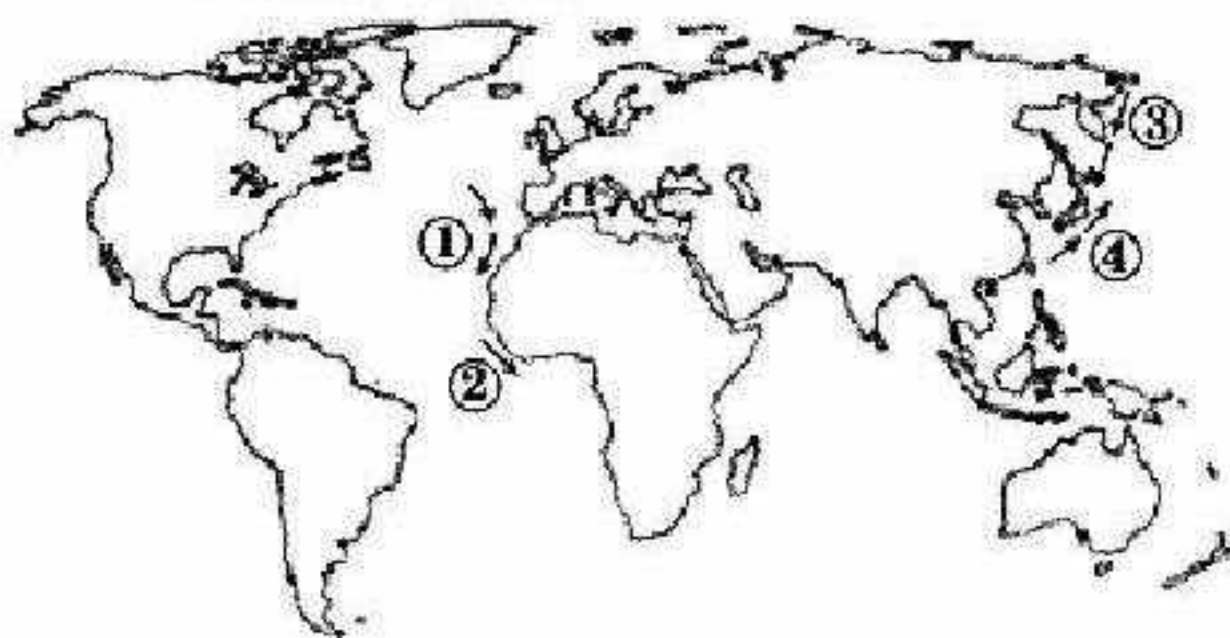
Select the correct answer using the code given below

- (a) 1 only (b) 1 and 2 only  
(c) 2 and 3 only (d) 1, 2 and 3

68. Match List I with List II and select the correct answer using the code given below the Lists : (CDS)

**List I****(Ocean current)**

- A. Guinea current  
B. Oyashio current  
C. Canaries current  
D. Kuroshio current

**List II****(Location in Map)****Code :**

- (a) A-4; B-3; C-1; D-2  
(b) A-2; B-3; C-1; D-4  
(c) A-2; B-1; C-3; D-4  
(d) A-4; B-1; C-3; D-2

69. Arrange the following layers of atmosphere vertically from the surface of the Earth : (CDS)

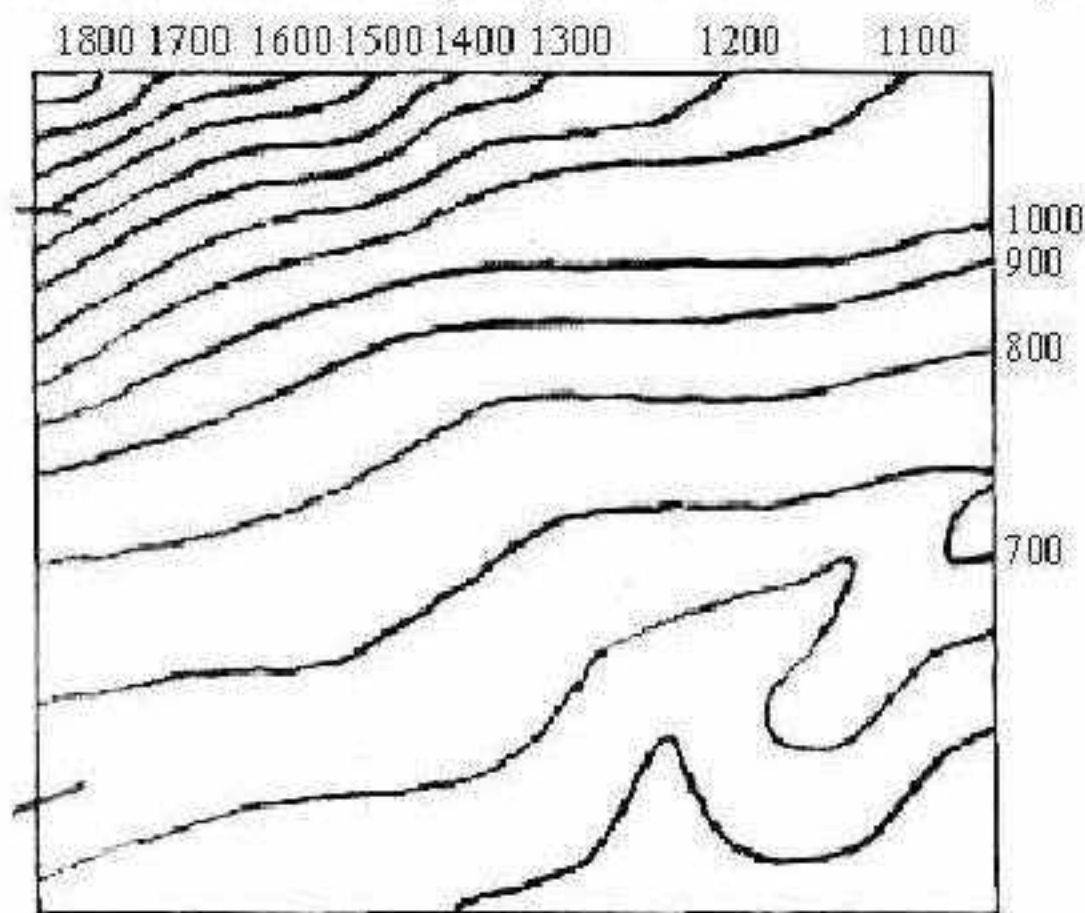
1. Mesosphere
2. Troposphere
3. Stratosphere
4. Thermosphere

Select the correct answer using the code given below :

- (a) 1-2-3-4 (b) 2-1-3-4  
(c) 2-3-1-4 (d) 3-4-2-1



70. Consider the contour plot given below : (CDS)



Contour in Metres

The above contours of an area indicate several, relief features. Which one among the following relief features is **not** depicted here ?

- (a) Steep slope (b) River valley  
(c) Conical hill (d) Gentle slope
71. Arrange the following tributaries of river Indus from North to South : (CDS)

1. Chenab 2. Jhelum  
3. Ravi 4. Sutlej

Select the correct answer using the code given below :

- (a) 4-3-1-2 (b) 2-3-1-4  
(c) 1-2-3-4 (d) 2-1-3-4

72. Match List I with List II and select the correct answer using the code given below the Lists : (CDS)

List I (Type of Grass)	List II (Country)
A. Llanos	1. Australia
B. Prairies	2. Venezuela
C. Pampas	3. USA
D. Downs	4. Argentina

Code :

	A	B	C	D
(a)	1	4	3	2
(b)	1	3	4	2
(c)	2	4	3	1
(d)	2	3	4	1

73. Tank irrigation is commonly found in South-Central parts of India. What could be the reason ? (CDS)

1. Insufficient shallow ground water  
2. Rocky plateau with impervious surface depression  
3. Undulating terrain helps in accumulation of rain water in depression or man-made tank

Select the correct answer using the code given below :

- (a) 1 only (b) 1 and 2 only  
(c) 2 and 3 only (d) 1, 2 and 3

74. Which of the following is/are the reason(s) behind Gujarat being the leading producer of Salt in India ? (CDS)

1. The long length of coastline  
2. Long duration of hot and dry conditions  
3. Presence of gulf areas

Select the correct answer using the code given below :

- (a) 1 and 2 only (b) 2 only  
(c) 1, 2 and 3 (d) 1 and 3 only

75. Consider the following statements with regard to cold waves in winter season in northern India: (CDS)

1. There is lack of maritime influence.  
2. Northern India is nearer to the Himalayan region.  
3. Air mass comes from polar regions to northern India.

Which of the statements given above is/are correct ?

- (a) 1 only (b) 2 and 3  
(c) 1 and 3 (d) 1 and 2

76. Match List I with List II and select the correct answer using the code given below the Lists : (CDS)

List I (Ocean current)	List II (Coast)
A. Humboldt	1. Namibia – Angola
B. North Atlantic Drift	2. Chile – Peru
C. Benguela	3. Mozambique – Madagascar
D. Agulhas	4. United Kingdom Norway

Code :

- (a) A-2; B-1; C-4; D-3 (b) A-2; B-4; C-1; D-3  
(c) A-3; B-4; C-1; D-2 (d) A-3; B-1; C-4; D-2

77. The horizontal wind circulation near the Earth's surface is due to the (CDS)

1. pressure gradient. 2. frictional force.  
3. coriolis force.

Select the correct answer using the code give below :

- (a) 1 only (b) 2 and 3 only  
(c) 1 and 3 only (d) 1, 2 and 3

78. Match List I with List II and select the correct answer using the code given below the Lists :

List I (Place)	List II (Industry)
A. Jabalpur	1. Petro-chemical industry
B. Bengaluru	2. IT industry
C. Mathura	3. Paper industry
D. Ballarpur	4. Automobile industry

Code :

	A	B	C	D
(a)	4	1	2	3
(b)	3	2	1	4
(c)	4	2	1	3
(d)	3	1	2	4

79. Match List I with List II and select the correct answer using the code given below the Lists :

List I (National Park/ Wildlife Sanctuary)	List II (State)
A. Chandra Prabha	1. Uttarakhand
B. Silent Valley	2. Chhattisgarh
C. Valley of flowers	3. Uttar Pradesh
D. Indravati	4. Kerala

Code :

	A	B	C	D
(a)	2	1	4	3
(b)	3	4	1	2
(c)	2	4	1	3
(d)	3	1	4	2



80. Which of the following are the characteristics of organic farming ?

1. Use of chemical fertilizers to improve soil fertility.
2. Frequent decomposing and fallowing.
3. Use of herbs to control pests.
4. Higher productivity per hectare.

Select the correct answer using the code given below :

- (a) 1 and 4 only (b) 1, 3 and 4  
(c) 2 and 3 only (d) 2, 3 and 4

81. A farmer in a semi-arid area claims that his farming practice is very environment friendly. Which of the following practices on his farm can justify his claim ?

1. Planting a tree belt.
2. Practising crop rotation.
3. Carrying out a large scale irrigation system.
4. Using organic fertilizers.

Select the correct answer using the code given below :

- (a) 3 and 4 only (b) 1, 2 and 4  
(c) 1, 3 and 4 (d) 1 and 2 only

82. The luxuriant growth of natural vegetation in tropical rainforest is due to

1. fertile soil.
2. hot and wet climate throughout the year.
3. intense sunlight for photosynthesis.
4. seasonal change to facilitate nutrient absorption.

Select the correct answer using the code given below :

- (a) 1 and 4 only (b) 2 and 3 only  
(c) 1, 2 and 3 only (d) 1, 2, 3 and 4

83. Match List I with List II and select the correct answer using the code given below the Lists :

**List I**  
(Region)

- A. Selvas  
B. Savannas  
C. Taiga  
D. Tundra

**List II**  
(Vegetation)

1. Conifers  
2. Mosses and Lichens  
3. Epiphytes  
4. Grasses and trees

Code :

- |     | A | B | C | D |
|-----|---|---|---|---|
| (a) | 4 | 1 | 2 | 3 |
| (b) | 3 | 2 | 1 | 4 |
| (c) | 3 | 4 | 1 | 2 |
| (d) | 4 | 2 | 1 | 3 |

84. Which of the following statements with regard to the western coastal plain of India are correct ?

1. It is a narrow belt.
2. It is an example of submerged coastal plain.
3. It provides natural conditions for development of ports.
4. It has well developed deltas.

Select the correct answer using the code given below :

- (a) 1, 2 and 3 only (b) 1 and 2 only  
(c) 1, 2, 3 and 4 (d) 3 and 4 only

85. Match List I with List II and select the correct answer using the code given below the Lists :

**List I**  
(Island)

- A. Continental island  
B. Coral island  
C. Volcanic island  
D. Mountain island

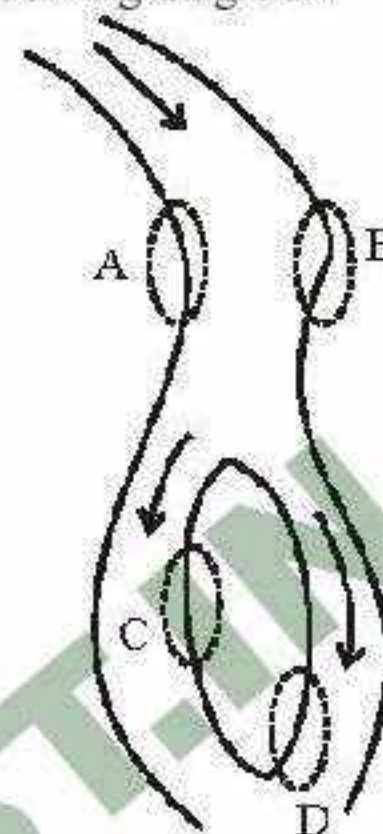
**List II**  
(Location)

1. Mauritius  
2. Madagascar  
3. Andaman and Nicobar islands  
4. Maldives

Code:

- |     | A | B | C | D |
|-----|---|---|---|---|
| (a) | 2 | 4 | 1 | 3 |
| (b) | 2 | 1 | 4 | 3 |
| (c) | 3 | 1 | 4 | 2 |
| (d) | 3 | 4 | 1 | 2 |

86. Consider the following diagram :



In which one among the following lettered area of the diagram would erosion most likely change the shapes of the riverbed?

- (a) A (b) B  
(c) C (d) D

87. Match List I with List II and select the correct answer using the code given below the Lists :

**List I**  
(Cloud)

- A. Cirrus  
B. Stratus  
C. Nimbus  
D. Cumulus

**List II**  
(Characteristic)

1. Rain giving  
2. Feathery appearance  
3. Vertically growing  
4. Horizontally spreading

Code :

- |     | A | B | C | D |
|-----|---|---|---|---|
| (a) | 3 | 1 | 4 | 2 |
| (b) | 3 | 4 | 1 | 2 |
| (c) | 2 | 4 | 1 | 3 |
| (d) | 2 | 1 | 4 | 3 |

**DIRECTIONS (Qs. 88-93) :** The following six (6) items consist of two statements, Statement I and Statement II. You are to examine these two statements carefully and select the answers to these items using the code given below:

Code:

- (a) Both the statements are individually true and Statement II is the correct explanation of Statement I  
(b) Both the statements are individually true but Statement II is **not** the correct explanation of Statement I  
(c) Statement I is true but Statement II is false  
(d) Statement I is false but Statement II is true

88. **Statement I:** Minerals are formed by slow cooling of the magma.

**Statement II:** Very small crystals are formed when lava cools quickly on the surface.



89. **Statement I:** The Kullu Valley in Himachal Pradesh receives copious snowfall during winter.  
**Statement II:** The Kullu Valley receives moisture-bearing wind of the Western Disturbances during winter.
90. **Statement I:** The hills with dense vegetation cover do not experience heavy soil erosion.  
**Statement II:** The vegetation cover helps infiltration of rainwater and binding of soils.
91. **Statement I:** The decrease of air temperature with increasing altitudes in the atmosphere is called the vertical temperature gradient.  
**Statement II:** In Troposphere, air temperature decreases with increasing altitude due to radiation from the Earth.
92. **Statement I:** Chemical weathering processes are found more active in hot and humid environment.  
**Statement II:** High temperature and rainfall help in the process of decomposition of rocks.
93. **Statement I:** The acceleration due to gravity decreases with increase in height from the surface of the Earth.  
**Statement II:** The acceleration due to gravity is inversely proportional to the square of the distance from the centre of the Earth.
94. Match List-I and List-II and select the correct answer using the code given below the Lists:

**List - I****(Region)**

- A. Selvas  
 B. Savanna  
 C. Tundra  
 D. Monsoon land

**List - II****(Characteristic vegetation)**

1. Tropophytes  
 2. Mosses and lichens  
 3. Epiphytes  
 4. Grasses and trees

**Code:**

- |     |   |   |   |   |
|-----|---|---|---|---|
|     | A | B | C | D |
| (a) | 3 | 2 | 4 | 1 |
| (b) | 1 | 4 | 2 | 3 |
| (c) | 1 | 2 | 4 | 3 |
| (d) | 3 | 4 | 2 | 1 |

95. Which of the following is/are the most likely cause/causes of sheet-flood found in western part of Rajasthan?
- Scanty rainfall
  - Sudden high intensity rain
  - Loose sandy soil with scanty vegetation
- Select the correct answer using the code given below.
- (a) 1 only (b) 1 and 2 only  
 (c) 2 and 3 only (d) 1, 2 and 3
96. Mulching, an agronomic measure of soil conservation, is very effective because it
- protects soil from gully erosion
  - protects soil from sheetwash and wind erosion
  - helps soil to retain moisture and nutrients
- Select the correct answer using the code given below.
- (a) 1 only (b) 1 and 2 only  
 (c) 2 and 3 only (d) 1, 2 and 3
97. Why is hydrolysis an effective form of chemical decomposition of bedrock in humid tropics?
- Humid tropics experience high temperature and humidity.
  - There is high diurnal range in temperature.

Select the correct answer using the code given below.

- (a) 1 only (b) 2 only  
 (c) Both 1 and 2 (d) Neither 1 nor 2

**Directions (Qs. 98) :** The following consists of two statements, Statement I and Statement II. You are to examine these two statements carefully and select the answers to these items using the code given below.

**Code:**

- (a) Both the statements are individually true and Statement II is the correct explanation of Statement I.  
 (b) Both the statements are individually true but Statement II is not the correct explanation of Statement I.  
 (c) Statement I is true but Statement II is false  
 (d) Statement I is false but Statement II is true.

**98. Statement I :**

Grand Banks are one of the major fishing grounds of the world due to the presence of a vast continental shelf.

**Statement II :**

Planktons grow in the shallow waters.

99. Which of the following statements is/are correct?

- The tropical cyclones of China Sea are called typhoon's.
- The tropical cyclones of the West Indies are called tornadoes.
- The tropical cyclones of Australia are called williywillies.
- Formation of an anticyclone results in stormy weather condition.

- (a) 1, 2, 3 and 4 (b) 1, 2 and 4 only  
 (c) 1 and 3 only (d) 3 only

100. Match List-I with List-II and select the correct answer using the code given below the Lists:

**List-I****(Geographical feature)**

- A. Cirque  
 B. Yardang  
 C. Barkhan  
 D. Drumlin

**List-II****(Type of geographic process)**

- Erosional feature of wind
- Depositional feature of glacier
- Depositional feature of wind
- Erosional feature of glacier

**Code:**

- |     |   |   |   |   |     |   |   |   |   |
|-----|---|---|---|---|-----|---|---|---|---|
|     | A | B | C | D |     | A | B | C | D |
| (a) | 4 | 1 | 3 | 2 | (b) | 4 | 1 | 3 | 2 |
| (c) | 2 | 3 | 1 | 4 | (d) | 2 | 1 | 3 | 4 |

101. Match List-I with List-II and select the correct answer using the code given below the Lists:

**List - I****(Textile industry)**

- A. Woolen textile  
 B. Cotton textile  
 C. Silk textile  
 D. Jute textile

**List-II****(Place)**

- Sualkuchi
- Rishra
- Ludhiana
- Davangere

**Code:**

- |     |   |   |   |   |     |   |   |   |   |
|-----|---|---|---|---|-----|---|---|---|---|
| (a) | A | B | C | D | (b) | A | B | C | D |
|     | 3 | 4 | 1 | 2 |     | 2 | 1 | 4 | 3 |
| (c) | A | B | C | D | (d) | A | B | C | D |
|     | 2 | 4 | 1 | 3 |     | 3 | 1 | 4 | 2 |



102. Which of the following are the results of El Nino?

1. Reduction in the amount of planktons which further reduces the number of fish in the sea.
2. Irregularities in the evaporation of sea water.
3. Distortion of equatorial atmospheric circulation.

Select the correct answer using the code given below:

- (a) 1 and 2 only (b) 2 and 3 only  
(c) 1 and 3 only (d) 1, 2 and 3

103. The rigid lithospheric slabs are known as 'Plates'. What would be the result, if the oceanic plate collides with the continental plate?

1. Oceanic plate is forced below the continental plate.
2. Continental plate is forced below the oceanic plate.
3. Continental and oceanic plates never collide.

Select the correct answer using the code given below:

- (a) 1 only (b) 2 only  
(c) 1 and 2 only (d) 1, 2 and 3

104. Consider the following layers of the atmosphere:

1. Troposphere
2. Stratosphere
3. Mesosphere
4. Thermosphere

Which one among the following is the correct sequence of the layers with increasing altitude from the Earth's surface?

- (a) 1-2-3-4 (b) 2-1-3-4  
(c) 3-2-1-4 (d) 4-2-3-1

105. Match List I with List II and select the correct answer using the code given below the lists:

**List I**  
(Landform of peninsular India)

- A. Marwar upland  
B. Bundelkhand upland  
C. Meghalaya upland  
D. Maharashtra plateau

**List II**  
(Predominant rock)

1. Quartzites  
Shales, Schists  
2. Sandstone,  
Shale, Limestone  
3. Granite and  
Gneiss  
4. Basalt

**Code:**

- |     | A | B | C | D |
|-----|---|---|---|---|
| (a) | 2 | 3 | 1 | 4 |
| (b) | 2 | 1 | 3 | 4 |
| (c) | 4 | 3 | 1 | 2 |
| (d) | 4 | 1 | 3 | 2 |

106. Which of the following statements about tornadoes are correct?

Tornadoes usually spin

1. anticlockwise in the northern hemisphere.
2. clockwise in the southern hemisphere.
3. clockwise in the northern hemisphere.
4. anticlockwise in the southern hemisphere.

Select the correct answer using the code given below:

- (a) 1 and 3 (b) 1 and 2  
(c) 2 and 4 (d) 2 and 3

107. Which of the following statements is/are correct?

1. Air close to the Earth's surface is heavier.
2. Air close to the Earth's surface contains larger quantity of water vapour and dust particles.

Select the correct answer using the code given below:

- (a) 1 only  
(b) 2 only  
(c) Both 1 and 2  
(d) Neither 1 nor 2

108. Match List-I with List-II and select the correct answer using the code given below the list.

**List I**  
(Mineral)

- A. Mica  
B. Chromite  
C. Magnesite  
D. Zinc

**List II**  
(Location of Map)



**Code:**

- |     | A | B | C | D |
|-----|---|---|---|---|
| (a) | 1 | 2 | 3 | 4 |
| (b) | 1 | 3 | 2 | 4 |
| (c) | 4 | 2 | 3 | 1 |
| (d) | 4 | 3 | 2 | 1 |

109. Which of the following statements are correct?

1. Assam produces nearly 80% of jute in India.
2. Jute grows well on loamy soil.
3. Hot and humid conditions are ideal for growing jute.
4. Jute is commonly cultivated with wheat in rotation.

Select the correct answer using the code given below:

- (a) 1, 2 and 3 (b) 2, 3 and 4  
(c) 2 and 3 only (d) 1 and 4 only

110. Match List-I with List-II and select the correct answer using the code given below the Lists.

List I (Peak in the Eastern Himalaya)	List - II (Location in the Map)
A. Makalu	
B. Kanchenjunga	
C. Namcha Barwa	
D. Mt. Everest	

**Codes**

- (a) A-2; B-3; C-4; D-1  
(b) A-2; B-4; C-3; D-1  
(c) A-1; B-4; C-3; D-2  
(d) A-1; B-3; C-4; D-2



111. Which of the following statements regarding the Deccan Traps is/are correct?

1. Intense volcanic activity in the form of fissure eruption took place towards the end of Cretaceous period.
2. The volcanic lava spread out in horizontal sheets.
3. The regur soil found here is rich in nitrogen.

Select the correct answer using the codes given below

- (a) 1 and 2 only (b) 1, 2 and 3  
(c) 3 only (d) 1 only

112. Match List I with List II and select the correct answer using the code given below the lists:

**List I**  
**(Desert)**

- A. Kalahari  
B. Namib  
C. Nubian  
D. Atacama

**List II**  
**(Country)**

1. Angola  
2. Sudan  
3. Botswana  
4. Chile

**Code:**

- (a) A-4; B-2; C-1; D-3 (b) A-3; B-2; C-1; D-4  
(c) A-4; B-1; C-2; D-3 (d) A-3; B-1; C-2; D-4

113. Match List I with List II and select the correct answer using the code given below the lists:

**List I**  
**(Current)**

- A. Kuroshio current  
B. Peru current  
C. Labrador current  
D. Florida current

**List II**  
**(Feature)**

1. Warm current in Atlantic Ocean  
2. Cold current in the Atlantic Ocean  
3. Warm current in the Pacific Ocean  
4. Cold current in the Pacific Ocean

**Code:**

- (a) A-3; B-4; C-2; D-1 (b) A-3; B-2; C-4; D-1  
(c) A-1; B-4; C-2; D-3 (d) A-1; B-2; C-4; D-3

114. Which of the following statements is/ are correct?

1. The major constituent mineral of granite rock is quartz.
2. The major constituent mineral of sandstone rock is feldspar.
3. The major constituent mineral of limestone rock is dolomite.

Select the correct answer using the code given below:

- (a) 1, 2 and 3 (b) 3 only  
(c) 1 and 2 only (d) 2 and 3 only

115. Match List-I with List-II and select the correct answer using the code given below the Lists :

**List-I**  
**(Map showing ocean current)**



**List-II**  
**(Name of ocean current)**

1. Kuroshio  
2. Humboldt  
3. Benguela  
4. Oyashio

**Code :**

- (a) A B C D (b) A B C D  
2 1 3 4 4 3 1 2  
(c) A B C D (d) A B C D  
4 1 3 2 2 3 1 4

116. The Earth's surface receives maximum energy at 12 noon but the maximum temperature never occurs at 12 noon. State which of the following reasons are correct.

1. Transformation of solar energy into heat requires some time.
2. The loss of energy through long-wave radiations from the Earth's surface exceeds the energy received from the Sun at 4:00 p.m.
3. Energy received by the Earth from solar radiations continues to exceed the energy lost by outgoing long-wave radiations from the Earth's surface up to 4:00 p.m.

Select the correct answer using the code given below :

**Code :**

- (a) 1 and 2 only (b) 2 and 3 only  
(c) 1 and 3 only (d) 1, 2 and 3

117. Arrange the following tropical forest groups in the correct order of sequence based on area covered in India beginning from the largest covered area :

1. Moist deciduous
2. Dry deciduous
3. Wet evergreen
4. Semi-evergreen

Select the correct answer using the code given below :

**Code :**

- (a) 1-2-3-4 (b) 3-4-2-1  
(c) 1-3-2-4 (d) 4-3-2-1

118. Which of the following statements is/are true ?

1. The angle of the axis in relation to the plane in which the earth revolves around the sun is not constant.
2. The amount of energy given off by the sun changes with the transparency of the atmosphere. Select the correct answer using the code given below.

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2

**DIRECTIONS (Qs. 119 to 121) :** The following questions consist of two statements, one labelled as the Assertion (A) and the other as 'Reason (R). You are to examine these two statements carefully and select the answers to these items using the codes given below:

- (a) Both A and R are individually true and R is the correct explanation of A  
(b) Both A and R are individually true but R is NOT the correct explanation of A  
(c) A is true but R is false  
(d) A is false but R is true

119. **Assertion (A) :** The Steppe climate is most widespread in North America and Eurasia.

**Reason (R) :** The Steppe climate is characterized by wet summers as well as wet winters.

120. **Assertion (A) :** Major natural regions of the world possess similar topography.

**Reason (R) :** Climate is a major influencing factor in a natural region.

121. **Assertion (A) :** The tidal effect of Moon on the surface of Earth is less than that of Sun.

**Reason (R) :** Moon's gravitational pull at Earth's surface is less compared to Sun's gravitational pull.



**DIRECTIONS (Qs. 122-128) :** The following four items consist of two statements, Statement I and Statement II. You are to examine these two statements carefully and select the answers to these items using the code given below:

**Code:**

- (a) Both the statements are individually true and Statement II is the correct explanation of Statement I.  
 (b) Both the statements are individually true but Statement II is not the correct explanation of Statement I.  
 (c) Statement I is true but Statement II is false.  
 (d) Statement I is false but Statement II is true.

122. **Statement I:** During the day, winds blow from sea to land.  
**Statement II:** The land gets more heated than the surrounding sea, hence lower pressure develops over land as compared to sea.

123. **Statement I:** Winds are deflected to their right in the northern hemisphere and to their left in the southern hemisphere.  
**Statement II:** The Earth's axis is inclined.

124. **Statement I:** Pressure gradients determine the velocity of winds.  
**Statement II:** When isobars (lines of equal atmospheric pressure) are closely spaced, the wind velocity would be gentle.

125. **Statement I:** Temperatures of countries like United Kingdom, Norway, the Netherlands and Denmark are higher as compared to places located on similar latitudes during the winter.  
**Statement II:** United Kingdom, Norway, the Netherlands and Denmark are located on the coast.

126. **Statement I:** The Mediterranean climate is highly suitable for fruit production.  
**Statement II:** Cool and moist winters in Mediterranean regions enable ample production of fruits.

127. **Statement I:** In the northern hemisphere, the ocean currents flowing from equator towards the north pole and from pole towards the equator are deflected to their right.  
**Statement II:** This happens due to rotation of the Earth on the axis from west to east.

128. **Statement I:** There is a large-scale fluctuation of oil flow from oil wells prior to earthquakes.  
**Statement II:** Tectonic stress accumulates to a certain level, the pore pressure within a deep oilbearing stratum reaches its breaking strength causing oil to sprout along the oil wells.

129. Consider the following statements.

- The Himalayan vegetation varies according to both altitude and climatic conditions.
- There are mainly two types of tropical forests that are found in the Himalayas—the tropical rainforests and the tropical deciduous forests.

Which of the statements given above is/are correct?

- (a) 1 only (b) 2 only  
 (c) Both 1 and 2 (d) Neither 1 nor 2

130. Match List I with List II and select the correct answer using the code given below the lists:

List I (Mineral)	List II (State)
A. Bauxite	1. Andhra Pradesh
B. Mica	2. Orissa
C. Copper	3. Madhya Pradesh
D. Zinc	4. Rajasthan

**Code:**

- (a) A-4; B-1; C-3; D-3 (b) A-2; B-1; C-3; D-4  
 (c) A-4; B-3; C-1; D-2 (d) A-2; B-3; C-1; D-4

131. Match List-I with List-II and select the correct answer using the code given below the Lists :

List-I (Port)	List-II (Special feature)
A. Kandla	1. Deepest landlocked protected port
B. Kochi	2. Located at mouth of lagoon
C. Vishakhapatnam	3. Tidal port
D. Kolkata	4. Inland riverine port

**Code :**

	A	B	C	D
(a)	3	1	2	4
(b)	3	2	1	4
(c)	4	1	2	3
(d)	4	2	1	3

132. Consider the following coal mines of India :

- Bokaro
- Adilabad
- Raniganj
- Bishrampur

Select the correct sequence of the above from east to west.

- (a) 1-3-4-2 (b) 3-1-4-2  
 (c) 3-1-2-4 (d) 1-3-2-4

133. Match List-I with List-II and select the correct answer using the code given below the Lists :

List-I (Mountain pass)	List-II (State)
A. Zoji La	1. Himachal Pradesh
B. Lipulekh	2. Sikkim
C. Shipki La	3. Uttarakhand
D. Nathu La	4. Jammu and Kashmir

**Code :**

	A	B	C	D
(a)	2	1	3	4
(b)	2	3	1	4
(c)	4	1	3	2
(d)	4	3	1	2

134. Which of the following statements is/are correct ?

- Inter-Tropical Convergence Zone is a low pressure belt which forms an important zone of contact over Northern India and Pakistan.
- Inter-Tropical Convergence Zone invites inflow of winds from different directions.

Select the correct answer using the code given below :

- (a) 1 only (b) 2 only  
 (c) Both 1 and 2 (d) Neither 1 nor 2

135. Consider the following statements regarding El Nino effect on Indian Monsoon :

- The surface temperature goes up in the Southern Pacific Ocean and there is deficient rainfall in India.
- The Walker Circulation shifts eastward from its normal position and reduces monsoon rainfall in India.

Which of the statements given above is/are correct ?

- (a) 1 only (b) 2 only  
 (c) Both 1 and 2 (d) Neither 1 nor 2



136. Which of the following statements is/are correct ?

1. The local time of Itanagar (Arunachal Pradesh) is about two hours ahead than Dwarka (Gujarat).
2. The local time at Chennai (Tamil Nadu) and Lucknow (Uttar Pradesh) is almost same.
3. The local time of Mumbai (Maharashtra) is one hour ahead than Kolkata (West Bengal).

Select the correct answer using the code given below :

- (a) 1 and 2 only (b) 2 only  
(c) 1 and 3 only (d) 1, 2 and 3

137. Match List-I with List-II and select the correct answer using the code given below the Lists

**List-I**

**(Atomic power station)**

- A. Narora
- B. Rana Pratap Sagar
- C. Tarapur
- D. Kalpakkam

**Code :**

	A	B	C	D
(a)	2	4	3	1
(b)	1	3	4	2
(c)	2	3	4	1
(d)	1	4	3	2



**DIRECTIONS (Qs. 138 - 139) :** The following questions consist of two statements, one labelled as the Assertion (A) and the other as Reason (R). You are to examine these two statements carefully and select the answers to these items using the codes given below:

- Both A and R are individually true and R is the correct explanation of A.
- Both A and R are individually true but R is NOT the correct explanation of A.
- A is true but R is false.
- A is false but R is true.

138. **Assertion (A) :** The cotton industry in India suffered a major recession soon after the independence.

**Reason (R) :** Most of the cotton mills had gone to West Pakistan, India retaining the cotton growing areas.

139. **Assertion (A) :** Narmada and Tapi rivers do not form deltas.

**Reason (R) :** These rivers form estuaries.

140. The following **four** items consist of two statements, Statement I and Statement II. You are to examine these two statements carefully and select the answers to these items using the code given below:

**Statement-I :** The semi-arid tracts of India stretching from eastern Rajasthan in the north to south central Tamil Nadu are agriculturally less productive.

**Statement II :** The semi-arid tracts are homeland to a large number of central Indian Scheduled Tribes population.

- Both the statements individually true and Statement II is the correct explanation of Statement I.
- Both the statements are individually true but Statement II is not correct explanation of Statement I.

(c) Statement I is true but Statement II is false.

(d) Statement I is false but Statement II is true.

141. Which of the following statements is / are correct ? (CDS)

1. The earth is nearest to the sun at Perihelion, which generally occurs on January 3
2. The earth is farthest away from the Sun at Perihelion, which generally occurs on July 4
3. The earth is farthest away from the Sun at Aphelion, which generally occurs on July 4
4. The earth is nearest to the Sun at Aphelion, which generally occurs on January 3

Select the correct answer using the code given below :

- (a) 1 only (b) 2 and 4  
(c) 1 and 3 (d) 1 and 2

142. Consider the following tributaries of river Brahmaputra :

1. Lohit
2. Tista
3. Subansiri
4. Sankosh

Arrange the above rivers from west to east:

- (a) 2 - 4 - 3 - 1 (b) 2 - 3 - 4 - 1  
(c) 4 - 2 - 3 - 1 (d) 3 - 1 - 2 - 4

143. Which of the following statements is /are correct ? (CDS)

1. Acid rain reacts with buildings made from limestone
2. Burning of sulphur containing coal can contribute to acid rain
3. Eutrophication is an effective measure to control pollution

Select the correct answer using the code given below :

- (a) 1 and 2 only  
(b) 2 and 3 only  
(c) 1 only  
(d) 1, 2 and 3

144. Which of the following statements about India's scientific and research mission in Antarctica is / are correct ? (CDS)

1. The first scientific base station in Antarctica was Dakshin Gangotri
2. Dakshin Gangotri is now being used as supply base and transit camp
3. The Maitri station is manned throughout the year for scientific activities

Select the correct answer using the code given below :

- (a) 1 only  
(b) 2 and 3 only  
(c) 1 and 2 only  
(d) 1, 2 and 3

145. Arrange the following popular hill stations of India in terms of their height (from highest to the lowest) from the mean sea level : (CDS)

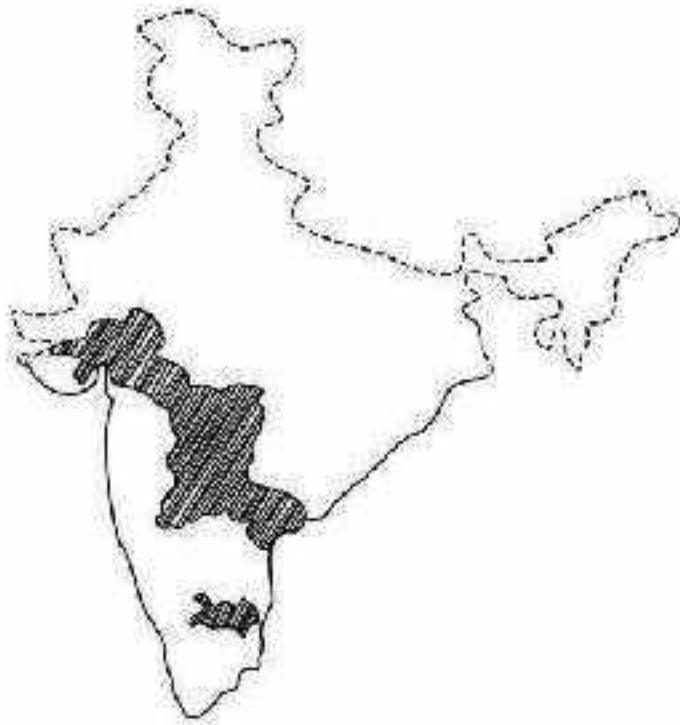
1. Mussoorie
2. Shimla
3. Ooty
4. Darjeeling

Select the correct answer using the code given below :

- (a) 3 - 2 - 4 - 1 (a) 3 - 1 - 4 - 2  
(a) 2 - 3 - 4 - 1 (a) 2 - 4 - 1 - 3



146. Consider the following map of India :



The areas marked in the map given above account for the production of which one of the following cash crops?

- (a) Cotton (b) Groundnut  
(c) Sugarcane (d) Tobacco

147. Consider the following statements regarding laterite soils of India :

1. Laterite soils are generally red in colour
2. Laterite soils are rich in nitrogen and potash
3. Laterite soils are well developed in Rajasthan and UP
4. Tapioca and cashew nuts grow well in this soil

Which of the statement given above is/are correct?

- (a) 1 only (b) 2, 3 and 4  
(c) 1 and 4 only (d) 1, 2 and 4

148. Which of the following statements regarding Mediterranean and Monsoon climate is / are correct?

1. Precipitation in Mediterranean climate is in winter while in monsoon climate it is mostly in summer
2. The annual range of temperature in Mediterranean climate is higher than the Monsoon climate
3. Rainy and dry seasons are found in both the climates

Select the correct answer using the code given below:

- (a) 1 only  
(b) 2 and 3 only  
(c) 1 and 3 only  
(d) 1, 2 and 3

149. Which of the following are the major factors responsible for the monsoon type of climate in India?

1. Location
2. Thermal contrast
3. Upper air circulation
4. The Himalayan Mountains

Select the correct answer using the code given below.

- (a) 1 and 4 only (b) 1, 2, 3 and 4  
(c) 2, 3 and 4 only (d) 1, 2 and 3 only

150. Consider the following- Indian States :

1. Chhattisgarh
2. Telangana
3. Andhra Pradesh
4. Uttarakhand
5. Tamil Nadu

Which among, the States given above are the largest and smallest respectively (in terms of geographical area)?

- (a) 3 and 4 (b) 3 and 2  
(c) 1 and 4 (d) 2 and 5

(CDS) 151. Match List-I with List-II and select the correct answer using the code given (CDS)

**List-I**  
(Climate)

- A. Mediterranean
- B. Marine west Coast
- C. Dry mid-latitude
- D. Moist continental

**List-II**  
(Characteristic)

1. Temperature cycle is moderated by marine influence
2. Warm summers and cold winters with three months below freezing. Very large annual temperature range
3. Strong temperature cycle with large annual range. Warm summers to hot and cold Winters to very cold
4. Temperature range is moderate with warm to hot summers and mild winters

Code :

- |     | A | B | C | D |
|-----|---|---|---|---|
| (a) | 2 | 1 | 3 | 4 |
| (b) | 2 | 3 | 1 | 4 |
| (c) | 4 | 3 | 1 | 2 |
| (d) | 4 | 1 | 3 | 2 |

152. Match List-I with List-II and select the correct answer using the code given below the Lists (CDS)

**List-I**  
(Weathering type)

- A. Chemical weathering
- B. Mechanical weathering
- C. Glacial deposits
- D. Deposition by ground water

**List-II**  
(Landform/ Process)

1. Till
2. Oxidation
3. Plant roots
4. Stalactite

Code :

- |     | A | B | C | D |
|-----|---|---|---|---|
| (a) | 2 | 3 | 1 | 4 |
| (b) | 2 | 1 | 3 | 4 |
| (c) | 4 | 1 | 3 | 2 |
| (d) | 4 | 3 | 1 | 2 |

153. Which of the following State capitals of North-East India is/are connected by Indian Railways? (CDS)

1. Imphal
2. Agartala
3. Kohima
4. Aizawl

Select the correct answer using the code given below.

- (a) 1, 2 and 3 (b) 2 and 4  
(c) 1, 3 and 4 (d) 2 only

154. Match List-I with List-II and select the correct answer using the code given below the Lists : (CDS)

**List-I**  
(Region)

- A. Baghelkhand
- B. Kuttanad
- C. Saurashtra
- D. Rarh

**List-II**  
(State)

1. West Bengal
2. Madhya Pradesh
3. Kerala
4. Gujarat



Code :

	A	B	C	D
(a)	2	3	4	1
(b)	2	4	3	1
(c)	1	3	4	2
(d)	1	4	3	2

155. Match List-I with List-II and select the correct answer using the code given below the Lists : (CDS)

List-I (City)	List-II (Earthquake zone)
A. Kolkata	1. Zone V
B. Guwahati	2. Zone IV
C. Delhi	3. Zone III
D. Chennai	4. Zone II

Code :

	A	B	C	D
(a)	3	2	1	4
(b)	3	1	2	4
(c)	4	1	2	3
(d)	4	2	1	3

156. Match List-I with List-II and select the correct answer using the code given below the Lists : (CDS)

List-I (Lake)	List-II (Type)
A. Ashtamudi Kayal	1. Residual (sweet water)
B. Himayat Sagar	2. Lagoon
C. Dal Lake	3. Glacial
D. Tsomgo Lake	4. Artificial (sweet water)

Code :

	A	B	C	D
(a)	2	4	1	3
(b)	2	1	4	3
(c)	3	1	4	2
(d)	3	4	1	2

157. Match List-I with List-II and select the correct answer using the code given below the Lists : (CDS)

List-I (Farming area)	List-II (State)
A. Doab	1. Assam
B. Char	2. Karnataka
C. Maidan	3. Punjab
D. Terai	4. Uttar Pradesh

Code :

	A	B	C	D
(a)	3	2	1	4
(b)	3	1	2	4
(c)	4	1	2	3
(d)	4	2	1	3

158. Match List-I with List-II and select the correct answer using the code given below the Lists : (CDS)

List-I (Steel mill)	List-II (State)
A. Kalinganagar	1. West Bengal
B. Vijayanagar	2. Tamil Nadu
C. Salem	3. Odisha
D. Durgapur	4. Karnataka

Code :

	A	B	C	D
(a)	1	4	2	3
(b)	1	2	4	3
(c)	3	4	2	1
(d)	3	2	4	1

159. This item consists of two statements, Statement I and Statement II. (CDS)

**Statement I :** The Kuroshio is a warm north-flowing ocean current on the west side of the North Pacific Ocean.

**Statement II :** Presence of a number of volcanoes at the bottom of the Sea of Japan is responsible for the Kuroshio becoming warm.

Examine these two statements carefully and select the answer to the item using the code given below.

Code:

- (a) Both the statements are individually true and Statement II is the correct explanation of Statement I  
 (b) Both the statements are individually true but Statement II is not the correct explanation of Statement I  
 (c) Statement I is true but Statement II is false  
 (d) Statement I is false but Statement II is true

160. Contribution of the manufacturing sector to environmental degradation primarily occurs during (CDS)

1. procurement and use of natural resources
2. industrial processes and activities
3. product use and disposal

Select the correct answer using the code given below.

- (a) 1 only (b) 2 and 3 only  
 (c) 1 and 2 only (d) 1, 2 and 3



# Hints & Explanations

## Level - 1

1. (d) Demographic gap is the difference between birth rate and death rate that develops when a country undergoes demographic transition.
2. (c). A geostationary satellite is an earth-orbiting satellite. It is placed at an altitude of approximately 35,800 kilometres directly over the equator that revolves in the same direction the earth rotates (west to east).
3. (c) The angular speed of a whirlwind in a Tornado towards the centre remains constant.
4. (c) According to data from the United Nations half of those 7.2 billion people live in only six countries: the United States, Brazil, Pakistan, India, China, and Indonesia. The world population has reached 7.2 billion.
5. (c) The temperature inside the earth's surface increases with depth. From 20 m below the earth's surface, the temperature increases at the rate of 1 degree Celsius for every 40 m of descent. This rapid increase of temperature continues up to a great depth.
6. (a) Asia has large areas of inland drainage because rainfall is seasonal and scanty.
7. (b) In the given condition, difference between seasons will be reduced.
8. (d) The eastern and western boundaries of the Pacific Ocean experience frequent earthquake because these margins coincide with the plate margins.
9. (a) The Vindhyan system of rocks is important for the production of precious stones and building materials. The system derives its name from the Vindhyan hills where its rocks are prominently exposed. It forms a dividing line between the Ganga Plain and the Deccan. The main rocks of the Vindhyan system are coarse, medium and fine textured sandstones, shales and limestones. The Vindhyan system of rocks bear out precious stones, ornamental stones, diamonds, building materials, and raw materials for cement, lime, glass and chemical industries
10. (c) The horse latitudes are regions located at about 30 degrees north and south of the equator. These latitudes are characterized by calm winds and little precipitation.
11. (d) A nautical mile is based on the circumference of the planet Earth. If you were to cut the Earth in half at the equator, you could pick up one of the halves and look at the equator as a circle. You could divide that circle into 360 degrees. You could then divide a degree into 60 minutes. A minute of arc on the planet Earth is 1 nautical mile. A nautical mile is 1.1508 miles or 6,076 feet.
12. (a) El Niño is a warm ocean current. The term El Niño refers to the large-scale ocean-atmosphere climate interaction linked to a periodic warming in sea surface temperatures across the central and east-central Equatorial Pacific.
13. (c) Kanha National Park belongs to tropical moist dry deciduous forest. It is a tiger reserve of India and the largest national park of Madhya Pradesh.
14. (d) Broken Hills are located in New South Wales, Australia. It is a mining city.
15. (b) Time is advance towards the east as sun rises first in the east then in west.
16. (d) Climate change benefits Russia and Northern Europe as they are in colder region.
17. (c) Tapi does not flow in to the Bay of Bengal. The river rises in the eastern Satpura Range of southern Madhya Pradesh and flows into the Gulf of Cambay of the Arabian Sea.
18. (a) Duncan Passage is a strait in the Indian Ocean. It separates South and Little Andaman.
19. (d) An endemic species is one whose habitat is restricted to a particular area. The term could refer to an animal, a plant, a fungus, or even a microorganism. Some of the endemic species in India are Grey-headed Bulbul, Malabar Lark, Nilgiri Flycatcher and Grey Jungle fowl etc.
20. (b) Bangladesh shares longest border with India. India and Bangladesh share a 4,096 kilometres long international border. It is the fifth-longest land border in the world.
21. (d) Nigeria is not a landlocked country in Africa. Its coast in the south lies on the Gulf of Guinea in the Atlantic Ocean.
22. (c) The International Date Line is an imaginary line of longitude on the Earth's surface located at about 180 degrees east (or west) of the Greenwich Meridian.
23. (c) Greenhouse gases catch the sun's radiation on its way back into space and reflect some of that warmth back to Earth, increasing temperatures. Carbon dioxide is known as greenhouse gas because of their ability to trap and reflect the sun's radiation back to Earth.
24. (d) The most significant natural sources of atmospheric methane are wetlands. Wetlands are characterized by waterlogged soils and distinctive communities of plant and animal species that have evolved and adapted to the constant presence of water. Due to this high level of water saturation as well as warm weather, wetlands are one of the most significant natural sources of atmospheric methane.
25. (d) Biomass is the mass of living biological organisms in a given area or ecosystem at a given time. Over 90% of the Biomass is in Oceans.
26. (c) A continually rising air pressure is an indication of fine and settled weather, and a steadily falling tendency in the barometer foretells the advent of unsettled and cloudy weather.
27. (d) Loess soil is a wind-blown sedimentary deposit. Good examples are found in China and Europe and United States etc. It is a kind of silt that forms a fertile topsoil in some parts of the world. Loess consists of tiny mineral particles brought by wind to the places where they now lie. These mineral particles are finer than sand, but coarser than clay.
28. (c) Baghdad is 3 hours away from London. That is why news is broadcast from London at 10:30 am and it is heard at Baghdad at 1:30 pm. Greenwich Mean Time is at 0 degree longitude and Baghdad is at 45 degree east.
29. (b) The correct sequences of water bodies, from lower to higher salinity concentration, is Baltic sea- Arctic Sea- Gulf of California- Red sea.



30. (a) If the object does not reflect any colour, it appears black. The tiny droplets of water in rain clouds scatter the white light of the sun. Red is scattered first, and violet the last. This happens at such a high altitude that no rays of the sun reach the bottom of the cloud. Thus, we do not see the rays of the sun and this results in a dark effect.
31. (b) Water effectively bounces off the outer bank as it turns exerting an extra pressure on the bank. This is why the river bank is weakest where the river turns.
32. (d) The main objectives of the watershed management strategy of India are to restore the ecological balance by harnessing, conserving and developing degraded natural resources such as soil, vegetative cover and water.
33. (c) Along the eastern slopes of the Rockies, the Chinook wind provides a welcome respite from the long winter chill.  
Impact of Chinooks  
Loss of moisture due to significant drops in humidity.  
Soil moisture is lost, and the high winds may result in soil loss  
Summer Chinooks can damage small plants and agriculture products  
Susceptible people may get headaches or suffer nervous disorders  
Rapid Large Temperature Changes Can Occur  
Snow may melt or evaporate through sublimation
34. (d) Ozone holes are more pronounced at the polar regions especially over Antarctica.
35. (a) South Asia comprises the sub-Himalayan countries. According to the United Nations geographical region classification, the current territories are Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka.
36. (d) Biological diversity is used to refer to the total number of different species on Earth. A collection of this biodiversity would include human beings, Bengal tigers, sugar maples, oyster mushrooms, bacteria, and the millions of other living organisms found on Earth.
37. (c) The Gaddis are a tribe living mainly in Himachal Pradesh and Jammu and Kashmir. They belong to the class of the shepherds and their job is looking after goats and sheep.
38. (b) Secondary waves (S waves) are the second fastest travelling seismic waves (after primary waves) and can travel through solids but not through liquids or gases. It helps scientists to understand the internal structure of the Earth.
39. (a) There are four terrestrial planets in our Solar System: Mercury, Venus, Earth, and Mars. The terrestrial planets in our Solar System are also known as the inner planets because these planets are the four closest to the Sun.
40. (d) Veliconda Hills are situated in southeastern Andhra Pradesh state. They form the eastern flank of the Eastern Ghats.
41. (d) Gneiss is a high grade metamorphic rock, meaning that it has been subjected to higher temperatures and pressures than schist. It is formed by the metamorphosis of granite, or sedimentary rock.
42. (c) The difference in time to the extent of 1 day on either side of the International Date Line is caused by rising of the sun in the east and not by inclined axis of the earth.
43. (c) Revolution of the earth is not associated with the generation of ocean current.
44. (b) Spring tides occur twice each lunar month all year long without regard to the season. Neap tides, which also occur twice a month happen when the sun and moon are at right angles to each other. During full or new moons-which occur when the earth, sun, and moon are nearly in alignment-average tidal ranges are slightly larger.
45. (a) Canary Current is a cold current which blows in the North Atlantic Ocean.
46. (d) Trade winds blow from the subtropical highs or horse latitudes toward the low pressure of the ITCZ(Intertropical Convergence Zone).
47. (c) Albedo is the fraction of solar energy (shortwave radiation) reflected from the Earth back into space.
48. (a) The Higgs boson (or Higgs particle) is a particle that gives mass to other particles. Peter Higgs was the first person to think of it and the particle was found in March 2013. The Higgs boson or Higgs particle is an elementary particle in the Standard Model of particle physics. Superstring theory is an attempt to explain all of the particles and fundamental forces of nature in one theory by modelling them as vibrations of tiny supersymmetric strings.
49. (c) Global dimming is defined as the decrease in the amounts of solar radiation reaching the surface of the Earth. The Global dimming has devastating effects on the earth's environment and living beings. The pollutants causing global dimming also leads to acid rain, smog and respiratory diseases in humans.
50. (b) Fault trap is a kind of structural trap. Here, the fracture and slippage of rock along a fault line may bring an impermeable stratum in contact with a layer of permeable reservoir rock and thus forms a barrier to petroleum migration.
51. (c) The origin of the river is a tiny reservoir named as Narmada Kund which is situated on the Amarkantak Hill in Anuppur District of East Madhya Pradesh. Amarkantak region is a unique natural heritage area and is the meeting point of the Vindhyas and the Satpuras, with the Maikal Hills being the fulcrum.
52. (b) The westerlies generally blow between 30° and 60° latitude in both the Northern and Southern hemispheres from the west towards the east. These winds are thus called westerly winds, after the direction from whence the winds come. It blows below the subtropical highs in the Southern Hemisphere.
53. (d) Mid-latitude or frontal cyclones are large travelling atmospheric cyclonic storms up to 2000 kilometres in diameter with centres of low atmospheric pressure. The jet stream plays a major role in the location of mid-latitude cyclones.
54. (c) Red soils develop in a warm, temperate, wet climate under deciduous forests and have thin organic and mineral layers overlying a yellowish-brown leached layer resting on red layer made of iron oxide(ferric oxide). Red soils generally form from iron-rich sediments. They are usually poor growing soils, low in nutrients and humus and difficult to cultivate.
55. (b) While all other seas in the world are defined at least in part by land boundaries, the Sargasso Sea is defined only by ocean currents. The Sargasso Sea does not have a coastline as it is located in the middle of the Atlantic Ocean.



56. (a) Damodar-Brahmani-Mahanadi-Tungabhadra
57. (c) The Narmada River travels a distance of 1,312 km before it falls into Gulf of Cambay in the Arabian Sea near Bharuch in Gujarat. The first 1,079 km of its run is in Madhya Pradesh. In the next length of 35 km, the river forms the boundary between the States of Madhya Pradesh and Maharashtra. Again, in the next length of 39 km, it forms the boundary between Maharashtra and Gujarat.
58. (c) The edge of the sunlit hemisphere forms a circular boundary separating the earth into a light half and a dark half.
59. (c) A landlocked country is a country entirely enclosed by land or whose only coastlines lie on closed seas. Angola is situated in Southern Africa, bordering the South Atlantic Ocean, between Namibia and Democratic Republic of the Congo.
60. (c) Chlorofluorocarbons (CFCs) are nontoxic, nonflammable chemicals containing atoms of carbon, chlorine, and fluorine. They are used in the manufacture of aerosol sprays, blowing agents for foams and packing materials as solvents and as refrigerants. CFCs contribute to ozone depletion in the upper atmosphere.
61. (a) Albedo also varies according to the angle of incidence of the Sun Rays being higher for slanting rays and lower for vertical or nearly vertical rays. From this we can derive that albedo will be relatively higher during early morning and late evening because at both times, Sun rays are slanting.
62. (c) Composite cone volcanoes, which are also called 'stratovolcanoes' or simply 'composite volcanoes,' are cone-shaped volcanoes composed of layers of lava, ash and rock debris. These steep-sided volcanoes erupt in an explosive manner. It is also called strata cone because of the cataclysmic eruption.
63. (d) Cordilleras of North America is a part of the Cordilleran mountain system found in the western part of North America and extending through the coterminous United States and Alaska, Canada, and Mexico.
64. (c) The amount of water vapour in the air at any given time is usually less than that required to saturate the air. The relative humidity is the percent of saturation humidity, generally calculated in relation to saturated vapour density.
- $$\text{Relative Humidity} = \frac{\text{actual vapor density}}{\text{Saturation vapour density}} \times 100\%$$
65. (c) Chinook is a warm, dry, gusty, westerly wind that blows down the Rocky Mountains in North America.
66. (c) Srisailem Dam is the 2nd largest capacity hydroelectric project in the country. The dam is constructed across the Krishna River which flows in the Kurnool district of Andhra Pradesh.
67. (a) Biodiversity is richer in tropical regions. Biodiversity is a measure of the health of ecosystems. Greater biodiversity implies greater health. Biodiversity is in part a function of climate. In terrestrial habitats, tropical regions are typically rich whereas Polar Regions support fewer species.
68. (a) Vishakhapatnam is the deepest landlocked port in India.
69. (a) On the equator, the day and night stay approximately the same length all year round.
70. (b) Kochi Refinery was set up on 27th April, 1963. Koyali Refinery was built with Soviet assistance and went on stream in October, 1965. Panipat Refinery was set up in 1998 at Baholi Village in Distt. Panipat, Haryana. Mathura Refinery was commissioned in January, 1982.
71. (a) Stalagmite is a conical mineral deposit, usually calcite or aragonite, built up on the floor of a cavern, formed from the dripping of mineral-rich water.
72. (b) Population dividend or Demographic dividend refers to a period - usually 20 to 30 years - when fertility rates fall due to significant reductions in child and infant mortality rates. It occurs when the proportion of working people in the total population is high because this indicates that more people have the potential to be productive and contribute to growth of the economy.
73. (c) A Savanna is a rolling grassland scattered with shrubs and isolated trees, which can be found between a tropical rainforest and desert biome. Savannas are also known as tropical grasslands. They are found in a wide band on either side of the equator on the edges of tropical rainforests.
74. (c) Black holes are regions of spacetime from which nothing, not even light, can escape. A typical black hole is the result of the gravitational force becoming so strong that one would have to travel faster than light to escape its pull. Such black holes contain a spacetime singularity at their centre.
75. (a) Subsistence Farming is a type of farming in which most of the produce (subsistence crop) is consumed by the farmer and his family, leaving little or nothing to be marketed.
76. (d) Tectonic plates are composed of oceanic lithosphere and thicker continental lithosphere, each topped by its own kind of crust. Tectonic plates are able to move because the Earth's lithosphere has greater strength than the underlying asthenosphere. The outer shell of the earth, the lithosphere is broken up into tectonic plates. The seven major plates are the African plate, Antarctic plate, Eurasian plate, Indo-Australian plate, North American plate, Pacific plate and South American plate. Along convergent boundaries, subduction carries plates into the mantle.
77. (c) North Indian plain would have been much cooler in winter.
78. (c) If most of a plate boundary had ruptured recently in large earthquakes the seismic gaps can be defined as those segments where no recent rupture has occurred. Such gaps are expected to be filled in the near future by earthquakes and therefore the seismic hazard within gaps is more imminent than elsewhere along the same plate boundary.
79. (a) In absence of cold Labrador current there will be no North East Atlantic fishing ground.
80. (a) The time of Florida would be 6.58 p.m on Saturday.
81. (d) Underground water may also be connected to surface water through wetlands. Groundwater can flow into- or out of wetlands (springs or flow-through wetlands) which may in turn flow into lakes and streams.
82. (d) Getting poorer countries close
83. (b) The condition exists because warm moist air rises by orographic lifting to the top of a mountain range. As atmospheric pressure decreases with increasing altitude, the air has expanded and adiabatically cooled



- to the point that the air reaches its adiabatic dew point. At the adiabatic dew point, moisture condenses onto the mountain and it precipitates on the top and windward sides of the mountain.
84. (d) In terms of percentage of forest cover with respect to total geographical area, Mizoram with 90.38 percent had the highest forest cover in terms of percentage of forest cover to Geographical area
  85. (a) In astronomy, axial tilt (also called obliquity) is the angle between an object's rotational axis and the perpendicular to its Orbital plane, both oriented by the right hand rule. At an obliquity of  $0^\circ$ , these lines point in the same direction i.e. the rotational axis is perpendicular to the orbital plane. Axial tilt differs from inclination. Over the course of an orbit, the angle of the axial tilt does not change, and the orientation of the axis remains the same relative to the background stars. This causes one pole to be directed toward the Sun on one side of the orbit, and the other pole on the other side, the cause of the seasons on the Earth.
  86. (c) Yakuts are the nomadic reindeer herder of Tundra.
  87. (a) A rapid fall of barometer reading means stormy conditions.
  88. (d) Lakshadweep is about 220 to 440 Kms away from the coast of Kerala, lying one of the world's most spectacular tropical Islands systems in a scattered group of 36 coral islands. All these islands have been built up by corals and have fringing coral reefs very close to their shores.
  89. (d) Taungup Pass is a mountain corridor connecting India with Myanmar. Taungup is situated in Sandoway district of Myanmar.
  90. (b) Doddabetta is the highest mountain in the Nilgiri Hills (Tamil Nadu) at 2,637 metres.  
The Vindhyas run across most of central India.  
The Dhaulagiri massif in Nepal extends 120 km from the Kaligandaki River west to the Bheri.  
Mt. Kailash peak is standing in the remote south-west corner of Tibet in the Himalayan Mountains.
  91. (a) The Faroe Islands are an archipelago between the Norwegian Sea and the North Atlantic Ocean. The Faroese sheep is a breed of domestic sheep native to the Faroe Islands. Thus, this group of islands is also known as Island of Sheep.
  92. (b) The Tuareg is a pastoral nomad living in the desert of Sahara. They are found in Algeria, Mali and Niger.
  93. (c) The national Population Register was created by the UID Act 2010. The Unique Identification Authority of India (UIDAI) was established in January 2009 and is a part of the Planning Commission of India. UIDAI aims to provide a unique 12 digit ID number to all residents in India on a voluntary basis. The number will be known as AADHAAR.
  94. (c) Rotterdam of Netherlands is largely famous for Shipbuilding. Rotterdam's economy is still almost based on shipping. The port lies at the heart of the densely populated and industrialized triangle of London, Paris, and the German Ruhr district and at the mouths of two important rivers (the Rhine and the Meuse).
  95. (b) Topographic maps are detailed, accurate graphic representations of features that appear on the Earth's surface. A topographical map with scale 1:50000 indicates 1 cm to 500 m.
  96. (b) Blowing from the subtropical highs or horse latitudes toward the low pressure of the ITCZ are the trade winds. They are named by their ability to quickly propel trading ships across the ocean. They blow from 30 degree north and south the Equator.
  97. (b) Kuroshio current is a warm current in the Pacific Ocean along the southern and eastern shores of Japan.
  98. (b) Neyveli Thermal Power Station is a set of power plants situated near lignite mines of Neyveli (Tamil Nadu). It is operated by NLC (Neyveli Lignite Corporation). It consists of two distinct units: Neyveli Thermal Power Station I - 1020 MW and Neyveli Thermal Power Station-2 - 1,970 MW.
  99. (d) Sequence of oil refineries in India according to their time of establishment is as follows:-  
1. Guwahati Refinery - 1962  
2. Barauni Refinery - 1964  
3. Haldia Refinery - 1975  
4. Mathura Refinery - 1982
  100. (c) Tides are the rise and fall of sea levels caused by the combined effects of gravitational forces exerted by the Moon, Sun, and rotation of the Earth.
  101. (c) There is negative relationship between rainfall and pressure. When the air pressure is lower, more rainfall occurs. When there is low pressure in the atmosphere, the air bubbles that is rising, are always hotter than the air around. If the ground is heated then air will rise. The cool air will produce condensation that will ultimately lead to rainfall.
  102. (c) Esker - A narrow, sinuous ridge of partly stratified coarse sand and gravel of glaciofluvial origin.
  103. (c) The structure of Exosphere say, height of volume sphere is above 500 km, having maximum hydrogen and helium and the researches are being done for its specific situation of sphere. Since, structure of Atmosphere is divided into 6 spheres say-  
(i) Troposphere (upto 11 km), (ii) Tropopause, (iii) Stratosphere, (iv) Ozonosphere, (v) Ionosphere and (vi) Exosphere (above 500 km.)
  104. (a) Jammu-Srinagar Highway passes through Banihel pass in Pir Panjal range.
  105. (c) In Mediterranean Region most of the rainfall occurs in winter season. Normally summer's leap is moderate.
  106. (c) Magnetism
  107. (a) Spring tides occur when the sun and moon are directly in line with the earth and their gravitational pulls reinforce each other, consequently a great flood or rush.
  108. (b) In Tundra biome due to the frozen ice beneath the surface soil restricts root growth. There is a region beneath the top layer of soil which is permanently frozen & called permafrost.
  109. (b) Days and Nights are not equal length all around the equator due to the angle of the earth in relation to the sun because the earth tilts toward the sun for six months and away from the sun for six months.



110. (b) Equator
111. (a) Sirocco is a local Mediterranean wind that comes from Sahara and can achieve Hurricane speed in North Africa and Europe. Its Arabic name is Quibli.
112. (d) An anticyclone is a large scale circulation of wind around a central region of high atmospheric pressure. It is clockwise in northern hemisphere but anticlockwise in the Southern Hemisphere.
113. (a) El Nino is a cold water current which runs along the coast of Peru and Chile. It is also a climate pattern which occurs every five years.
114. (a) A desert is a region which receives very low amount of precipitation. Patagonian desert is located both in Argentina and Chile. The desert has a population density of around 2 persons per km.
115. (d) Doldrums are noted for their calm periods when winds disappear totally. They are a low pressure area around the equator.
116. (d) Rice, jute and tea grow mainly in tropical climate.
117. (c) Temperate cyclones are depressions caused by the meeting of the warm tropical air and the cold polar air at latitudes 40 to 60 N and S. When cold polar air moves in a general westerly direction and warm tropical air moves in a general easterly direction, a wave develops.
118. (c) Chinook winds have been observed to raise winter temperature, often from below  $-20^{\circ}\text{C}$  ( $-4^{\circ}\text{F}$ ) to as high as  $10-20^{\circ}\text{C}$  ( $50-68^{\circ}\text{F}$ ) for a few hours or days, then temperatures plummet to their base levels. The greatest recorded temperature change in 24 hours was caused by Chinook winds on January 15, 1972, in Loma, Montana; the temperature rose from  $-48$  to  $9^{\circ}\text{C}$  ( $-54$  to  $48^{\circ}\text{F}$ ).
119. (c) A hurricane is a type of tropical cyclone or severe tropical storm that forms in the southern Atlantic Ocean, Caribbean Sea, Gulf of Mexico, and in the eastern Pacific Ocean. A typical cyclone is accompanied by thunderstorms, and in the Northern Hemisphere, a counterclockwise circulation of winds near the earth's surface.
120. (d) Suez Canal joins Asia and Africa, Strait of Hormuz joins Gulf of Oman and Persian Gulf, Strait of Gibraltar joins Europe and Africa.
121. (c) Slate belongs to the category of igneous rocks which are formed due to the solidification of molten lava after eruption.
122. (d) Ferrel's law, named after American meteorologist W. Ferrel, is the rule that air or water moving horizontally in the Northern Hemisphere is deflected or pushed to the right of its line of motion while air or water moving horizontally in the Southern Hemisphere is deflected to the left of its line of motion. Ferrel's law, which predicts the directions of the large-scale circulations of the earth's atmosphere and oceans, is a restatement in global terms of the action of the Coriolis force.
123. (a) Igneous means made from fire or heat. Igneous rocks are formed by the agency of fire out of molten matter. About 50% of the heat given off by the Earth is generated by the radioactive decay of elements such as uranium and thorium, and their decay products. The most popular model of radioactive heating is based on the bulk silicate Earth (BSE) model, which assumes that radioactive materials, such as uranium and thorium, are found in the Earth's lithosphere and mantle – but not in its iron core. The BSE also says that the abundance of radioactive material can be estimated by studying igneous rocks formed on Earth, as well as the composition of meteorites.
124. (d) The Narmada river (Rewa) is the fifth largest river in the Indian subcontinent. It is third largest river which is completely flows in India after Ganga and Godavari.
125. (c) The low pressure conditions in north-west India
126. (b) The sequence is Kandla - Haldia - Paradeep and Kochi.
127. (a) Jharkhand-Madhya Pradesh-west Bengal-Meghalaya
128. (c) The western ghats are a barrier in the path of the monsoons and cause a very high rainfall in the summer. Nearness to the sea also enables the wind patterns to acquire moisture. The Himalayas being the tallest mountain chain in the world contain the monsoon and act as a barrier to the north.
129. (a) The Gulf of Mannar is a shallow bay situated between south eastern tip of India and Sri Lanka draining into the gulf. It has 3600 species of flora and fauna.
130. (d) The Deccan Traps were created by what is known as "flood basalts". That is, the crust split creating a fissure. From the fissure tremendous quantities of very fluid basalt flowed. The eruption did not create a mountain like volcano; instead it created just the extensive lava flow. The vents, or fissures, that created the Deccan Traps were not single events. Many eruptions were responsible for the Traps.
131. (b) Most of the plateau of peninsular India enjoys this climate, except a semi-arid tract to the east of the Western Ghats. Winter and early summer are long dry periods with temperature above  $18^{\circ}\text{C}$ . Summer is very hot and the temperatures in the interior low level areas can go above  $45^{\circ}\text{C}$  during May. The rainy season is from June to September and the annual rainfall is between 75 and 150 cm. Only central eastern Tamil Nadu falls under this tract and receives rainfall during the winter months of late November to January.
132. (d) The Nokrek biosphere reserve is located in Meghalaya.
133. (d) Aghil pass is located in Trans Himalayas.
134. (c) The 'Golden Quadrilateral' which connects Delhi, Mumbai, Chennai and Kolkata passes through Vadodara, Pune, Vishakhapatnam and Varanasi. Four other cities among the top ten metropolises namely Bangalore, Pune, Ahmadabad, and Surat are also



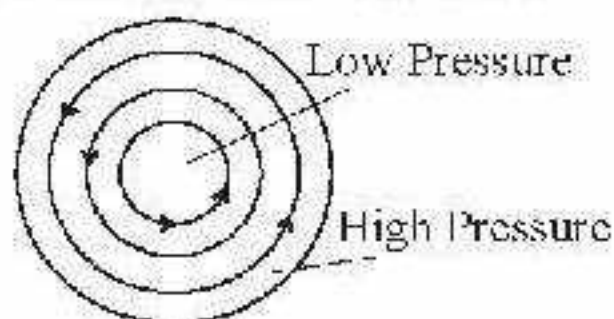
connected by the network. The largest highway project in India and the fifth longest in the world, it is the first phase of the National Highways Development Project (NHDP), and consists of building 5,846 km (3,633 mi) four/six lane express highways at a cost of 600 billion (US\$11 billion).

135. (d) Deltaic regions of Mahanadi, Godavari and Krishna are conducive to well irrigation. The rain-water sinks down easily in the areas where the soil is soft and porous. So water is available at a lower depth when wells are dug and it helps irrigation.
136. (b) India has signed a Memorandum of Understanding (MoU) with China in Beijing on October 2013 for strengthening cooperation on Trans-border Rivers.
137. (c) The South Western Railway Zone Headquarter which is situated in Hubli city in Karnataka has the highest elevation (approximately 2056 feet) from the mean sea level.
138. (d) In Geography and Geology, Fluvial refers to the processes associated with rivers, streams and the deposits and land forms created by them. Such kind of topography is called Fluvial topography.

139. (b)

Mercury	Mars	Venus	Earth	Uranus
4,800 km	6,800 km	12,100 km	12,750 km	51,118 km

140. (a) Reunion Island
141. (c) Melting of icebergs greatly effecting the long-term sea-level change. As the melted ice flows as water, or falls as ice chunks into the ocean it increases the total volume of the ocean.
142. (d) The anticlock wise rotation of Earth deflects winds to the right in the northern hemisphere and to the left in the southern hemisphere.
143. (c) The 'eye' is the focus of the hurricane, the point about which the rest of the storm rotates and where the lowest surface pressures are found in the storm.
144. (d) Pir Panjal Range is concerned with lesser Himalayan region. It includes Himachal Pradesh, Jammu & Kashmir and Kashmir (POK)
145. (b) The Palk strait is very shallow zone for shipping, so it would be better for ships to go around Sri Lanka rather than crossing through this zone.



146. (c) In the northern Hemisphere of the earth, the wind flows in a counter-clock wise (anti clock) direction towards the centre. Consequently the flow of air accumulates at the centre causing cooling and condensing water vapour then forming clouds resulting in rain fall.
147. (b) Our atmosphere has five layers- Troposphere, Stratosphere, Mesosphere, Thermosphere and Exosphere. The exosphere is the outer most layer of the atmosphere

showing altitude about from 700 km to 10000 km above sea level. This layer gradually and gradually merges in outer space having no atmosphere.

148. (b) Heavier and denser cold air (cold fronts) pushes the warmer lighter air (warm fronts) causing precipitation and showering.
149. (d) Elements in the Earth's crust -  
Oxygen = 47%, Silicon = 28%, Calcium = 3.5%, Sodium = 3% and Magnesium = 2%
150. (b) Solar energy, water and fisheries come in the category of renewable resource and coal, crude oil and natural gases are non-renewable.

## Lavel - 2

1. (d) The Global Positioning System (GPS) is a satellitebased system that can be used to locate positions anywhere on the earth. It is associated with longitude and latitude. It is a "constellation" of 24 well-spaced satellites that orbit the Earth and make it possible for people with ground receivers to pinpoint their geographic location. The Russian government has developed a system, similar to GPS, called GLONASS. The US began the GPS project in 1973.
2. (c) A. Tropical evergreen forests- Above 200 cm  
B. Tropical deciduous forests - 100-200 cm  
C. Tropical Dry forest- 50-100 cm  
D. Arid forest- Less than 50 cm
3. (c) Cash crops are those which are produced for the purpose of generating cash or money. The products are therefore intended to be marketed for profit. Sugarcane and coffee are cash crops which provide immediate cash to farmers.
4. (d) 1. Manas- Assam  
2. Pachmarhi - Madhya Pradesh  
3. Nokrek - Meghalaya  
4. Achanakmar- Amarkantak- Chhattisgarh,
5. (c) The lower course of a river is sometimes choked with sediments because the valley of a river is widest in its lower course, the velocity of a river in its lower course is low and the delta sometimes develops in a river's lower course.
6. (c) Both statements are correct.
7. (a) Black soils become sticky when it is wet. It is rich in iron, lime, calcium, Magnesium, carbonates, and alumina and poor in Phosphorous, Nitrogen and Organic matter. The soil is black in colour because it is volcanic in origin. It is created from igneous rocks, and is also called 'regur soil'.
8. (a) 1. Chinook wind- Rocky Mountains  
2. Foehn- Northern slopes of the Alps  
3. Sirocco- North African desert  
4. Mistral - Southern slopes of Alps
9. (b) The oil refineries of India from west to east: Koyali (Gujarat), Mathura (U.P), Haldia (West Bengal), Bongaigaon (Assam).
10. (b) Red soils are very poor in lime, humous and potash.
11. (c) Ozone Layer absorbs most of the ultraviolet radiation found in the sun's rays. Chlorofluorocarbon is a serious threat to the ozone layer. Other Ozone depleting gases are Halon, Carbon tetrachloride (CCl<sub>4</sub>), Methyl chloroform (CH<sub>3</sub>CCl<sub>3</sub>), Methyl bromide (CH<sub>3</sub>Br) etc.
12. (b) 13. (d)



14. (b) The ozone layer is a belt of naturally occurring ozone gas that sits 9.3 to 18.6 miles (15 to 30 kilometres) above Earth and serves as a shield from the harmful ultraviolet radiation emitted by the sun. It is mostly found in Stratosphere and it is significant for the life on the earth.
15. (c) **Tiger Reserves**                      **States**  
 1. Indravati Tiger Reserve - Chhattishgarh  
 2. Periyar Tiger Reserve - Kerala,  
 3. Simlipal Tiger Reserve - Odisha  
 4. Bandipur Tiger Reserve - Karnataka.
16. (d) Reang is the scheduled tribes of the Indian state of Tripura. Dimas is a tribal group of people in Assam. The Konyak are the Naga tribal group. Mishmi tribal people are mostly of Arunachal Pradesh (formerly North East Frontier Agency) in extreme northeastern India, near Tibet and Assam, speaking dialects of the Tibeto-Burman linguistic family.
17. (b) The reason for the decrease of per capita holding of cultivated land is:  
 Population is growing very fast in India and practice of dividing land equally among the heirs goes on. Hence, family land is inherited by the heirs equally. Each heir has the legal right to demarcate and subdivide his inheritance.
18. (b) Rural Forestry is the raising of trees on community land and not on private land as in farm forestry. All these programs aim to provide for the entire community and not for any individual. The government has the responsibility of providing seedlings, fertilizer but the community has to take responsibility of protecting the trees.  
 Farm forestry is when Individual farmers are being encouraged to plant trees on their own farmland to meet the domestic needs of the family.
19. (d) The tank irrigation is practised mainly in peninsular India due to the following reasons:  
 1. The undulating relief and hard rocks make it difficult to dig canals and wells.  
 2. There is little percolation of rain water due to hard rock structure and ground water is not available in large quantity.  
 3. Most of the rivers of this region are seasonal and dry up in summer season. Therefore, they cannot supply water to canals throughout the year.  
 4. There are several streams which become torrential during rainy season. The only way to make best use of this water is to impound it by constructing bunds and building tanks. Otherwise this water would go waste to the sea.  
 5. The scattered nature of population and agricultural fields also favour tank irrigation.
20. (b) **River - Tributary**  
 Ganga- Gomti and Kosi  
 Indus- Chenab and Sutlej  
 Yamuna- Chambal and Ken  
 Godavari- Wainganga and Indravati
21. (a) A region of the globe found over the oceans near the equator in the intertropical convergence zone and having weather characterized variously by calm air, light winds, or squalls and thunderstorms is called Doldrums.
22. (c)
23. (a) In the open ocean the height of tsunami is less than 1 meter however, its height increases up to 15 meters or more at shallow coastal water. The wavelength in the open ocean is between 650 to 960 km/h.
24. (a) Neptune's atmosphere is made up of hydrogen, helium and methane. The methane in Neptune's upper atmosphere absorbs the red light from the sun but reflects the blue light from the Sun back into space. This is why Neptune appears blue.
25. (b) A comet is an icy small Solar System body that, when passing close to the Sun, heats up and begins to outgas, displaying a visible atmosphere or coma, and sometimes also a tail.
26. (a) Dharamsala is in Himachal Pradesh. It is known worldwide for the presence of the Dalai Lama. Almora is situated in Uttarakhand. Nainital is a popular hill station also in Uttarakhand. The four famous lakes of Nainital are Bhimtal Lake, Sattal, Khurpa Tal, Naukuchia Tal. Darjeeling is situated in West Bengal. Darjeeling Himalayan Railway is a UNESCO World Heritage Site.
27. (b) The tributaries of Brahmaputra from east to west - Tista, Subansiri, Lohit, and Dibang.  
 Tista is said to be the lifeline of Sikkim, the Subansiri River is a tributary of the Brahmaputra River in Assam and Arunachal Pradesh, and the Tibet Autonomous Region of China. Lohit River flows in Arunachal Pradesh. Dibang River flows through the northeast states of Arunachal Pradesh and Assam.
28. (c) The Nilgiri Biosphere Reserve is an International Biosphere Reserve in the Western Ghats and Nilgiri Hills ranges of South India. Manas Wildlife Sanctuary is situated in Assam and UNESCO Natural World Heritage site which is a Project Tiger Reserve. The Panchmarhi Biosphere Reserve is situated in the Satpura Range of Madhya Pradesh state. Simlipal National Park is a national park and a tiger reserve situated in the Indian state of Odisha.
29. (d) Calm weather and intense rain and hail can occur when very warm and humid air rises over a mass of a very cold air.
30. (b) Kollam is an old seaport and city on the Laccadive Sea coast in Kerala. Tuticorin is a port city in Thoothukudi in Tamil Nadu. Ongole is a city in Prakasam district of Andhra Pradesh. Nellore is the 4th most populous city in Andhra Pradesh.
31. (c) The Ukai Dam constructed across the Tapi River is the largest reservoir in Gujarat.  
 Bhakra Dam is a concrete gravity dam across the Sutlej River in Bilaspur, Himachal Pradesh.  
 Nagarjuna Sagar Dam is the world's largest masonry dam built on the Krishna River at Nagarjuna Sagar.  
 The Pandoh Dam is an embankment dam on the Beas River in Mandi in Himachal Pradesh.
32. (c) Recycling is the practice of collection and separation of the materials from the waste stream and their subsequent processing to produce a marketable product which would otherwise be discarded as waste. It leads to reduction of waste disposal cost.
33. (a) Acid rain is a result of air pollution. Some gases especially nitrogen oxides and sulphur dioxide react with the tiny droplets of water in clouds to form sulphuric and nitric acids. The rain from these clouds then falls as very weak acid which is known as "acid rain".



34. (a) Nathu La is a mountain pass in the Himalayas. It connects the Indian state of Sikkim with China's Tibet Autonomous Region. Nathu La is located on the 563 km Old Silk Route, an offshoot of the historic Silk Road. It was sealed by India after the 1962 Sino-Indian War and was re-opened in 2006 following numerous bilateral trade agreements.
35. (a) Matrilineal descent is a kinship system where a descent group traces its ancestral lineage via the maternal (uterine) side of the group. The property passes from mother to daughter. Women are dominant in the family. The examples of matrilineal societies are Khasi and Jaintia tribes of Meghalaya.
36. (c) Periyar National Park and Wildlife Sanctuary is a protected area in the districts of Idukki and Pathanamthitta in Kerala. Kanha National Park is one of the tiger reserves of India and the largest national park of Madhya Pradesh. The Sariska Tiger Reserve is an Indian national park located in the Alwar district of Rajasthan. Dachigam National Park is located in Jammu and Kashmir.
37. (a) Numerous grape varieties are cultivated in France including both internationally wellknown and obscure local varieties. Hence, Southern part of France is famous for wine making industry.
38. (b) Laterite soil layer that is rich in iron oxide and derived from a wide variety of rocks weathering under strongly oxidizing and leaching conditions.
39. (b) 40. (b) 41. (a)
42. (b) is correct
43. (b) The Srisailem Dam is constructed across the Krishna River in Kurnool district, Andhra Pradesh. Sabarigiri Hydroelectric Power Plant is located at Moozhiyar, Pathanamthitta district, Kerala, India. Hirakud Dam is built across the Mahanadi River, about 15 km from Sambalpur in Odisha. Sileru Dam is situated on the boarder of Andhra Pradesh and Odisha.
44. (b) The "Demographic Transition" is a model that describes population change over time. Five stages of Demographic Transition:  
High birth rate and death rates however population growth is small.  
High birth rate but falling death rate. The total population begins to expand rapidly.  
Falling birth rate, continuing falling death rate. The population growth slows down.  
Low birth rate and low death rate. The population growth is small, and fertility continues to fall.  
Death rate slightly exceeds the birth rate and this causes population decline.
45. (a) Earthquake waves are propagate vibrations that carry energy from the source of the shaking outward in all directions. It is of four types:  
P (for primary)                      S (for secondary)  
Love                                      Rayleigh  
A volcano is a mountain that opens downward to a pool of molten rock below the surface of the earth. When pressure builds up, eruptions occur.
46. (a)
47. (b) Hypocenter - The point of origin of an earthquake. Homoseismal Lines - The lines joining the places which experience the earthquake tremors at the same time called Homoseismal Lines.
48. (c) West flowing rivers:  
Narmada River(1057 km) - Rises in Amarkantak Plateau and flows in to gulf of khambat  
Tapti(724 km) - Rises from Betul district in Maharashtra. Luni and Payaswani are also west flowing rivers.
49. (a) Terracing is the mechanical practice used on slopping agricultural land to reduce the length and /or the degree of slope.  
Contour ploughing is the farming practice of ploughing and/or planting across a slope following its elevation contour lines.  
Shifting agriculture is a system of cultivation that preserves soil fertility by plot (field) rotation, as distinct from crop rotation.
50. (a) Arrangement of the states of India on the basis of conferring statehood is as follows:  
1. Nagaland- 1963                      2. Meghalaya - 1970  
3. Sikkim- 1975                      4. Arunachal Pradesh-1987
51. (c) Wind flows from areas of high pressure to areas of low pressure. This is due to density differences between the two air masses.
52. (a) Large scale exploitation of ground water is done with the help of tube wells. Haryana, Punjab and Rajasthan receive less than 40 cm annual rainfall and are deficient in surface water resources. As such, these states exploit more than 85 per cent of the available ground water for irrigation. The demand for ground water for irrigation started increasing in Punjab and Haryana with the advent of Green Revolution in 1960s. States/ union territories with small replenishable ground water resource of less than one BCM/year are Goa, Himachal Pradesh, Meghalaya, Nagaland, Tripura, Sikkim, Andaman & Nicobar Islands, Chandigarh, Dadra and Nagar Haveli, Daman and Diu, Delhi, Lakshadweep and Pondicherry.
53. (b) The correct match is as follows:  
Summer Solstice- 21st June  
Winter solstice- 22nd December  
Vernal Equinox- 21st March  
Autumnal Equinox- 23rd September  
June 21 is called the summer solstice in the Northern Hemisphere. In the Northern Hemisphere, the winter solstice occurs either December 21 or 22.  
Vernal Equinox is the time when the sun crosses the plane of the earth's equator, making night and day of approximately equal length all over the earth and occurring about March 21. The Autumn Equinox is the first day of the autumn season and occurs when the sun passes the equator moving from the northern to the southern hemisphere. It occurs on 23 September.
54. (c) Jhum is a traditional form of shifting cultivation common in the North-East. Slash-and-burn is a mere land clearing method used by many people around the globe to open up forest land and use it for permanent agriculture. On the contrary, shifting cultivation is an integrated farming system involving forestry, agriculture and strong social organisation on the part of the communities. The village or group of villages practice jhum on one particular tract of land until the soil is depleted of nutrients and then move on to another allowing the former tract of land to regenerate.
55. (b) Falls are possible only when a river is losing height suddenly. Next comes meanders. When a river reaches flatter land, flow is slowed down and meanders are formed through erosion of the river banks and deposition on the inside of bends.



Oxbow lake is formed when a wide meander is cut off from the main river, creating a free-standing body of water.

Delta is formed at the mouth of a river, where the river flows into an ocean, sea, estuary, lake, or reservoir.

56. (d) India has the world's largest cropped and irrigated area. The cropping pattern of foodgrains in India is dominated by cereal crop. The average size of an Indian farm holding is below 2 hectares which constitute almost 80% of all Indian farmers.
57. (c) The correct arrangement from north to south is as follows:  
Dudhwa- Uttar Pradesh  
Simlipal - Odisha  
Indravati - Chattisgarh  
Bandipur- Karnataka
58. (a) 59. (c)
60. (d) On the equator, the day and night stay approximately the same length all year round. The earth's rotational velocity is maximum at the Equator. The Coriolis force is greatest at the poles and 0 at the equator.
61. (a)
62. (c) Malawi is a landlocked country in southeast Africa that was formerly known as Nyasaland. Malawi runs a Presidential system and is Unitary Republic. Malawi's economy is highly dependent on agriculture and majority of the population is rural. The government depends heavily on foreign aid to meet its development needs.
63. (a) The Atacama Desert is commonly known as the driest place in the world. Geographically, the aridity of the Atacama is explained by it being situated between two mountain chains (the Andes and the Chilean Coast Range) of sufficient height to prevent moisture advection from either the Pacific or the Atlantic Oceans, a two-sided rain shadow.
64. (a) India's off shore and deep sea fish catch is very poor considering the marine potential of 20-25 million tonnes because Indian coast does not have many gulfs, bays, estuaries and back waters as is the case with Norway. As such it lacks good fishing grounds.
65. (a) Tides are rise and fall of sea levels caused by the combined effect of the gravitational forces exerted by the moon and the sun and the rotation of the earth because the Earth rotates once in about 24 hours with respect to the sun. The tidal range is not constant but changes depending on where the sun and moon are.
66. (b) The sidereal day is the time it takes for the Earth to complete one rotation about its axis with respect to the 'fixed' stars. By fixed, we mean that we treat the stars as if they were attached to an imaginary celestial sphere at a very large distance from the Earth. A measurement of the sidereal day is made by noting the time at which a particular star passes the celestial meridian (i.e. directly overhead) on two successive nights. On Earth, a sidereal day lasts for 23 hours 56 minutes 4.091 seconds, which is slightly shorter than the solar day measured from noon to noon. At the same time that the Earth spins on its axis, it also orbits or revolves around the Sun. This movement is called revolution.
67. (b) The Earth completes one "rotation" every twenty four hours. A rotation is when the planet spins around once. The Earth rotates counter-clockwise; this is why the Sun "rises" in the east and "sets" in the west. Revolution is when one object completes a circular

path around another object. The Earth takes 365.24 days to revolve around the Sun. This is why a year is 365 days long. During the year the Earth is angled differently towards the Sun. These changing angles provide us with different Sun intensities and therefore we get four different seasons.

68. (b) A- 2, B- 3, C- 1, D- 4

The Guinea Current is a slow warm water current that flows to the east along the Guinea coast of West Africa. Oyashio Current is a cold subarctic ocean current that flows south and circulates counter-clockwise in the western North Pacific Ocean. The Canary Current is a wind-driven surface current that is part of the North Atlantic Gyre. The Kuroshio is a north-flowing ocean current on the west side of the North Pacific Ocean

69. (c) The correct sequence is as follows:

1. Troposphere                      2. Stratosphere
3. Mesosphere                      4. Thermosphere

70. (c) A conical hill is a hill with uniform slope and is represented by concentric contours spaced almost regularly. It is a small but distinctive rock hill, 655 metres (2,150 ft) high, on the southern slopes of Mount Terror, above Cape MacKay, on Ross Island.

71. (d) The Indus River originates near the Mansarovar Lake in the Tibetan plateau, on the northern slopes of the Kailash Mountain Range. Given below are the main tributaries of the Indus River from north to south:

- Jhelum
- Chenab
- Ravi
- Sutlej

72. (d) The correct match is as follows:

- Llanos- Venezuela  
Prairies- USA  
Pampas -Argentina  
Downs - Australia

73. (a) In the semi arid tropical region of India tanks are constructed mainly in south and central India due to shallow ground water.

74. (c) Gujarat is blessed with the longest coastline of 1600 km. Summers (March through May) are quite hot, however, with temperatures typically rising well above 100 °F (38 °C) during the day and dropping only to the 90s F (low 30s C) at night. Gujarat is drier in the north than in the south. Rainfall is lowest in the northwestern part of the state-in the Rann of Katch. The coastline of Gujarat includes two, gulf areas Gulf of Katchh and Gulf of Khambat.

75. (d) In northern India, there is light rainfall during winter. This is caused by the cyclonic storms which originate in the Mediterranean Sea and travel towards India. These winds are called western disturbances. They cause heavy snowfall in the higher reaches of the Himalayas and rainfall in the plains. They result in a cold wave in northern India.

76. (b) The correct match is as follows:

- Humboldt-Chile-peru



- North Atlantic Drift-U.K. Norway  
Benguela-Namibia-Angola  
Agulhas-Mozambique-Madagascar.
77. (c) In the horizontal direction, where gravity does not operate, the equilibrium of forces usually involves a balance between the pressure-gradient force and the Coriolis force.
78. (c) Jabalpur is the place of commercial automobiles. Bangalore is the IT hub. Mathura is famous for its petro-chemical industries. Ballarpur has paper industries.
79. (b) The Chandra Prabha Wildlife Sanctuary is situated in the eastern region of Uttar Pradesh. Silent Valley National Park is in Kerala. Valley of flowers is in Uttarakhand. Indravati National Park is the finest and most famous wildlife parks of Chhattisgarh.
80. (c) In organic farming, weed and pest control is based on methods like crop rotation, biological diversity, natural predators, organic manures and suitable chemical, thermal and biological intervention.
81. (b) 1, 2 and 4 are correct.
82. (b) What makes humid tropical forests so productive is the combination of high temperatures, light, and rainfall year-round (good growing conditions) coupled with especially efficient nutrient recycling.
83. (c) Selva is dense equatorial forest, in the Amazon basin, characterized by tall broad-leaved evergreen trees, epiphytes, lianas, etc Taiga also known as boreal forest or snowforest, is a biome characterized by coniferous forests consisting mostly of pines, spruces and larches. In Tundra, the vegetation is composed of dwarf shrubs, sedges and grasses, mosses, and lichens. A Savannah or Savanna is a grassland ecosystem characterised by the trees being sufficiently widely spaced so that the canopy does not close.
84. (b) Only 1 and 2 are correct.
85. (a) Maldives consists of 1,192 coral islands. The island of Mauritius is relatively young geologically, having been created by volcanic activity some 8 million years ago. Madagascar is a special type of continental island is the microcontinental island, which results when a continent is rifted.
86. (d)
87. (c) Cirrus is a genus of atmospheric cloud generally characterized by thin, wispy strands. Stratus clouds are a genus of low-level cloud characterized by horizontal layering with a uniform base, as opposed to convective or cumuliform clouds that are formed by rising thermals. nimbus indicates a precipitating cloud. Cumulus clouds, being low-stage clouds, are generally less than 1,000 m (3,300 ft) in altitude unless they are the more vertical cumulus congestus form. Cumulus clouds may appear by themselves, in lines, or in clusters.
88. (b) If the magma cools quickly, the crystals do not have much time to form, so they are very small. If the magma cools slowly, then the crystals have enough time to grow and become large. Mineral crystals that form when magma cools slowly are larger than crystals that form when lava cools rapidly.
89. (a) (a) is correct and statement II is the correct explanation of statement I.
90. (a) (a) is correct and statement II is the correct explanation of statement I.
91. (a) (a) is correct and statement II is the correct explanation of statement I.
92. (b) Both statements are correct but statement II is not the correct explanation of statement I.
93. (a)
94. (b) Selvas- Tropophytes  
Savanna- Grasses and Trees  
Tundra- Mosses and Lichens  
Mansoon land - Epiphytes
95. (\*)
96. (d) Mulches are materials placed over the soil surface to maintain moisture and improve soil conditions. Mulching has proven to be an effective soil conservation practice, reducing both wind and water erosion during the winter period.
97. (c) Hydrolysis is the weathering reaction that occurs when the two surfaces of water and compound meet. It involves the reaction between mineral ions and the ions of water (OH<sup>-</sup> and H<sup>+</sup>), and results in the decomposition of the rock surface by forming new compounds. Temperatures usually stay high (above 70) throughout the year. Humid Subtropical climate is known for hot humid summers. During the summer the average temperature is between 70 and 80 degrees.
98. (b) The Grand Banks is a large area of submerged highlands southeast of Newfoundland and east of the Laurentian Channel on the North American continental shelf. It is in this area that the cold Labrador Current mixes with the warm waters of the Gulf Stream. The mixing of these waters and the shape of the ocean bottom lifts nutrients to the surface. These conditions created one of the richest fishing grounds in the world. Plankton are organisms that live in the water. They are carried by waves, tides and currents. They are usually found in the shallow surface waters.
99. (c) A typhoon is the name of a strong tropical cyclone whose development is common in the Western North Pacific Ocean and South China Sea. The vast majority of tornadoes occur in the Tornado Alley region of the United States although they can occur nearly anywhere in North America. Willy willies is a severe tropical cyclone of Australia. Formation of an anti cyclone results in calm and settled weather.
100. (b) A cirque is an amphitheatre-like valley head, formed at the head of a valley glacier by erosion. Yardang is a keel-shaped crest or ridge of rock, formed by the action of the wind usually parallel to the prevailing wind direction. Barkhan is a crescent-shaped shifting sanddune convex on the windward side and steeper and concave on the leeward. It is an erosional feature of wind. Drumlin



- is a long, narrow or oval, smoothly rounded hill of unstratified glacial drift. Drumlins are generally found in broad lowland regions, with their long axes roughly parallel to the path of glacial flow.
- 101.(a) Woolen textile- Ludhiana(Punjab)  
Cotton textile - Davanagere (Karnataka)  
Silk textile - Sualkuchi(Assam)  
Jute textile - Rishra(West Bengal)
- 102.(c) El-Nino a name given to the occasional development of a warm ocean current along the Peru Coast as a temporary replacement of the cold. It is an extension of the equatorial current and leads to an increase of surface water temperatures of 10°C and a decrease in Plankton which thrive in colder current. El Nino occurs every seven to fourteen years and result forms a weakening of S.E. Trade Winds in the Pacific.
- 103.(a) When two rigid slabs of lithospheric, known as plate collide with another. The plate made of heavier material tends to be below the plate made of lighter material.
- 104.(a) Correct sequence of the layers given in Question is Troposphere – Stratosphere – Mesosphere (in between Stratosphere–Ionosphere). Thermosphere (Above the Mesosphere or synonymous Ionosphere).
- 105.(a)
- 106.(b) **Tornado**–A rapidly rotating column of the air developed around a very intense low pressure area, associated with a dark funnel shaped cloud, originate at USA. The air is anticlockwise in the northern hemisphere and clockwise in southern hemisphere.
- 107.(c) At higher altitude air is lighter while close to earth surface it is heavier. In Troposphere the dust particles and water are more than upper layer.
- 108.(c) Mica–Gutur (Andhra Pradesh)  
Chromite – Namakkal and Tiruchengode (Tamil Nadu)  
Magnesite – Hindustan Produce Company (Kolkata)  
Zinc – Zawar (Rajasthan)
- 109.(c) In India, Jute (*Corchorus spp*) is produced about 75% in West Bengal (1st rank), 16% in Bihar (2nd rank) and about 5% in Assam (3rd rank) as per the statistical Data of year 2011-12. Jute grows well in loamy soils under hot and humid conditions as ideal climatic condition. Generally Maize/Moong/Urd (spring season)-Jute-Rice crop rotation is followed, while Jute Rice-Wheat rotation is followed on less amount.
- 110.(d) Eastern Himalaya is located between central Nepal in the west to Myanmar in the east. Makalu is the fifth highest mountain in the world in Nepal at 8,481 metres. Kanchenjunga is the third highest mountain in the world located along the India-Nepal border in the Himalaya. Namcha Barwa is a mountain of the Tibetan Himalaya. Mt. Everest is the world highest mountain with a peak at 8,848 metres.
- 111.(b)
- 112.(d) A. Kalahari – Botswana  
B. Namib – Angola  
C. Nubian – Sudan  
D. Atacama – Chile.
- 113.(a) a. Kuroshio current - warm Pacific current  
b. Peru current - cold current in Pacific ocean  
c. Labrador current - cold current in Atlantic ocean  
d. Florida current - Warm current in Atlantic ocean
- 114.(c) Limestone is composed of mineral calcite and aragonite which are different forms of calcium carbonate. Limestones may be formed from skeletons of corals and foraminifera. It is a sedimentary rock easily soluble in water.
- 115.(d) HUMBOLDT-South Pacific Cool  
BENGUELA-South Atlantic Warm/Cool  
KUROSHIO-North Pacific Warm  
OYASHIO-North Pacific Cool
- 116.(c) Transformation of solar energy into heat requires some time, energy received by the earth from solar radiations continues to exceed the energy lost by outgoing long-wave radiations from the earth's surface from 4.00p.m.
- 117.(a) The main areas of tropical forest are found in the Andaman and Nicobar Islands; the Western Ghats, which fringe the Arabian Sea coastline of peninsular India; and the greater Assam region in the north-east. Small remnants of rain forest are found in Orissa state. Semi-evergreen rain forest is more extensive than the evergreen formation partly because evergreen forests tend to degrade to semi-evergreen with human interference. There are substantial differences in both the flora and fauna between the three major rain forest regions.
- 118.(a) For the poles latitude = 90° and for equator latitude = 0°. Latitude at a point on the surface of the earth is defined as the angle, which the line joining that point to the centre of earth makes with equatorial plane.
- 119.(c) The Steppes are areas of comparatively lower temperature and slightly more precipitation. Here annual average temperature is approximately 21°C. Temperate grasses are main vegetation of these regions. Northern America's Prairies and the steppes of Eurasia are the major areas of these grasslands.
- 120.(d) Major natural regions of the world have not same type of climates. The different climates make different topographies.
- 121.(d)
- 122.(a) During the day the land gets warmer than the sea producing low pressure over the land into which cooler air moves from over the sea. Thus the local wind blows from sea to land which is called sea breeze.
- 123.(b) Winds are deflected to their right in the northern hemisphere while to the left in southern hemisphere.
- 124.(a) When isobars are closely spaced, the wind velocity would be gentle as the pressure gradients determine the velocity of winds.



125. (a) Since United Kingdom, Norway, Netherland and Denmark are located on the coast, their temperature is higher than the places located on similar latitudes during the winter.
126. (c) 127. (a)
128. (a) We have been observing the flow of oil from wells in the Gulf of Suez and have noticed that remarkable fluctuations in flow occurred near the time of certain nearby earthquake events. The Gulf of Suez is considered to be an opening tensile region with Sinai moving away from the African continent. The earthquakes occurred close to the bifurcation point of the Gulf of Suez and Eilat and the wells are about 100 km north from this point in the Gulf of Suez. The oil was driven up by natural pore pressure and was not pumped. Measurements of oil flow were made once a month.
129. (a) In the Himalayas the forest range from tropical deciduous forests in the foot hills, to temperate forests in the middle altitudes. Higher up coniferous. Sub-alpine & alpine forest spring up. These finally give way to alpine grasslands & high altitude meadows. They are followed by scrublands which lead to the permanent snowline.
130. (b) Bauxite - Orissa  
Mica - Andhra Pradesh  
Copper - Madhya Pradesh  
Zinc - Rajasthan
131. (b) Kandla-tidal port, Kochi-located at mouth of lagoon, Vishakhapatnam-deepest land-locked protected port, Kolkata-inland riverine port.
132. (b) Ranigang-Bokaro-Bishrampur-Adilabad.
133. (d) Zoji La-Jammu-Kashmir, Lipulekh-Uttaranchal, Shipki La-Himachal Pradesh, Nathu La-Sikkim.
134. (b) The Intertropical Convergence Zone (ITCZ), known by sailors as the doldrums, is the area encircling the earth near the equator where the northeast and southeast trade winds come together. The ITCZ appears as a band of clouds, usually thunderstorms that circle the globe near the equator. In the Northern Hemisphere, the trade winds move in a south-western direction from the northeast, while in the Southern Hemisphere, they move north-westward from the southeast.
135. (c) El Nino is a shift in ocean temperatures and atmospheric conditions in the tropical Pacific that disrupts weather around the world. It is a poorly understood recurrent climatic phenomenon that primarily affects the Pacific coast of South America, but has dramatic impacts on weather patterns all over the world. In the Indian Ocean, it affects the movement of the monsoon winds.
136. (a) Indian Standard Time is based on  $82\frac{1}{2}^{\circ}\text{E}$  longitude which passes through Allahabad. Since the east-west extent of India is vast so a time difference of two hours of found in the local time. Local time of Lucknow and Chennai are almost same because they lie along the same longitude.
137. (c) Narora- Uttar Pradesh, Rana Pratap Sagar- Rajasthan, Tarapur- Maharashtra, Kalpakkam-Tamil Nadu.
138. (a)
139. (c) Narmada and Tapi – the west-flowing rivers, forms narrow and elongated catchment areas. Their great velocity and higher gradient make delta formation impossible. The east-flowing rivers, greater in number, have wide catchment area and form large deltas.
140. (b)
141. (c) The Earth is closest to the Sun or at its Perihelion- about two weeks after the December solstice, i.e. 3 January and farthest from the Sun or at its Aphelion, about two weeks after the June solstice, i.e., 4 July.
142. (b) Tista, Subansiri, Sankosh and Lohit are the tributaries of river Brahmaputra.
143. (a) Acid precipitation affects stone primarily by dissolution and alteration. The chemical smoke expelled from various coal burning powerplant causes production of acid rains.
144. (d) Dakshin Gangotri was the first scientific base station of India in Antarctica, part of the Indian Antarctic Program. Now it is being used for the purpose of supply base and transit camp.
145. (a) Ooty → Shimla → Darjeeling → Mussoorie  
2,240 mt    2,205 mt    2,042 mt    2,006 mt.
146. (b) Groundnut cultivation is done mostly in Andhra Pradesh, Telangana, Tamil Nadu, Gujarat, Karnataka and Maharashtra.
147. (c) Laterite soil is Characterized by the possession of iron oxides with red colour. Nitrogen, Phosphorus and potash are not present in proper quantity so it shows low fertile texture. Tapioca and cashewnuts are generally grown in such soil. This soil is found less or more in states- Odisha, Maharashtra, Andhra, Tamil Nadu, Karnataka, Meghalaya and West Bengal.
148. (a) During winter the polar jet stream causes rain fall in mediterranean region. Monsoon Climate is related with wind direction during high temperature.
149. (b) All the given factors in the options (eg. location, thermal contrast, upper air circulation and the Himalayan mountains) are responsible for the monsoon type of climate in India.
150. (a) On the basis of Geographical area -  
The largest state is Andhra Pradesh - (160,205km<sup>2</sup>)  
The Smallest state is Uttarakhand - (53,483 km<sup>2</sup>)  
Chhatisgarh - (135,191 km<sup>2</sup>)  
Telangana - (114,840 km<sup>2</sup>)  
Tamil Nadu - (130,058 km<sup>2</sup>)
151. (d) **Mediterranean** - Temperature range is moderate with warm to hot summers and mild winters.  
**Marine West Coast** - Temperature cycle is moderated by marine influence.  
**Dry mid latitude** - Strong temperature cycle with large annual range. Warm summers to hot and cold winters to very cold.  
**Moist continental** - Warm summers and cold winters with three months below freezing. Very large annual temperature range.



152. (a) Chemical weathering - Oxidation  
 Mechanical weathering - Plant roots  
 Glacial deposits - Till  
 Deposition by ground water - Stalactite
153. (d) Only Agartala is connected with Indian Railways because Imphal, Kohima and Aizawl are not situated on the route of direct railway lines and also due to mountainous zones.
154. (a) Baghelkhand - Madhya Pradesh  
 Kuttand - Kerala  
 Saurashtra - Gujarat  
 Rarh - West Bengal
155. (b) **City** - **Earthquake zone**  
 Kolkata - Zone III  
 Guwahati - Zone V  
 Delhi - Zone IV  
 Chennai - Zone II
156. (a) **Lake** - **Type**  
 Ashtamudai Kayal - Lagoon  
 Himayat Sagar - Artificial (Sweet water)  
 Dal Lake - Residual (Sweet water)  
 Tsomgo Lake - Glacial
157. (b) **Farming area** - **State**  
 Doab - Punjab  
 Char - Assam  
 Maidan - Karnataka  
 Terai - Uttar Pradesh
158. (c) **Steel mill** - **State**  
 Kalinganagar - Odisha  
 Vijayanagar - Karnataka  
 Salem - Tamil Nadu  
 Durgapur - West Bengal
159. (c) The Kuroshio current is warm due to variations in water level in the northern region of the East China sea and neighbour ocean.
160. (d) Manufacturing sector is responsible to some extent for environmental degradation. Some building material such as Cement, sand, bricks, stones and timbers are taken from nature which disturb ecological balance.