CHAPTER

3

Geography

Part I Physical Geography

The Universe

- The vast surrounding space in which stars, planets, satellites as well as our Earth and all the objects on it is called Universe.
- Nobody knows how big our Universe is or it has any limits. All the heavenly bodies exist in it. The billions of stars exist in the Universe are not distributed uniformly in space. These stars occur in the form of cluster of billions of stars called galaxies. The Universe is made up of over 90% hydrogen. On the scale of atoms most of these atoms are formed into gas stars.
- Among the various theories on the origin of Universe including the steady state and the pulsating theories, the one most widely accepted has been the Big Bang theories.
- The Universe comprises of galaxies that are huge, congregation of stars held together by the forces of gravity. Galaxies occur in three structural forms : Spiral, Elliptical and Irrelugar.
- Each galaxy may contain as many as 1000 million stars. It is believed that Earth's own galaxy known as Milky Way alone contains as many as 100000 million stars.

Unit of Measurement

- **Light Year** A light year is unit of distance. It is the distance that light can travels in one year, *i.e.*, $(9.46 \times 10^{12}$ km).

  1 light year $= 300000 \times 365 \times 24 \times 60 \times 60$ km.
- **Parsec** It is another unit of measurement used in astronomy. It is equal to 3.26 light year. Parsec is one of the oldest methods for measuring the distances to stars.
- **Astronomical Unit (AU)** This unit is used to measure distances within the solar system. The astronomical unit is the average distance between Sun the Earth, *i.e.*, 149597870 km.

Celestial Bodies

Galaxy

Galaxies are giant assemblies of stars, planets, gases and dust, they are not distributed uniformly in space. These stars occur in huge bunches or cluster. They are so big that they have sometimes been called 'Island Universe'.

Big Bang Theory

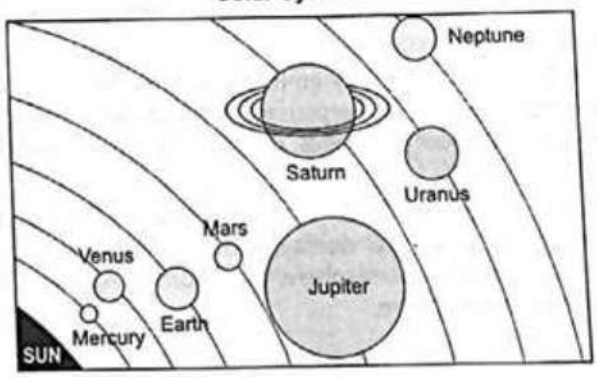
- The Big Bang Theory was postulated in 1950 and 1960, it explains the origin of Universe.
- It says that all the matter in the universe was originally a concentrated lump called primeral atom.
- Big Bang was an explosion that occured 15 billion years ago, leading to the formation of galaxies of stars and other heavenly bodies.
- In the solar system the planet,to the Sun is **Mercury** and the planet farthest from the Sun is **Neptune**.
- **Pluto** is now considered as a dwarf planet, earlies it used to be ninth planet of the solar system.
- The size of the solar system has been estimated to at about 10^5 AU.
- The solar system is dominated by the Sun which accounts for almost 99.9% of the matter in the whole solar system.
- The Sun is the only source of all energy in the solar system. The planets does not produce light of their own. Almost all the energy of the solar system is derived from the Sun.
- All planets except **Uranus** and **Venus** rotate around Sun counter clockwise.

- Galaxies are found in different shape and size.
- Ours Nearest galaxy is Andromeda.
- Our Earth lies in spiral type of galaxy called Milky Way. It consists of over 100 billion stars.

Constellations

These are clusters of stars organised into distinct shapes and figures and named accordingly. **Hydra** is the largest constellation.

Solar System



Stars

- Stars are the heavenly bodies like the Sun that are extremely hot and have light of the own.
- Our Sun is a star.
- For seeing brightest star is Sirius, also called Dog star and closest to Earth is Proxima Centauri.
- Stars are made up of hydrogen gas, helium and dust.
- The stars are born, grow old and finally die.
- Stars die due to a great supernova explosion and left neutron star which is called **blackhole.**

Life Cycle of Star

Proto Star → Red Giant → Nova and Supernova → White Dwarf Way → Nuetron Star → Pulsars → Black Holes

Black Hole

- Black Hole is the result from the collapse and compaction under gravity, of a star of mass greater than three times that of the Sun, at the end of its life cycle.
- Nothing, not even light can escape from its gravity.
- S Chandrashekhar had predicted an upper limit to the mass of stars, which they either explode or form a black hole. This is known as Chandrashekhar limit.

Solar System

The Solar System consists of the Sun, the eight planets and their satellites and including all the heavenly bodies such as asteroids, comets and meteors. The Sun is at centre and all the heavenly bodies moving around it in elliptical motion.

The Sun

The most important centre member of our solar system.

Sun Statistics

- **Diameter** 1384000 km.
- **Temperature** 6000°C at surface.
- **Distance from Earth** 149.8 million km.
- Made up of hydrogen—70%, Helium—28%, other 2.5%.
- Sun is brightening due to **nuclear fusion** is taking place.
- Sun's glowing surface is called **photosphere** above the photosphere is the **chromosphere.**
- Sun revolves in elliptical shape. It takes 250 million years to complete one revolution, it is also known as '**cosmic year.**'
- The glowing surface of the Sun, that we see is called the Photosphere. Above the photosphere is the red coloured chromospheres and beyond it is magnificent Corona, which is visible during eclipses.
- The Sun is continuously emitting streams of protons in all directions either as persistent spiral streams called solar winds or as bours of incadescent material called Solar Flares.
- The constituent particles of solar wind are trapped by the Earth's magnetic field and enter the Earth's upper atmosphere as auroral displays, described as Aurora borealis in the Northern hemisphere and Aurora Australis in the Southern hemisphere.
- The planet travels with the Sun through million of stars in our galaxy at a speed of about 70000 km per hour.
- The Sun is about 150 million kms away from the Earth.
- Light (at the speed of 300000 km/second) takes about 8.5 minutes to reach the Earth from the Sun.

Sunspots and Solar Activity

Many photographs of the Sun had taken in white light showing many dark spots which are called Sunspots. It appears dark by contrast with the solar surface because of having a somewhat **lower temperature** of about 4500 K. It is characterised by intense magnetic fields.

Planets

- A planet is a heavenly body that moves in an orbit around a star, such as the Sun.
- In our solar system there are nine planets. (But Pluto is now not considered in the family of 9 planets).

Point to be Remember

- **Inner planets** or **Terrestrial planets** Mercury, Venus, Earth, Mars.
- **Outer planets** or **Jovian planets** Jupiter, Saturn, Uranus, Neptune.
- **All planets** move in orbits that are very slightly elliptical.
- **Only five planets** Mercury, Venus, Mars, Jupiter and Saturn—are visible to the naked eyes.

Mercury

- Mercury is nearest to the Sun.
- **Rotation** 58.65 days.
- **Revolution** 88 days **(Fastest in Solar System).**
- It has no satellite.

Venus

- Also known ***Earth's twin, Morning star, Evening star.***
- Brightest heavenly body after Sun and Moon because of (70% albedo).
- **Closest Planet to Earth.**
- **Hottest planet** in our solar system because of 97% CO_2.
- Slightly smaller than Earth (500 km less in diameter).
- Rotates clockwise (backward) unlike others **(East to West).**
- It has no satellite.
- **Slowest rotation** period in our solar system (257 days).
- Almost equal rotation and revolution (224.7 days).

Earth

- Earth is the largest of the inner planets.
- Earth is known as the "watery planet" or the "blue planet" due to the presence of huge amount of water on it.
- It is third planet from the Sun and the fifth in size.
- Earth is the only planet which provides life on it. It has a large quantity of oxygen which supports life.

Mars
- Mars is the 'fourth' nearest planet to the Sun.
- Mars is called *'Red Planet'*.
- Revolution period : 687 days.
- Rotation period : 24.6 hrs (almost equal to Earth)
- It has two satellites—**Phobos and Deimos.**
- It has signs of water.
- There is possibility of life.
- Various space missions have been sent *e.g.* Vikings, Pathfinder, Mars Odyssey.

Jupiter
- Largest of all planets almost 11 times of Earth.
- Called *'Lord of the Heavens'*.
- A great red spot (a cyclone) is detected on it.
- *Fastest rotation* time in our solar system is 9.8 hrs.
- **Revolution** 12 yr.
- It has 16 satellites (prominent are Europa, Gannymeda and Callisto).
- Europa resembles the living condition like of Earth.
- Gannymeda is the largest satellite of our solar system.

Saturn
- Second largest planet (in size) after Jupiter.
- **Least density** of all (30 times less dense than Earth).
- **Revolution** 29 yr.
- **Rotation** 10.3 hrs.
- More than 39 satellites (prominent is Titan).
- It has system of ring (3 well defined).

Uranus
- Identified as a planet in 1781 by William Hershal.
- Rotates from **North to South** as it is inclined at an angle of 98° to its orbit.
- **Revolution Period** 84 yr.
- **Rotation Period** 10.8 yr.
- Like Saturn it is also surrounded by a system of nine faint rings.
- It has 21 satellites (Miranda, Ariel, etc.)

Neptune
- Appears as 'Greenish star' because of presence of 'Methane'.
- **Revolution period** 165 yr.
- **Rotation period** 15.7 days.
- Discovered by JG Galle of Berlin in 1846.
- Prominent satellite are 'Trion and Neroid'.

Pluto
- It is known as **Dwarf Planet**.
- Discovered by *CW Tombaugh* (USA) in 1930.
- **'Smallest planet'** in our solar system.
- It is also known as 'Black Planet'.
- **Revolution period** 248 yr.
- **Rotation period** 6.4 days.
- One satellite (Charon) which is nearly half the size of Pluto.
- *Now Pluto has lost its status as 9th planet.*

Points to be Remember
- Pluto's orbit is highly elliptical and as a result it intersects the orbit of the Neptune. Therefore, in its journey around the Sun; Neptune was the farthest planet from 1979 to 1999.
- It will again happen after 228 yr.

Asteroids
- Asteroids or minor planets circle in a broad belt between the orbits of Mars and Jupiter.
- It is the debris left over from the formation of inner planets.
- Also called 'Planetoids' or small planets.
- They are chunks of rock covered in frozen gases.
- Too small to retain any atmosphere of their own.
- Largest is Ceres (Diameter : 1025 km).
- Apophis-asteroid is likely to hare an impact on earth in april 2036

Comet
- Comet is a member of the Sun's family, part of the solar system.
- Comet travels on a path or orbit around the Sun on a regular schedule.
- It has a head and a tail. Its tail originates once it gets closer to the Sun.
- May have originated in a huge cloud the 'oort cloud' that is thought to surround the solar system.
- The brightest part of the comet is head corona.
- It is made up of solid matter combined with gases.
- **Hailey comet** Reappears after 76 yr. Last seen in 1986.
- **Comet Shoemaker Levy 9** Collided with Jupiter between July 16 and July 21, 1994. It provided an opportunity to us to observe the changes because of the collision. A comet becomes visible only when it travels close to the Sun.

Meteors (Shooting Stars)
- They are often seen in sky. Shooting with great speed producing a trail of light.
- Meteors are fragments of rock coming towards the Earth, formed due to the Colision of asteroids with one another.
- Largest known was of 70 tonnes which landed in Namibia in prehistoric times.

Moon

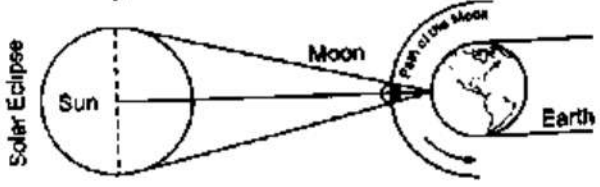
- The Moon is only satellite of the Earth.
- Only 59% of Moon surface is directly visible from the Earth.
- It takes 27 days, 7 hr, 43 min and 11.47 sec to complete one revolution around the Earth.
- Rotates on its axis in exactly the same time as that in revolution. That is why we see only one side of the Moon.
- **Circumference** 11000 km.
- **Distance from the Earth** 382200 km.
- Moonlight takes 1.3 sec to reach on the Earth.
- US Astronaut Neil Armstrong and Edwin Aldrin reached Moon on July 21, 1969 on Apollo-XI (Landing spot is called ('Sea of Tranquility').)

Phases of the Moon

- Due to its spherical shape, only one-half of the Moon gets illuminated by the Sun.
- Visible surface of Moon is not the same everyday because it revolves round the Earth.
- Visible shape of the Moon are referred to as the phases of the Moon.
  (a) **New Moon** This is the phase when the Moon is between the Earth and the Sun and consequently the part of the Moon facing us is in complete darkness.
  (b) **Full Moon** This occurs on the 14th day after the new Moon. The Moon at this time shows its fully lighted surface.

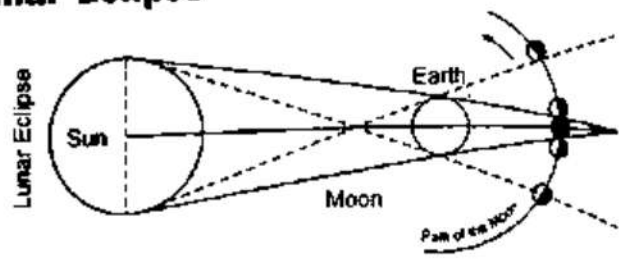
Eclipses

Solar Eclipse



- When Moon comes between Sun and Earth.
- It can be partial or total.
- It will happen only on a new Moon day when the Moon is in line with the Sun.
- However, due to the inclination of the Moon's orbit, A solar eclipse doesn't occur on every new Moon day.

Lunar Eclipse



- When Earth comes between Sun and Moon.
- Occurs only on a full Moon day but it doesn't occur on every full Moon day because the Moon is not in the same position in relation to that of the Earth and the Sun on every full Moon day.

The Earth

- Only planet of our Solar System where life exists
- Also called 'Blue Planet'.
  Circumference 40008 km (Polar) and Equatorial circumference 40075 km.
- **Area** Nearly 510 million sq. km.
- 5th largest planet of our solar system.
- **Perigee** Nearest position of the Earth to the Moon (356000 km).
  Apogee Farthest position of the Earth from the Moon (407000 km).
  Apihelion Farthest position of the Earth from the Sun on July 4, about 152 million km.
  Perihelion Nearest position of the Earth to the Sun on January 3, about 147 million km.
- Its 70% part is filled up of water.
- Shape is oblate ellipsoid or oblate spheroid.
- It is third planet of our solar system.
- It takes 24 hr to complete one rotation.

Composition of the Earth

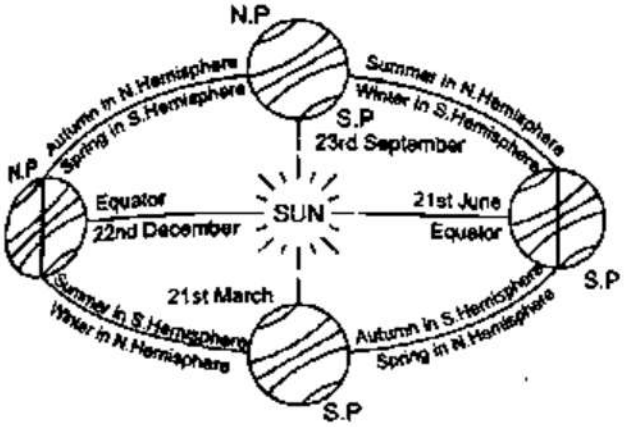
- Made up of over 100 elements.
- The following 8 elements are important

Oxygen	:	46.5%
Silicon	:	27.72%
Aluminium	:	8.13%
Iron	:	5.01%
Calcium	:	3.63%
Sodium	:	2.85%
Potassium	:	2.62%
Magnesium	:	2.09%

Earth Movements

Rotation

- Earth rotates Westward to Eastward (anti-clockwise) in 23 hrs 56 min and 4091 sec.



- Due to this rotation days and night are occurred there and also there is a change in the direction of wind and ocean currents.
- Rotation velocity at equator is 1667 km/hr and at poles it is zero.
- Axis is an imaginary line passing through the centre of Earth and running from North to South at an angle of 66.5° to the plane of the Earth's orbit.
- The longest day in **North Hemisphere** is 21 June (summer solstice) while shortest day is on 22 December (winter solstice) *vice-versa* in South Hemisphere.
- Days and nights are equal at the equator.

Revolution

- Earth takes 365 days, 5 hr. 48 min and 45.51 sec to complete a revolution.
- Due to the revolution there is a change in season and also due to tilt of Earth's axis at 66.5.

The Four Seasons

- **Spring** March 21, this is the season of Spring in the North Temperate Zone. The Sun is directly overhead the equator. (vernal equinox)
- **Summer** June 21, The North Temperate Zone experiences summer because the Sun is directly overhead the Tropic of Cancer. (summer solstice)
- **Autumn** September 23, The North Temperate Zone experiences autumn because the Sun returns to the equator. (autumnal equinox)
- **Winter** December 22. The North Temperate Zone experiences winter. The Sun is at the Tropic of Capricorn. (winter solstice).

Internal Structure of the Earth

The Earth's Crust

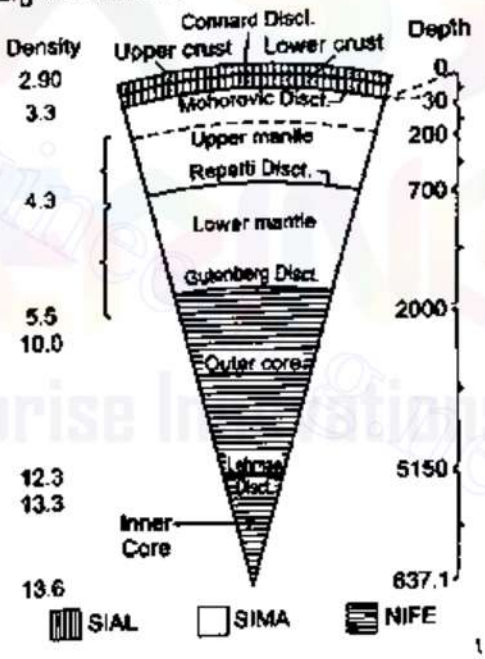
- The outermost solid cover or shell of the Earth is known as the Earth's crust.
- The thickness of the crust is about 30 km.
- The density of the rocks in the Earth's Crust ranges from 2.7 to 3 g/cc (grams per cubic centimeter).
- The upper part of the crust consists of silica and aluminium in greater proportions. That is why, it is called 'Sial'.
- Whereas the lower part of the crust is called 'Sima' because the proportion of silica and magnesium is higher in this part.

Mantle

- This layer lies below the crust.
- Its thickness is about 2900 km and the density of substances in the mantle ranges from 3.0 to 4.7.

Core

- The earth's core lies below the mantle. Its thickness may be about 3471 km.
- Its radius is 6371 km.
- It is divided into two parts the outer core and inner core. The outer core is probably in a liquid state and the inner core in a solid state.
- The core mainly consists of iron with some amount of nickel and sulphur (NIFE).
- After the mantle, the earth's density goes on increasing rapidly towards its centre and finally is more than 13.
- The temperature of the central part of the earth may be about 5000°C.
- Discontinuties within Earth layers.
  Mohorvic discontinuity — Between lower crust and upper mantle.
  Gutenburg discontinuity—Between mantle and core.



Longitude

- It's an imaginary line. Measured in degrees West to East of Greenwich from 0° to 180° meridian.
- It is the angular distance measured from the centre of the Earth.
- At equator
  1° = 111 km.
  30° N or 30° S = 96.5 km goes on decreasing this way until it is zero at the poles.
- Longitudes have very important functions to help in determining local time in relation to Greenwich Mean Time (GMT).

Antipodal Points

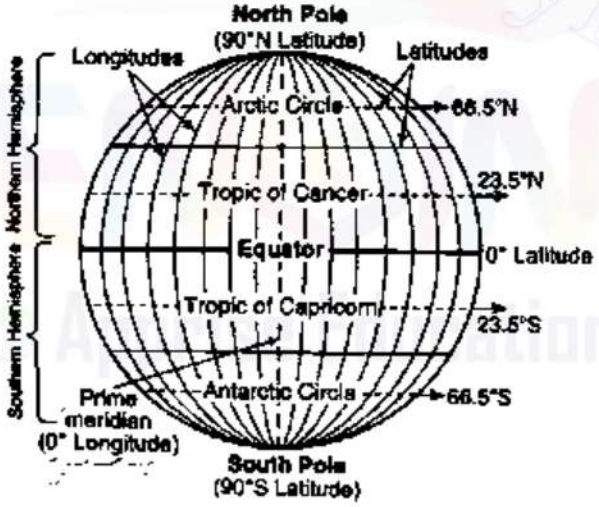
- 180 meridian (International Date Line) lies exactly opposite to 0° meridian. Such points are known as **Antipodal points**.
- Earth is divided into 24 longitudinal zone.

4 min = 1°; 1 hr = 15°

Latitude

- Latitudes is the angular distance of a point on the Earth's surface, measured in degrees from the centre of the Earth.
- Latitude lines drawn parallel to the equator.
- One degree latitude = 111 km (Approx.)
- Each degree is subdivided into 60 min and each min into 60 sec.
- The equator represent 0° latitude.

North Pole = 90° N
South Pole = 90° S
Tropic of Cancer = 23.5° N
Tropic of Capricorn = 23.5° S
Arctic Circle = 66.5° N
Antartic Circle = 66.5° S



Standard Time and Time Zones

- Most countries adopt their standard from the central greenwich mean time.
- The whole world has been divided into 24 standard time zones.
- Each zone, therefore, is separated by 15° longitudes or by one hour thus, 15° = 1 hour.
- Larger countries like USA, Canada, Russia having greater East-West stretch have to adopt several time zone.
- Russia has 11 time zone.
- India has only one time zone. The Indian Government has accepted the meridian of 82.5° East (near Allahabad) for the standard time which is 5 hr 30 min ahead of Greenwich Mean Time.

Greenwich Meridian (the Prime Meridian)

- Marks the starting points of every time zone in the world.
- GMT is World Time and the basis of every world time zones, which sets the time of day and is at the centre of the time zone map.
- Greenwich defines both time and place for the whole world.
- Greenwich, England, Longitude 0°0'0", latitude 51°28'38" N (North of equator) has been the home of Greenwich Mean Time (GMT) since 1884.

International Date Line

- It is the 180° meridian running over the Pacific Ocean deviating at Fiji, Soma and Gilbe Islands.
- This meridian is considered to be deviated at the land masses so that the travellers do not feel inconvenient.
- One who crossing the Date Line from West to East repeat a day and travellers crossing it from East to West lose a day.

Atmosphere

- The envelope of air that completely surrounds the Earth is known as atmosphere.
- The atmosphere extends to about 1000 km from the surface of the Earth. But 99% of the total mass of the atmosphere is found within 32 km.
- Atmosphere contains life-giving gases, like oxygen for man and animal, and carbondioxide for plants.
- It also acts like a blanket, like greenhouse and thus keeps the Earth warmer then it would otherwise be.
- It regulates the heat balance of the Earth and also protects us from the harmful ultraviolet radiation of the Sun. It serves a storehouse for water vapour, which leads to precipitation and hence, facilitates the hydrological cycles.

Composition of Air

Nitrogen	78.03
Oxygen	20.99
Argon	0.93
Carbondioxide	0.03
Hydrogen	0.01
Neon	0.0018
Helium	0.0005
Krypton	0.0001
Xenon	0.000005
Ozone	0.0000001

Structure of Atmosphere

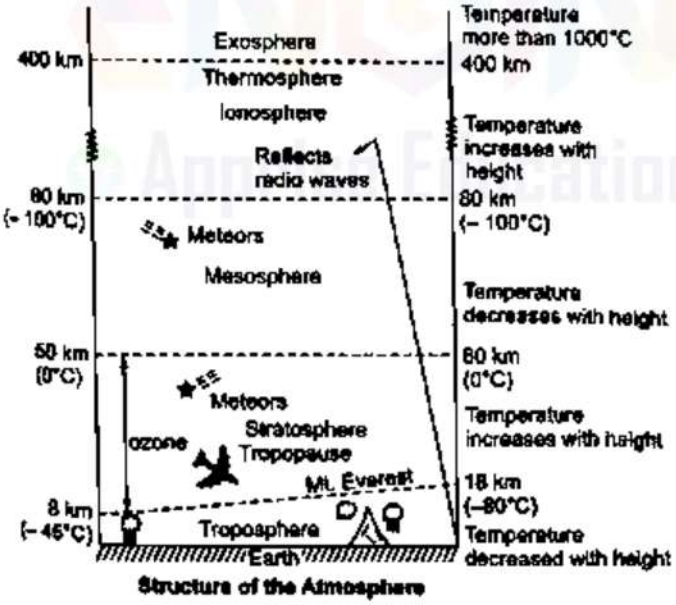
The atmosphere can be divided into five zones

Troposphere

- This is the layer nearest to Earth's surface.
- All weather phenomenon occur here.
- Thickness varies 8 km at poles to 16 km at equator.
- Water vapour and dust exsist in this layer.
- In this, at every 165 m there is a drop of 1° C (Normal Lapse Rate of Temperature).
- Tropopause separates troposphere from stratosphere.
- Height of troposphere change according to season in summer it goes high in winter down's low.

Stratosphere

- Region of uniform temperature extending from 16 km to 50 km height.
- Free from cloud, dust and water vapour.
- It's average height is 20-50 km.
- This is the layer where aeroplane flies.
- This sphere is free from any climate changes.
- Contains **ozone** (25-30 km from Earth's surface) region being called ozonosphere.
- Ozone absorbs the ultra-violet rays from the Sun. This layer has a comparatively higher temperature due to the absorption of ultraviolet radiation from the Sun. (Temperature increases as we go up).
- Stratopause separates stratosphere from mesosphere.



Structure of the Atmosphere

Mesosphere

- **Mesopause** separates **mesosphere** from **ionosphere**.
- Upto height of about 80 km.
- In this sphere temperature is decreased with increase in height, and falls to about 1000° C at 80 km height.

Ionosphere

- Upto a height of about 500-600 km.
- Due to presence of large amount of ions present in this sphere cosmic rays are present here.
- Because of presence of this sphere it reflects radio waves back to the Earth. This makes radio communication possible. It protects Earth from falling meteorites as most of them burn out in this region.

Exosphere

- Upper limit of this sphere is quite uncertain.
- In this sphere Earth gravity is extremely weak.
- The outer part of exosphere is called magnetosphere.
- Van Allen's Radiation Belts
  The ionized particles pressure increase in frequency with increasing heights. There are two belts in the upper atmosphere having a high concentration of ionized particles. This is the last sphere of the atmosphere.
- The final boundary between the Earth and the outer space is called 'Magnetopause'.

Weather and Climate

- **Weather** is the description of the atmospheric condition of a particular place at a particular time for a short period of time.
- **Climate** is the composite or integrated picture of the weather conditions over a long period of time.
- Climate data is based on calculated averages of data recorded over a period of 35 years. The classical period of 30 years, as defined by WMO.

Humidity

- It refers to the content of water vapour present in the gaseous form at a particular time and place.
- Humidity is measured by **Hygrometer**.

Humidity Capacity

It refers to the capacity of an air of certain volume at certain temperature to retain maximum amount of moisture content. Humidity capacity is directly related with temperature *i.e.*, higher the temperature, higher the humidity capacity and lower the temperature lower the humidity capacity.

Types of Humidity

Absolute Humidity

The total weight of moisture content (water vapour) per volume of air at definite temperature is called absolute humidity. It change with the change in temperature. The absolute humidity decreases from equator towards poles and from oceans to the continents.

Specific Humidity

It is defined as the mass of water vapour in grams contained in a kg of air and it represents the actual quantity of moisture present in definite air.

Relative Humidity

It is defined as ratio of the amount of water vapour actually present in the air having definite volume and temperature (*i.e.*, absolute humidity) to the maximum amount the air can hold (*i.e.*, humidity capacity).

$$\therefore \text{ Relative Humidity} = \frac{\text{Absolute Humidity}}{\text{Humidity Capacity}} \times 100$$

Saturated air The air having 100% relative humidity is called saturated air.

Dew point The temperature at which an air becomes saturated is called dew point.

Atmospheric Pressure

- Atmospheric Pressure is the pressure at any point on the surfaces of the Earth due to the weight of the column of air above that point
- One atmospheric pressure (76 cm of mercury) = 760 mm of Hg = 1013.25 milibars (mb).
- The modern metric unit of pressure measurement is the milibar (mb), one milibar being equal to the pressure necessary to support 0.75 mm of mercury column.
- The mean sea level pressure of the atmosphere is 1013.2 mb.
- Atmospheric pressure is affected by altitude, by temperature and by Earth rotation.

Pressure Belts

Equatorial Low Pressure Belt (or Doldrums)

- From 5° North to 5° South.
- Tremendous heat on equator thus warm air rises creating low pressure. In this region wind speed is very low, that's why called Doldrums (Belts of Calm).

Tropical High Pressure Belt (Horse Latitudes)

- From 30° to 35° North and South.
- Usually high temperature in this region except two months
- Due to high pressure in this region there is difficulty to cross this region by a ship.
- Here the pressure is high, although high temperature because here pressure depend on the rotation and movement of air, (as winds from Doldrums belt rises up and accumulate here. Also winds from Sub-Polar Low Pressure Belt accumulate here)

Sub-Polar Low Pressure Belt

- From 60° to 65° North and South.
- In this region low pressure is created because of intense high pressure at the poles.

Polar High Pressure Belt

- From 65° to 90° North and South.
- High pressure exist due to very low temperature here.

Chart

5° N to 5° S	—	Doldrum
5° to 30° N and S	—	Trade Winds
30° to 40° N and S	—	Horse Latitudes
35° to 60° N and S	—	Westerly Winds
40° S	—	The Roaring Forties
50° S	—	The Furious Fifties
60° S	—	The Shrieking Sixties

Winds

- Winds blow from areas of high atmospheric pressure to those of low pressure. There is low pressure about the equator and at the Arctic and Antarctic circles and high pressure near the tropics.

Types of Winds

- Three broad categories are
  - (a) **Regular Winds** Also known as **Prevailing winds** and **Planetory winds**, *e.g.*, Trade winds, Westerlies, Polar Easterlies.
  - (b) **Periodical Winds** These are the winds which blow seasonally. *e.g.*, Monsoons.
  - (c) **Variable Winds** Cyclones and other local winds are known as variable winds.

Trade Winds

- These are steady currents of air blowing towards equatorial low pressure from North Eastern and South Eastern subtropical high pressure area 30°N and 30°S. Trade in German means 'Track'. To blow 'trade' means 'to blow steadily in the same direction.'

Westerlies

- It blows from subtropical high pressure to sub-polar low pressure belt between 30° and 60°, on either side of Equator.
- It is also known as 'Roaring Forties or Furious Fifties and Shrieking Sixties in the Southern hemisphere as they gather force in the absence of any land mass.

Polar Easterlies

- It moves from high pressure to sub-polar low pressure areas.
- These are deflected by the Earth's rotation to become East winds or Polar Easterlies.

Monsoons

- It blows over and above the Indian ocean.
- They may be regarded as land and sea breezes on a much larger scale changing not with day and night but with the season.
- In winter monsoon blow from the vast Asiatic landmass towards the Indian ocean, while in their direction reverses itself.
- Summer monsoons account foremost of rainfall in our country.
- They blow from the sea to land in summer and in winter it blows from land to sea.

Local Winds

Bora	• Cold, dry winds blowing outwards from Hungary to the North of Italy (Near Adriatic Sea).
Blizzard	• Very cold winds in Tundra region.
Brickfielder	• Hot wind in Australia.
Chinook	• Hot, dry wind in Rockies also called *snow eater*.
Foehn	• Hot, dry wind in the Alps.
Haboob	• It blows in Mid-day in May and September over North and North-East Sudan with thunderstorm that why visibility is very low here sometime it make rain heavily.
Khamsin	• Hot, dry wind in Egypt.
Levanter	• Very cold wind in Spain.
Mistral	• Very cold wind, which blows low from the Alps over France.
Kalbaisakhi	• Warm, North India
Berg	• Warm South Africa
Zonda	• Warm Andes
Harmattan (Doctor)	• Warm Guiena Coast.
Norwester	• Hot wind in New Zealand.
Punas	• Cold, dry wind blowing down towards the Western side of Andes.
Santa Ana	• Hot wind in South California.
Sirocco	• Hot, moist wind from Sahara to Mediterranean sea.
Solano	• Hot, moist wind from Sahara towards Siberian Peninsula.

The Jet-Stream

- The jet-stream is a system of upper-air westerlies. It gives rise to slowly moving upper-air waves. In the upper-air waves are some narrow zones in which wind velocities up to 250 knots are observed in some air streams. This phenomenon is called the Jet-Stream. They develop just below the tropopause over areas of very steep pressure gradient on the surface.

Land and Sea Breezes

- Land gets heated sooner than water and it also cools down sooner.
- Thus, during day time land is hotter than sea while at night the reverse is the case.
- Heat lowers pressure. Winds thus blow from sea to land during the day and from land to sea during the night.
- These are respectively known as the sea breeze and the land breeze.

Clouds

- Differentiation of clouds is based on average height of cloud, we divided 10 types of cloud in 4 groups according to their height.

(a) **High (mean height 5-14 km)**
- (i) Cirrus
- (ii) Cirro-cumulus : It forms the mackerel sky
- (iii) Cirro-stratus (produced halo)

(b) **Middle (mean height 2-7 km)**
- (i) Alto-cumulus : woolpack clouds sheep cloud
- (ii) Alto-stratus
- (iii) Nimbo-stratus

(c) **Low (mean height 0-2 km)**
- (i) Strato-cumulus (ii) Stratus
- (iii) Cumulus

(d) **Cumulo-nimbus** (Thunder clouds), caused heavy precipitation.

Precipitation

- Precipitation (also known as the classes of hydrometers) is any product of condensation of atmospheric water vapour that falls under gravity. The main forms of precipitation includes drizzle, rain, snow, graupel and hail.
- On the basis of its origin, it may be classified into three main types—conventional, orographic and cyclonic or frontal.
  - (a) **Conventional Precipitation** It is caused by convectional ascent of warm and humid air to great heights. It is heavy but highly localized, occurs mostly during the days and is associated with minimum amount of cloudiness.
  - (b) **Orographic Precipitation** It occurs when warm and humid air strikes landform barriers such as mountain ranges is forced to rise.
  - (c) **Cyclonic Precipitation** is associated with a cyclonic circulation.

EL Nino-Southern Oscillation

- EL Nino/La Nino- Southern Oscillation (ENSO) is a quasiperiodic climate pattern that occurs across the tropical Pacific ocean. roughly, five years. It is characterised by variaties in the temperature of the surface of the tropical eastern pacific ocean warning or cooling known as **EL Nino** as **La Nino** respectively and air surface pressure in the tropical western pacific the southern ocillation.
- ENSO causes extreme weather such as floods and droughts in many regions of the world. Developing countries dependent upon agriculture as fishing, particulary these bordering the Pacific ocean, are the most affected. **El Nino** in Spanish for the **"little boy"** and refers to the christ child, because periodic warming in the pacific ocean near South Ameria is usually noticed aroung christmas.

Rainfall

Precipitation occurs as a result of ascending current of air, such ascent results in cooling and saturation of air. Further cooling leads to condensation and precipitation. Ascent of air may take place under three different conditions in the atmosphere. These give rise to three major types of rainfall.

Types of Rainfall

Convectional Rainfall

In equatorial regions, there is uniformly high temperature throughout the year. This leads to intense heating of land and near the radiation of heat to the atmosphere. The heated air near the ground expands in volume and ascends to high levels and then ascending currents of hot and humid air result in

condensation and formation of cumulo-nimbus clouds which give rise to torrential rainfall in the afternoon between 2 pm and 4 pm.

Orographic or Relief Rainfall

It occurs when the air is forced to ascend up the slope of mountain range or plateau which lies in its path. Such ascent leads to cooling of air causing condensation and precipitation. Precipitation is concentrated on **Windward** slope of mountain range which faces the wind. After precipitation it descends on the opposite or Leeward side. Descend of air results in compression and air gets warmed up. Therefore, the Leeward side is relatively dry called rain-shadow region.

Cyclonic Rainfall

Cyclones are formed to fill up the intense low pressure developed differential heating of land and water. So, the air coming from the sea brings with them heavy rainfall.

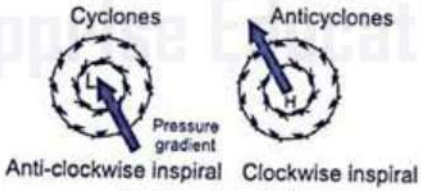
Tropical cyclones give rainfall to East coast of continents in the tropical belt, *e.g.*, Odisha in India.

Acid Rain

- It is precipitation charged with an excessive amount of acid droplets formed when oxides of sulphur and nitrogen, released by burning of hydro carbons, are converted to acids in the atmosphere.
- Acid rain leaches crucial minerals like calcium and magnesium, which are essential for plant growth, from the soils.
- It is now emerging as a major problem in the developing world where energy use has surged and the use of sulphur containing coal and oil, the primary sources of acid emissions, is very high.

Cyclones

- Sometimes there happens to be low pressure in the middle and high pressure all around it. In this, the winds blow in a circular manner in
  (a) Anti-clockwise direction in Northern hemisphere.
  (b) Clockwise direction in Southern hemisphere.

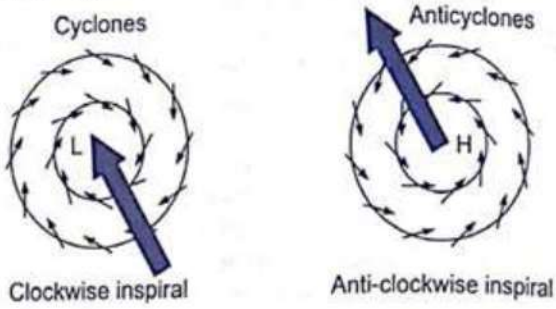


- These are known as
  (a) Cyclones — Indian Ocean
  (b) Hurricanes — West Indies
  (c) Typhoons — China sea
  (d) Willywillies — North-West Australia
  (e) Tornadoes — Coastal USA and Canada

In the temperate region, they occur due to the coming close and imperfect mixing of masses of air of contrasting temperature and humidity conditions (wave cyclones). In the tropical regions, they occur due to the intense heating up of air in some regions causing very low pressure in these locations.

Anticyclone

- If there is high pressure in the centre and low all round, winds blow outwards in clockwise and the sky clean up.
- This is anticyclone.



- Anticyclone is totally opposite to Cyclone.

Types of Climates divided by Koeppen

Tropical Rain Forest Climate

- It is also called equatorial type of climate or Selvas.
- Average monthly temperature 24° to 27°C.
- 5°-10° of equator, night and day equal.
- There is lot of difference between night and day temperature.
- It is also called 'Belt of Calm or Doldrum'.
- Annual Rainfall is 250 cm.
- Evergreen dense forest are found. Trees are gregarious and there is competition for Sunlight.
- A lot of animal and plant species are found here.
- Main region of rain forest are Amazon Basin, Congo Basin, Indonesia.

Monsoon Climate

- Approximate 200 cm of heavy rainfall.
- Seasonal rainfall generally in summer.
- Vegetation—Deciduous forest.
- Complete seasonal reversal of winds.
- India (include South Asia) China.

Tropical Savanna Climate

- Approximate 150 cm of rainfall.
- Temperature constantly high and precipitation is seasonal in nature.
- Trees with longer roots, grassland dotted with scattered trees and fire resistant.

Tropical—Subtropical Hot Desert

- It observes lowest rainfall.
- Situated in the trade wind belt mostly in Western margins of continents.
- Greatest diurnal temperature.
- Vegetation—Xerophytic *e.g.*, Cactus.

Middle Latitude Desert Climate

- They are totally unlike the hot deserts. They have very cold winters.
- Mostly situated between 35°-50° N and S.
- They were found in deep interior of the continent.
- Tarim, Gobi, Russian, Turkistan and Central Iran

Tropical and Subtropical Steppes

- This type of climate is just transition belt between hot desert and humid climate and it occupies pole ward margins of the tropical and subtropical deserts.
- Abundance of grasses and shrubs.
- Known to be in different names

Prairies	North America
Pampas	South America
Velds	South Africa
Pustaz	Hungary
Downs	Australia
Canterbury	New Zealand
Steppes	Eurasia

Mediterranean Climate

- Condition—Dry summer and humid in winter.
- High temperature in summer (25°C).
- Winters are mild 4°C to 10°C.
- Location—In the Western coast of continents between 30°-45° North and South.
- Vegetation—Olives, grapevine grapes and citrus family fruits are found in abundance.
- Thick barks and long roots plant and trees are found.

China Type Climate

- Rainfall throughout the year.
- Average annual temperature 20°C.
- Location—Eastern coasts of continents between 25°-45° North and South.

West European Type Climate

- Location—Western side of continents between 40°-65° North and South.
- Summers are moderate to cools (15°-18°) winters mild (2°-10°) C.

Continental Type Climate

- Coldest winter month average—12° to −6.7°C and hottest summer months average 18°C to 21°C.
- In the interior parts of big continents.

Cool East Coast Climate

- Summer is long, warm and humid. Average temperature is 21° to 24°C.
- Winter temperature average—4° to 1.7°C for a period of 3-5 months.
- The corn belt of US has this type of climate so that it is known as 'Corn-Belt' climate.

Highland Climate

- Experienced in the mountainous regions.
- Here winds are stronger than at low levels.
- It is determined by elevation shape of highland, exposure to winds and location.
- **Vegetation** Vegetation are various as we move up.

Taiga Climate

- Cool and short summer (around 10°C) and very cold and long winter (below 0°C).
- **Vegetation** Coniferous forest are found, needle-leaf, composed of evergreen spruce and pine.
- Taiga means snow forests or coniferous forest.
- Annual range of temperature is highest (In Verkhoyansk, annual range is − 64°C).
- Total annual rainfall below 50 cm.
- These forests are the important source of soft wood and fur bearing animals.

Tundra Climate

- Summer are warm enough to melt the thick snow cover or small water bodies, with the result that land is water soaked and marshes. Swamps are common.
- **Vegetation** Lichens and Mosses.
- Precipitation less than 30 cm.
- Blizzards blow.

Lithosphere

- There are three major types of rocks. All rocks are discriminated by their features hardness and minerals which are found in it.

Igneous Rocks

- It is formed by the solidification of molten magma from the interior of the Earth.
- The most abundant of three (at least 95%).
- All other types of rocks originate from these rocks, i.e., why they are called Primary Rocks. e.g.,
  Granite Continental Rocks.
- Formed by solidification of magma beneath the Earth's surface. The cooling is obviously slow because of the heat at depths and crystals formed are large.
  Basalt Found on ocean beds.
  Volcanic Formed by the solidification of lava from volcanoes.
- Example of Igneous Rocks are granite, Pumic Stone, Basalt and Gabbro.

Sedimentary Rocks

- It is made up of weathered remains of igneous rocks, also contains organic matter from the remains of marine organism.
- It is also known as '**Stratified Rocks**' because of its layers.
- It comprises only about 5% of the Earth's crust but covers about 75% of the total land surface.

- **Examples are** Gypsum, chalk, limestone, all type of coal found in it (except Anthracite), shale, Gravel, Pebble, Sandstone (Petroleum also found in this type of rocks).

Metamorphic Rocks

- Those rocks metamorphize or change due to great pressure, intense temperature and the action of water and chemical activity are called metamorphic rocks.

Quartzite	:	From sandstone
Slate	:	From shale and mudstone
Gneiss	:	From granite
Marble	:	From lime stone, dolomite, chalk
Anthracite	:	From coal
Schist	:	From shale

The Continents

- It is believed that originally there was only one land mass called **Pangaea**. At that time, the universal ocean was called Panthalasa.
- It splits into two-Angaraland and Southern Gondwanaland.
- They drifted apart (still continuing) known as Continental Drift. A Wagener worked it upon.
- The sequence of continents areawise is: Asia, Africa, North America, South America, Antarctica, Europe and Australia.

Weathering

Weathering is the mechanical fracturing and chemical decomposition of rocks by natural agents at the surface of the Earth.

Types of Weathering

- **Physical or Mechanical Weathering** Disintegration of rocks due to temperature variations, fast action, wind action and unloading of confining superiorcumbent pressure but temperature is a key factor in physical weathering *e.g.*,
  (a) Block disintegration due to temperature change.
  (b) Shattering due to rain shower and heat.
  (c) Block disintegration due to frost.
  (d) Exfoliation due to temperature and wind.
  It is also known as onion weathering, refers to peeling off concentric shells of rocks due to combined actions of heat and wind in hot arid and semi-arid regions.
- **Chemical Weathering** Decomposition and disintegration of rocks due to chemical reactions is called chemical weathering *e.g.*,
  (a) **Solution** It refers to dissolution of soluble particles and minerals from the rocks with the help of water *e.g.*, Calciu Hydroxide is formed due to the reaction with water.
  Calcium carbonate ($CaCO_3$) is formed due to reaction of calcium hydroxide with CO_2.
  (b) **Oxidation** It is the process of reaction of atmospheric oxygen to form oxides. When water is mixed within oxygen its reaction with the numerals of the rocks form hydroxide and other oxides like iron oxide. *e.g.*,. Reaction of water with rock containing iron produces rust. Rust disintegrates the rocks.

Mountains

New Mountains or (Young Mountain)

- It came into existence after the continental drift.
- New folded mountain Andes, Rockies, Alps and Himalayas. They are also called as Alpine mountains.

Old Mountains

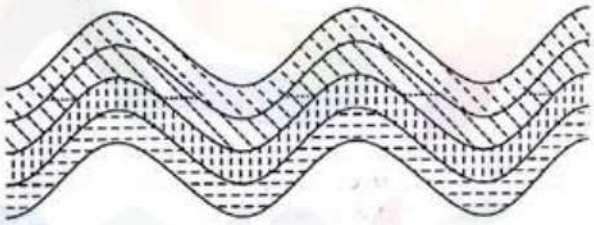
- It came into existence in pre-drift era, *e.g.*, Aravallis (India),
- Pennines (Europe),
- Appalachians (US)

Types of Mountain

According to its featers mountains are mostly divided into two parts.

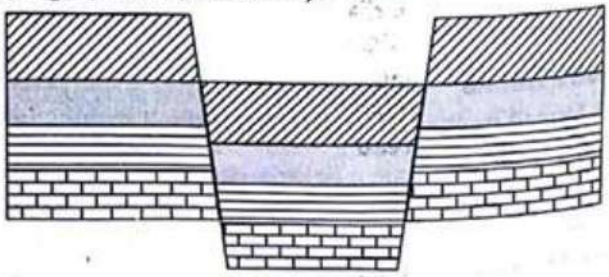
Fold Mountains

- Fold mountains are formed when the rocks of the crust of the Earth folded under stress, mainly by force of compressional. *e.g.*, Himalayas, Alps, Rockies, Atlas, Andes (all are big mountains).



Block Mountains

- These mountains are formed when the great blocks of Earth's crust may be raised or lowered. During the upliftment of structural mountains magma flows upwards into the crust after a gap of time its cool down and hardened beneath the surface. It contracts and overlying rock may crack into large blocks shifted up and down. An intense folding of rocks is generally followed by faulting of strata due to horizontal forces of tension. The land between the two parallel faults either rises forming Block Mountains or Horsts, or subsides into a depression termed as Rift Valley or Graben, *e.g.*, Narmada, Tapti and Damodar Valley. The Vosges in France and Black Forest in Germany and Salt range in Pakistan are cited as typical example of Block mountains (through which Rhine flows).



Volcanic Mountains

- It is formed as a result of volcanic erruption.

- *Some famous volcanic mountains are*

Etna and Vesuvius	Italy
Fujiyama	Japan
Cotopaxi	Andes
Ojos de Salado	Argentina/Chile (Highest active volcano)
Popcatepeti	Mexico
Mauna Loa and Kilauea	Hawaii (Most active Volcano)

Volcanic Mountain

Residual Mountains

- These are mountains which are carved out as a result of erosion of plateaus and high planes by various types of erosion.
- Nilgiri, Parasnath, Girnar, Rajmahal (India), Highland of Scotland, Sierras of Central Spain, Catskill of New York are the example.

Plateaus

- Plateaus are formed because of the folds in the rocks due to internal motions of the Earth. These are wavelike mountains which rise above the neighbouring ground surface at least for 300 m.
- It has a large area on its top unlike a mountains and has an extensively even or undulating surface.
- Generally the height of plateau ranges from 300 × 500 ft.

Types of Plateaus

- **Intermountain Plateau** Plateaus formed between mountain, *i.e.*, Tibetan plateau, Bolivian plateau, Peru plateau, Columbian plateau, Mexican plateau, Iranian plateau, anatolian plateau etc.
- **Piedmount Plateau** Appalachian Piedmount plateau, Pantagonian plateau etc.
- **Continental Plateau** These are formed when the lacolith inside the Earth comes to the surface due to weathering, *i.e.*, Deccan Plateau of India, Ranchi Plateau, Shillong plateau, Columbian plateau, Mexican Plateau, Tibetan Plateau etc.
- **Bank/Coastal Plateau** These plateaus are on the bank of the oceans *i.e.*, Coromandal coastal upland of India.
- **Dome-shaped Plateau** These are formed due to the movement of man and animals on the surface *i.e.*, Chhotanagpur Plateau (Jharkhand).
- **Dissected Plateau** Deccan Plateau of India.
- **Step-like Plateau** Kaimur Plateau, Panna Plateau, Bhander Plateau, Rewa Plateau and Rohtas plateau.
- **Flat Shaped Plateau** Tibet Plateau, Bhander Plateau (MP), Rewa Plateau etc.
- **Rejuvenated Peneplain Plateau** Missouri Plateau of USA, Patlands of Ranchi and Palamu (Jharkhand).

Plains

- A relatively flat and a low-lying land surface with least difference between its height and lowest point is called a plain.
- The plains are usually lowlands (below 500 ft).

They have following types

- **Weathered Plains** The plains formed due to weathering by rivers, glaciers, winds etc.
- **Loess Plains** These are formed by the soil and sands brought by winds.
- **Karst Plains** Plains formed due to the weathering of limestone.
- **Erosional Plains** Plains near the river banks formed by river erosion.
- **Glacial Plains** Marshy plains formed due to the deposition of ice.
- **Desert Plain** These are formed as a result of the flow of rivers.
- **Depositional Plains** Large plains are formed due to the silt brought by the rivers. Ganga, Sutlej, Missisipi, Hwang Ho are the example of such plains.

Delta

- A delta is a land form that is formed at the mouth of a river where that river flows into an ocean, sea, estuary, lake, reservoir, flat arid area or another river.
- Deltas are formed from the deposition of the sediment carried by the river as the flow leaves the mouth of the river. Over long periods of time, this deposition builds the characteristic geographic pattern of a river delta.
- A triangular region of innumerable such distributaries is formed near the mouth of the river. This region is called the delta region.
- There are delta regions near the vent (opening) of the rivers Godavari, Ganga, Nile, Missisipi etc.
- The largest delta of the world is "Sundarbans Delta" (350 km).

Lagoon

- A Shailon lake is formed between the saved and the sea coast. It is called a lagoon. Such a lake is called Koyal in Kerala.

Estuaries

- The eembankment where fresh water from the land meets salt water from the ocean are called estuaries.
- The most commercially important and heavily populated estuaries are the mouths of major river.

Earthquakes

Earthquake is a vibration of Earth surface produced by internal forces and its passage of waves is recorded by Seismograph.

Seismic Focus or Centre

The point of origin of earthquake is called seismic focus.
Richter's Scale The intensity of waves is measured by this.
The point on the Earth's surface vertically above the Earth's surface is called Epicentre.

Types of Waves

- There are three types of waves produced by earthquakes.
  (a) **Primary Waves (P)** They travel very fast. It transmitted through solids, liquids and gases. Travel from the point of happening by displacement of surrounding particles.
  (b) **Secondary Waves (S)** It travels through solid matter only, so it can't pass through core of Earth.
  (c) **Surface Waves or Long Waves (L)** It causes maximum destruction on Earth and it travels on Earth surface.

The Earthquakes Zones in India

- The Indian plate is moving from South to North. That is why there are earthquake in the Himalayan region.
- Earthquakes occures in North-Eastern states, Andaman and Nicobar Islands, Jammu and Kashmir, the North-Western region of Uttar Pradesh, the Northern region of Bihar etc.
- During the last few years, there have been several earthquakes of varying intensities in Maharashtra and Gujarat.

Volcano

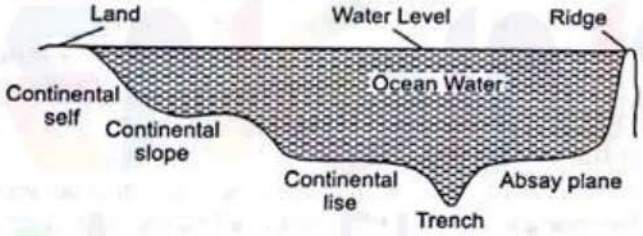
Volcanoes are divided on the basis of period of eruption
(a) **Active Volcanoes** The volcanoes which continuously effect lava, gas etc.
e.g., Stramboli, Maunaloa.
- Mt Etna (Mediterranean Sea)
- Stromboli (Mediterranean Sea)
- Pinatubo (Phillippines)
- Mayon (Phillippines)
- Cotapaxi

(b) **Dormant Volcanoes** They are those which have stopped effecting lava or ash but they can become active anytime.
e.g., Vesuvius, Fujiyama.
(c) **Extinct Volcanoes** These are volcanoes in which the eruption has completely stopped.
e.g., Mt Popa (Myanmar),
Mt Kilimanjaro (Africa).

Hydrosphere

Relief of Ocean Basin

- It is most important sphere of Earth, it covers 71% of Earth's surface and its average depth is 4 km.



Ocean Floor

- Like surface, ocean floor is also very irregular, all the physical features are found there.
- Four major units of ocean floor are
  Its depth is measured into fathom 1 Fathom = 1.8 m.

Continental Shelf

- It is not so deep. It is the coastal part of the ocean and the slope of the bottom is very gentle and it is not more than 100 fathoms. (1 Fathom = 6 feet)
- Petrol and gas is found here.
- In regions where the mountains extend along the coast there is found narrow shelf.
- Marine life exists entirely here.

Continental Slope

- It extends seawards from the continental shelf.
- **Andesite Line** The boundary between shelf and slope.
- Its depth is upto 2000 fathoms.

Continental Rise

- It is found at the foot of the slope. It is the area slightly rising due to the accumulation of debris transported on the slope.
- Large number of oil deposits are found here.

Ridges (Rise)

- These are mountains of sea, *e.g.*,

Dolphin Rise North	—	Atlantic Ocean
Challenger Rise	—	South Atlantic Ocean
Walvis Rise	—	South Atlantic Ocean
Chagos Ridge	—	Indian Ocean
Cocos Ridge	—	Pacific Ocean

- Some parts of the ridge or volcanic peaks reach the surface of the oceans and form islands (*e.g.*, Hawaii)
  Seamount The ridges rising more than 1000 m above the ocean floor is called seamount.
  Guyots Those flat topped seamounts are called Guyots maximum in Pacific Ocean.

Trenches

- Trenches are deep and narrow areas of the ocean, *e.g.*, marina trench or challenger-deepest trench in Pacific Ocean (11022 m). Others

Tonga trench	— Pacific Ocean	11033 m
Cormadec trench	— Pacific Ocean	10800 m
Java trench	— Indian Ocean	7450 m
Plurtonico trench	— Atlantic Ocean	9217 m

Salinity

- The most characteristic feature of oceans and seas is their salinity. The average salinity of the oceans is about 35 per thousand or 35%.
- The amount of salinity determines the composition and movement of the sea water and the distribution of various marine life.
- Average Salinity of Sea water : 35%
- Maximum salinity occurs between : 20°N and 10°S and 30°S.

Composition of Sea Water

Marine life to 1 content	%	out of 1000 gm (sea water)
$NaCl_2$	77.8%	27.213 g
$MgCl_2$	10.8%	3.807 g
$MgSO_4$	4.7%	1.658 g
$CaSO_2$	3.6%	1.260 g
K_2SO_4	2.5%	0.863 g
$CaCO_3$	0.5%	0.123 g
$MgBr_2$	0.1%	0.076 g
Total	100.00	35.00 g

Maximum Salinity

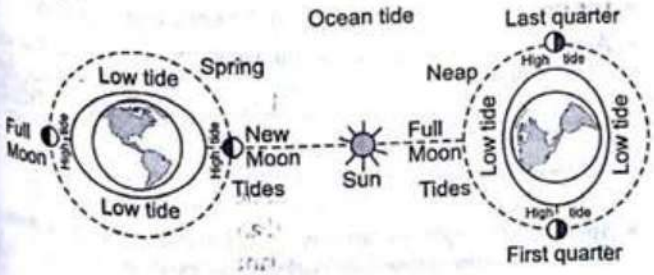
- Lake Van (330)%—Turkey
- Dead Sea (240)%—West Asia
- Maximum Saline Sea—Red Sea
- Average Salinity of sea 35% g/litre
- Chlorine is most abundant element.
- It is maximum in tropics and declined towards polar regions.
- It causes vertical circulation of water.

Tides

- It is the phenomenon of regular rise and fall of the sea water.
- Both Sun and Moon exert this force.
- Moon's force is two times more that of the Sun.
- The interval between two tides is 12 hr and 26 min.
- Tides are of two types.

Spring Tide Highest magnitude as the Sun, Moon and Earth are in a straight line.

Neap Tide Lowest magnitude as the tide producing forces of Sun and Moon act opposite to each other, as they form a triangle.



- Highest tidal amplitude and range Bay of Fundy, Highest Tides recorded in India at Okha, Gujarat.
- It takes 24 hours and 50 minutes for the rotating Earth to bring the same meridian vertically below the Moon everyday. Hence, tides occurs at regular intervals of 12 hours and 25 minutes. Generally, tides occurs twice a day. But Southampton, along the Southern coast of England, experience tides 4 times a day.

Ocean Currents

- Actual transpratation of water from one part of ocean to another part. Why it happens because of differences in salinity, density, temperature of ocean water and rotation of Earth and some more factors are also included.
- **Southern Hemisphere** Currents circulate in anti-clockwise direction in this hemisphere.
- **Northern Hemisphere** Currents circulate in clockwise direction in this part of hemisphere.

Pacific Ocean Currents

North Equatorial Current	(warm)
South Equatorial Current	(warm)
Equatorial Current	(warm)
Kuroshio or Japan Current and West Winds Drift	(warm)
California Current	(cold)
Oyashio or Kuril Current	(cold)
East Australian Current	(warm)
Peruvian Current	(cold)
South Pacific Current	(cold)
Okhotsk	(cold)

Atlantic Ocean Currents

North Equatorial Current	(warm)
South Equatorial Current	(warm)
Equatorial Counter Current or Guinea Current	(warm)
Gulf Stream	(warm)
Canaries Current	(cold)
Labrador Current	(cold)
Brazil Current	(warm)
Benguela Current	(cold)
South Atlantic Current	(cold)
Florida	(warm)
Falkland	(cold)
Caharies	(cold)

Indian Ocean Currents

South Equatorial Current	(warm)
Equatorial Centre Current	(warm)
Monsoon Current	(warm)
Mozambique and Agulhas Current	(warm)
West Australian Current	(cold)
South Indian Current	(cold)
Agulhas	(warm)

Note The monsoon currents flow from the South-West in July and from the North-East in January.

Coral Reef

- Coral reefs are structures produced by living organisms; found in shallow, tropical marine waters with little or no nutrients in the water.

- In most reefs, the predominant organisms are stony corals, colonial chidariars that secrete an exoskelton of calcium carbonate.
- Coral reefs are estimated to cover 284-300 square kilometers, with the indo-pacific region (including the Red Sea, Indian Ocean, South-East Asia and the Pacific) accounting 91.9% of the total. Coral reefs doesn't found in along the West coast of the Americas, as well as the West coast of Africa. It is also restricted from off the coastline of South Asia from Pakistan to Bangladesh.
- Famous coral reefs of the world includes
  (a) **The Great Barrier Reef** Largest coral reef system in the world, located in Queensland, Australia.
  (b) **The Belize Barrier Reef** Second largest in the world located in Belize, central America.
  (c) **The Red Sea Coral Reef** Located off the court of Egypt and Saudi Arabia.

Major Canals

Suez Canal

- Built in 1869 by the French engineer (Ferdenand de Lesseps) and was nationalised by Col Nasser of (Egypt) 26 July, 1956.
- Connects Mediterranean Sea and Red Sea.
- Length 169 km (Greatest Canal).

Panama Canal

- Connects Atlantic Ocean and Pacific Ocean.
- Length 58 km long, opened-1914.

Kiel Canal

- Connects London and Baltic Ports (North Sea and Baltic Sea).
- Length 98 km

Major Water Transportation

- **North Atlantic Sea Route** Connects Eastern Coast of North America and Western Europe. World's largest busy transport route.

Isopleths

Some important isopleths are

Isobars	Pressure
Isobaths	Depth in sea
Isobronts	Thunderstorm at the same time
Isohaline	Salinity
Isohels	Sunshine
Isohyets	Rainfall
Isohypse (or Contour Lines)	Elevation above sea level
Isonif	Snow
Isotherms	Temperature
Isoneph	Cloudness
Isocline	Slope

- **South Atlantic Sea Route** Connects South American countries and Western Europe.
- **North Pacific Route** Connects North America and East Asia.
- **South Pacific Route** Connects North America, Europe and Australia.
- **Mediterranean Sea and Indian Ocean Route** Connects America, Europe and Asia and African countries (Famous for oil trade route).

Major Natural Regions of The World

A region is a homogenous area with respect to climate, soil and vegetation. The boundaries of natural region are permanent. Following are the major natural regions of world.

Equatorial Rain Forest Region

- **Extension** Extending between 0-10° North and South of equator. Its greatest extent is found in Amazon basin, Central Africa (Congo basin), Malaysia and Indonesia.
- **Climate** Annual range of temperature 5°-10° C.
- Cloudiness, heavy precipitation through conventional currents and throughout the year.
- **Species** A great variety of vegetation is found like Mahogany, ebony, climbing plants, lion grass, epiphytic and parasitic plants.
- **Tribes** Sponse population, tribes found here, Indian tribes in Amazon basin, Pygmies in Congo basin, Orang Asli in Malaysia, etc.

Tropical Monsoon Region

Areas Found in Indian sub-continent, Myanmar, Thailand, Laos, Cambodia, parts of Vietnam, South China and Northern Australia.

- **Climate** Monsoon lands experience on shore wet monsoon in the summer and off shore dry monsoon in winter.
- In Indian sub-continent, the North-East monsoon (winter) brings little or no rain. However, a little amount of rainfall in the Punjab plains is due to cyclonic waves caused by Western disturbances.
- When the North-East monsoon passes over the Bay of Bengal, it absorbs moisture and thus brings rain to South-Eastern tip of Indian Peninsula (Tamil Nadu).
- **Species** Trees are normally deciduous. Tropical monsoon forests produce valuable timber. Teak, Sal, Eucalyptus, Bamboo are the best known. Shifting cultivation is widely practised in tropical monsoon forests.

Savanna/Sudan/Tropical Grassland Region

- Extending between 5°-20° N and S in both the hemispheres, best developed in Sudan (Africa).
- Climate is found in Africa, South America and Australia.
- **Areas** In South America, Savanna region is known as Llanos and Campos, the Australian Savanna is situated South of the monsoon strip running from West to East, North of Tropic of Capricorn.
- **Climate** This type of region has the feature of alternate hot rainy season and cool dry season temperature 20°-35° C.
- **Species** This region is famous for tall grasses and short trees, it is sometimes termed as 'parkland or bush veld'.

- The Savanna particularly in Africa is the home of wild animals, it is known as the 'big game country'.

Hot Desert Region

- **Extension** located on Western coast of the continents between latitudes 15-30° in both the hemispheres.
- **Climate** Excess heat and scanty rainfall. The aridity of hot deserts are mainly due to the effect of offshore trade winds.
- **Areas** Sahara desert, Great Australian desert, Arabian desert, Thar desert (India), Kalahari desert (Africa), Mojave and Mexican desert (North America).
- Diurnal range of temperature is very high. Days are hot while nights are quite cold.
- Intense isolation in daytime and rapid radiation in the night due to cloudless sky are causes of variation of temperature.
- **Vegetation** Xerophytic *e.g.*, bulbous cacti, thorny bushes, long rooted wirey grass, dwarf acacia, date palms etc.
- **Tribes** Bedouin : Arabian desert : Bushmen : Kalahari desert, **Bindibu : Australian desert.**

The Warm Temperate Western Margin/ Mediterranean Region

- **Extension** 30°-45° latitudes in both the hemispheres on the Western side of each continent. The basic cause of this type of climate is the shifting of the pressure and wind belts. It has great extent around Mediterranean sea, so it is popularly known as Mediterranean region.
- **Areas** South-West Africa (cape region), around the shores of Mediterranean sea, Central Chile (South America) Central California (USA) and Adelaide to Melbourne in Southern Australia.
- **Climate** Rainfall occurs in winter under the influence of on-shore westerlies and a dry, warm summer.
- **Species** Mediterranean lands are noted for orchard farming and also known as the 'world's orchard lands'. A wide range of citrus fruits are grown in which viticulture (grape farming) is pre-dominant.

The Warm Temperate Eastern Margin Region-China Type

- **Extension** Found on the Eastern margins of continents between 30°-45° latitudes in both the hemispheres.
- **Areas** Central China, South Japan, South East USA, Eastern Argentina, South Brazil, SE Africa and Australia as well as Northern New Zealand.
- **Climate** Warm moist summer and cool dry winter. Rainfall is mainly in summer.
- **Species** These regions are the homes of a number of valuable timber species. Eucalyptus, quebracho or axe breaker, yerba mate (Brazil and Argentina), palm trees, oak, camphor, camelia etc. Famous for Sericulture.

The Cool Temperate Western Margin-British Type

- **Exention** Found between 40°-65° latitude in both the hemispheres.
- **Areas** It includes British Isles, North-West Europe, Belgium, Netherlands, Denmark, West Coast of Canada.
- In Southern hemisphere Southern Chile, Tasmania and most part of New Zealand (Particularly Southern Island).
- **Climate** No dry season as the Westerly winds blow from the Ocean throughout the year.
- **Vegetation** Deciduous trees *e.g.*, oak, elm, ash, birch etc.

The Cool Temperate Eastern Margin Region-Lauretian Type

- **Extension** Found on the Eastern margins of continents between 40°-65° latitudes of Northern hemisphere. It is absent in Southern hemisphere because only a small section of Southern continent extends to the South of 40°S latitude.
- **Areas** In North America—North-East USA and Eastern Canada. In Asia—Eastern Siberia, North China, Manchuria, Korea and Northern Japan.
- **Climate** Cold dry winter and warm wet summers. Winter is dry and cold because the winds are dry blowing from the interior.
- **Vegetation** Coniferous trees, lumbering and its associated timber, paper and pulp industries are the most important economic avtivities.
- Agriculture is less important due to long and severe winters.

The Temperate Continental Region—Steppe Region

- **Extension** Located in the interior of the continents. Siberia - Russia, Northern Canada.
- **Climate** Summers are warm with a temperature over 20°C while winter are very cold well below freezing point.
- In Eurasia, temperate grasslands are called Steppes, Pustaz-Hungary, Prairies- North America, Pampas - Argentina, Downs - Australia, Veld - South Africa.
- The grasslands have been ploughed up for extensive wheat cultivation and are famous as the "granaries of the world". Besides wheat, maize is increasingly cultivated here.

The Cool Temperate Continental Region-Suberian/Taiga Region

- **Extension** Found in Northern hemisphere where the continents within the high latitudes have a broad East-West spread. Usually between 45°N - 70°N. The Taiga region has the stretchs from Alaska to Newfoundland in North America and Norway to Kamchatka in Eurasia.
- **Climate** Long cold, dry winter and cool short summer. Annual precipitation ranges between 35-60 cm.
- **Vegetation** Taiga conifers - Pine, fir, spruce, larch
- The Taiga coniferous belts are richest source of sc wood for use in building construction.

The Arctic or Tundra Region

- **Extension** In North of 70° latitude in North America and Eurasia, coastal tract of Iceland and Greenland.
- **Climate** Warmest month temperature is below 10°C but more than 0°C. Precipitation is mainly in the form of snow in winter.
- **Vegetation** Mosses, lichens, sedges etc.

Part II World Geography

Geologically

- The whole world has been divided into seven regions commonly regarded as continents. They are Asia, Africa, North America, South America, Antarctica, Europe, and Australia (from largest to smallest).

Area and Population

Continent	Area (kmz)	Percentage of total land mass	Total population	Percentage of total population
Asia	43820000	29.5%	4164252000	60%
Africa	30370000	20.4%	1022234000	15%
North America	24490000	16.5%	542056000	8%
South America	17840000	12.0%	392555000	6%
Antarctica	13720000	9.2%	1000	0.00002%
Europe	10180000	6.8%	738199000	11%
Australia	9008500	5.9%	29127000	0.4%

Highest and Lowest Points

Continent	Highest point	Height	Lowest point	Depth (m)
Asia	Mount Everest	8848	Dead Sea	– 422
South America	Aconcagua	6960	Laguna Del Carbon	– 105
North America	Mount Mckinley	6198	Death Valley	– 56
Africa	Mount Kilimanjaro	5895	Lake Assal	– 155
Europe	Mouth Elbrus	5633	Caspian Sea	– 28
Antarctica	Vinson Marsit	4892	Deep Lake	– 50
Australia	Puncak Jaya	4884	Lake Eyre	– 15

Largest Countries in the World

Area wise

S.N.	Country	Area (Sq. km)	Location
1.	Russia	17075000	Europe-Asia
2.	Canada	9976139	North America
3.	China	9561000	Asia
4.	USA	9372614	North America
5.	Brazil	8511965	South America
6.	Australia	7682300	South Pacific
7.	India	3287263	Asia
8.	Argentina	2776654	South America
9.	Kazakhastan	2717300	Asia
10.	Sudan	2505813	Africa

Largest Countires in the World Population wise

S.N.	Country	Population	Location
1.	China	1337600000	Asia
2.	India	1181052000	Asia
3.	USA	309309000	North America
4.	Indonesia	231369500	Asia
5.	Brazil	192952000	South America
6.	Pakistan	169537500	Asia
7.	Bangladesh	162221000	Asia
8.	Nigeria	154729000	Africa
9.	Russia	141927297	Europe-Asia
10.	Japan	127390000	Asia

Continents

Asia

- Asia is the largest of the continents both in area and population, it is located primarily in the Eastern and Northern hemisphere.
- It covers 8.7% of the Earth total surface area or 30% of its land area and with approximately 3.879 billion people, it hosts 60% of the world's current human population.
- It is bounded on the East by the Pacific ocean, on the South by the Indian ocean and on the North by the Arctic ocean and on the West by Mediterrranean sea. It is separated from Europe by Ural mountain, the Caspian sea, the Caucasus mountains.
- China world's largest country entirly lies in Asia.
- The three Gorges Dam in China is the world's largest hydropower project.
- The largest archipelago in the world by size is Indonesia. It is in Asia. Indonesia is also the world's most populous Muslim majority nation.
- Kazakhstan is the largest landlocked country in the world.
- The Tibet plateau is the largest plateau in the world with an average altitude of 4250 m.
- Ob, Yenizey, Lena, Kolyana, Amur, Hwang Ho, Yangtse Kiang, Mekong, Salween Ganga, Indus, Brahmaputra are important rivers of Asia.

Important Straits of Asia

Name	Separates	Connects
Bering Strait	Asia and North America	East Siberia and Bering Sea
Lizon Strait	Taiwan and Phillipines	South China Sea and Pacific
Makassar Strait	Borneo and Celebes Island	Celebes Sea with Java Sea
Malacca Strait	Malaya Peninsula and Sumatra	Java Sea with Bay of Bengal
Hormuz Strait	UAF and Iran	Persian Gulf with Gulf of Unan

Important Mountains of Asia

Himalayan range	Indian subcontinent Highest Peak Mount Everest (8848 m)
Karakoram range	Lies in the North of Himalaya K_2 highest peak
Kunlum Shah range	Lies to the North of Tibet Plateau
Arakan Yoma	A range of Himalaya furthur countinues through the Andaman and Nicobar Islands, Sumatra, Java and other Indonesia countries
Elbruz	Iran
Zagros	North-West of Makram
Tanrus	Turkey

Europe

- It is second smallest continent by surface area, covering about 10180000 sq kms or 2% of the Earth's surface and about 6.8% of its land area.
- Europe is third most populous continent after Asia and Africa with a population of 733 million or about 11% of the world's population.
- Europe is generally divided from Asia to its East by the watershed divides of the Ural and Caucases Mountain, the Ural river, the Caspian and Black Seas and the waterways connecting the Black and Aegean seas.
- Europe is bounded by the Arctic Ocean to the North, the Atlantic Ocean to the West, the Mediterranean Sea to the South and the Black Sea to the South-East.
- Of Europe's approximately 50 States, Russia is the largest by both area and population, while the Vatican city is the smallest.
- **Oceans and Seas** Atlantic Ocean, Arctic Ocean, Mediterranean Sea, Caspian Sea, Black Sea, White Sea, North Sea, Norwegian Sea, Baltic Sea, Aegean Sea, Adriatic Sea.
- **Important Rivers** PO, Tiber, Seine, Rhene, Ebro, Tagus, Elbe, Oden, Wista etc.

Important Straits of Europe

Name	Connects	Separates
Strait of Gibralter	Mediterranean Sea with Atlantic Ocean	Europe and Africa
Messina Strait	Tyrhenian Sea with Mediterranean Sea	Sicily and Peninsular Italy
Bosporus Strait	Black Sea with Sea of Marmara	Istambul and Anatolian Peinsula
Strait of Kerch	Sea of Azor with Black Sea	Kerch (Ukraine) and Russia

Important Mountains of Europe

Penine	The central upland region of Great Britain
Vobges	Lies in France and separate it from Italy
Alps	Lies in the South-Eastern part of France and separates it from Italy Mount Blane is the highest point
Balkam	Runs in East-West direction in Bulgaria
Ural	Forms natural boundary between Asia and Europe
Black Forest	Block Mountain of Germany

Africa

- Africa is world's second largest and second most populous continent only after Asia.
- With 1.0 billion people in 65 territories (including 54 recognized states), it accounts for about 14.72% of the world's human population.
- At about 30.2 million kms, it covers 6% of Earth's total surface area and 20.4% of the total land area.
- The continent is surrounded by the Mediterranean Sea to the North, both the Suez canal and the Red Sea along the Sinai Peninsula to the North-East, the Indian Ocean to the South-East, and the Atlantic Ocean to the West.
- Africa straddles the equator and encompasses numerous climate areas, it is the only continent to stretch from the Northern temperature to Southern temperature zone.
- Africa is the continent with the highest number of 54 countries.
- Sudan is the largest country of the African continent.
- Madagascar, one of the African Island is flora and fauna are so different from anywhere else on Earth that it is often referred to as the eight continent.
- **Important Islands** Madagascar, Cape Verde Islands, The comoros, Mauritius, Seychelles.

Important Straits of Africa

Name	Separates	Connects
Strait of Gibraltor	Europe from Africa	Mediterranean Sea with Atlantic Sea
Strait of Bab-el-Mandeb	Djibouti (Africa from) Yemen (Asia)	Red Sea with Gulf of Aden

- Nile, Zaire or Congo, Niger, Gambezi, Limpopo river are the important river of Africa.

Important Mountains of Africa

Atlas	Fold mountain Marocco Highest Peak Jbel Toubkal
Kilimanjaro	An example of extinct volcanoes Africa's highest peak located in Tanzania
Drakensberg	High escarpment in South-East Africa caused by Lava flow

Important Deserts of Africa

Sahara	The largest stretch of desert which is 5150 km from East to West and at least 1610 km in area
Kalahari	Semi desert region of Botswana lies to the East of Navib desert.
Libyan desert	Vast arid land of North-East of Africa in Libya

North America

- It is a continent wholly within the Northern hemisphere and almost wholly within the Western hemisphere. It is also considered a Northern subcontinent of Americans.
- It is bordered to the North by the Arctic Ocean, to the East by Atlantic Ocean, to the South-East by South America and to the West and South by the Pacific Ocean.
- North America covers an area of about 24709000 sq kms, about 4.8% of the planet's surface or about 16.5% of its land area.
- It is the third largest continent in area, following Asia and Africa and the fourth in population after Asia, Africa and Europe.
- The largest country in North America is Canada. Canada's coastline is world's longest at 243792 km miles.
- The smallest country of North America is St Kitts and Nevis.
- **Major Lakes** Lake Superior (largest sweet water lake in the world), Huron, Michigan, Great Slave, Great Bea, Erie, Ontario etc.
- **Major Lakes** Missippi, Missour, St Lawrence, Mackenzie, Colorado, Hudon, Potonau, Ohio etc.

Important Straits of North America

Name	Separates	Connects
Nares Strait	Greeland and Ellesmere Island	▪ Arctic Ocean and Baffin Bay
Davis Strait	Greeland and Baffin Island	▪ Baffin Bay and Labrador Sea
Hudson	Baffin Island and Ungava Peninsula	▪ Hudon Bay and Labrador Sea
Florida Strait	Florida and Cuba	▪ Gulf of Mexico and Atlantic Ocean
Bering Strait	Chukchi (Russia) and Alashka (North America)	—

- **Important River** Maekenzie, Yukon, Nelson, Mississipi-Missouri, St Lawrence River, Colorado, Columbia, Rio Grande.

Important Mountains of North America

Alaska	Mount Mckinsley (6194 m) is the highest peak of the continent is in the Alaska Range
Rocky	Lies East of the Cascade Range and Sierra Nevada, runing Alaska to Mexico and is over 4000 m

South America

- South America is a continent situated in the Western hemisphere, mostly in the Southern hemisphere, with a relatively small portion in the Northern hemisphere. The continent is also considered a subcontinent of the America.
- It is bordered on the West by the Pacific Ocean and on the North and East by the Atlantic Ocean, North America and the Carribean Sea lie to the North-West.
- This continent includes twelve independent countries.
- The South American countries that borders the Caribbean Sea Colombia, Venezuela, Guyana, Suriname and French Guiana are also known as Carribean South America.
- South America has an area of 17840000 sq kms. It ranks fourth in area (after Asia, Africa and North America) and fifth in population (after Asia, Africa, Europe and North America). The world's highest defacto capital city is LaPaz, the capital of Bolivia, which is located at an elevation of 3660 metres above sea level.
- The largest country in South America in both area and population in Brazil.
- Chile is called the 'shoe-string country'.
- Panama is called 'the land of canals and hats'.
- Suriname is the smallest independent country South America.
- Angel falls, the world's highest waterfall is in Venezuela.

Important Lakes of South America

Lake Maracibo	▪ Largest lake of South America North of Venezuela, is one of the major oil producing region.
Lake Titicaca	▪ Situated between Bolivia and Peru Highest navigable lake in the world
Lake Pupo	▪ Lies in the Altiplano high plateau between the Andes Mountain chain in Bolivia

Important River Basin of South America

Amazon River Basin	▪ World's second longest river after Nile and has the largest volume 65000 km long river flowing through Peru and Brazil to the Atlantic Ocean
Orinoco River	▪ Angel falls, the highest in the world located on the river
Panama, Laplata	▪ Are two other river basins

Australia

- Australia is the world's smallest continent, comprising the mainland of Australia and other islands. Australia and these nearby islands, are separated by seas overlying the continental self the Arafura Sea and Torres Strait between Australian and New Guiena, and Bass Strait between mainland Australian and Tasmania.
- Australia is an island continent, divided into six states and two contrally administered of which Western Australia is the largest state while new South water is the most populours.
- It is surrounded by Tinor Sea in the North-West, Arafura Sea in Gulf of Carpentaria in the North, Great Barrier Reef in the North-East and Great Australian Bright in the South. To the South-East of mainland lies the mountainous island of Tasmania.
- **Important Seas** Tasman Sea, Tinor Sea, Arafura Sea, Gulf of Carpentaria, Coral Sea, Great Australian Bright.
- **Mountain Great Dividing Range** Example of black-fault, mountains, major sources of minerals, timber, water and hydel power.

Antarctica

- Antarctica is Earth's Southern most continent, encaspulating the South pole. It is situated in the Antarctic region of the Southern hemisphere, almost entirely. South of the Antarctic circle, and is surrounded by the Southern Ocean.
- At 14.0 million kms it is the fifth-largest continent in area after Asia, Africa, North America and South America.
- Antarctica, on average, is the coldest, driest and windiest continent and has the highest elevation of all the continent.
- The continent is shaped somewhat like a comma, with the round portion surrounding the South pole and the 'tail' curving towards South America.
- This is the only continent with no permanent population.
- Roald Amundsen was the first man to reach the South pole in 1911.
- Ross ice-seef, it is the largest ice-shelf in the world. It is as large as France.
- O Vinson Massit is the highest peak in Antarctic.
- Queen Maud Range is the longest mountain range in Antarctic.

The Continents

Continent	Highest Elevation (M)	Lowest Elevation (M)
Asia	Mt Everest (8848)	Dead Sea (– 396)
Africa	Mt Kilimanjaro (5951)	Lake Assal (– 151)
N America	Mt Mc Kinley (6252)	Death Valley (– 87)
S America	Mt Aconeagua (7026)	Valdes Peninsula (– 40)
Antarctic	Vinson Massif (5189)	Bentley Subglacial Trench (– 2538)
Europe	Mt Elbrus (5687)	Capian Sea (– 28)
Australia	Mt Kosclusk (2251)	Lake Eyre (– 16)

Great Deserts

Name	Country/Region
Sahara (Libyan, Nubian)	N Africa
Australian (Gibson, Simpson)	
Victorian (Great Sandy)	Australia
Arabian (Rub'al Khali, An-Nafud)	Arabia
Dasr-e-Lut (Barren Desert)	Iran
Dasr-e-Kavir (Salt Desert)	Iran
Desierto de Sechura	Peru
Atacama	N Chile
Patagonia	Argentina
Kalahari	Botswana
Namib	Namibia
Thar	N W India
Negev	Israel
Ordos	China
Takla Makan	China
Gobi	Mongolia
Kara Kum	Turkmenistan
Kyzyl Kum	Kazakhstan
Mohave	Sclifornia, N America,
Sonoran	N America, Mexico

Famous Grasslands of the World

Grasslands	Countries	Grasslands	Countries
Steppe	Eurasia	Veld	South Africa
Pustaz	Hungary	Downs	Australia
Prairie	USA	Canterbury	New Zealand
Pampas	Argentina		

Some Important Isopleth

Isopleth	Reaction
Isohels	Sunshine
Isohyets	Rainfall
Isonif	Snow
Isocline	Slope
Isotherms	Temperature
Isobars	Equal Pressure
Isabath	Equal depth in sea
Isonaline	Salinity
Isohypse (or contour lines)	Elevation above sea-level
Isodapane	Equal transportation cost
Isobrants	Thunder Storm at the same time

World's Major Oceans

Ocean	Area (in Sq km)	Average Depth (in m)
Pacific	166240000	4188
Atlantic	86560000	3376
Indian	73430000	3872
Arctic	13230000	1260

Important Mountain Peaks

Name	Height (in m)	Range	Country
Mt Everest	8850	Himalaya	Nepal-Tibet
K_2 (Godwin Austin)	8611	Karakoram	India
Kanchenjunga	8597	Himalaya	Nepal-India
Nanga Parbat	8124	Himalaya	India
Aconcagna	6960	Andes	Argentina-Chile
Ojos del Salado	6885	Andes	Ecuador
Chimora 20	6267	Andes	Ecuador
Mt Mc Kinley	6194	Alaska	Alaska
Cotopaxi	5897	Andes	Ecuador
Kilimanjaro	5895	Kilimanjaro	Tanzania
Mt Elbrus	5642	Lancruser	Georgia
Mt Blauc	4807	Alps	France Italy
Matterhorn	4478	Penine Alps	Switzerland
Mt. Cook	3744	Southern Alps	New Zealan

Highest waterfall (Heating)

Waterfall	Location	Waterfall	Location
Aufel	Venezuela	Sutherlaud	New zealand
Tuglea	South Africa	Tak kakaw	British Gotnmbia
Cuguenan	Venezuela	Ribbon (Yosemite)	California

Part III Indian Geography

Location

- **Latitude** 8°4′N to 37°6′N; **Longitude** 68°7′E to 97°25′E

Area and Physical Features

- **Area** 3287263 sq km.
- India is the seventh largest country by geographical area, the second most populous country with 1.2 billion people. It accounts 2.4% of the total area of the world and 16% of population.
- Bounded by Indian Ocean on the South, the Arabian Sea on the South-West, and the Bay of Bengal on the South-East, it shares land borders with Pakistan to the West, China, Nepal and Bhutan to the North-East, and Burma and Bangladesh to the East, in addition Indian Andaman and Nicobar Islands share a maritime border with Thailand and Indonesia.
- India's coast is 7517 kilometres long. Indian State Gujarat has longest coast line area, followed by Andhra Pradesh.
- In India, of the total landmass

Plain	:	43.3%
Plateaus	:	27.7%
Hills	:	18.6%
Mountains	:	10.7%

- Major Himalayan origin rivers that substaintally flow through India include Ganga and the Brahmaputra both of which drain into the Bay of Bengal. Major penisular rivers, includes Godavari, the Mahanadi, the Cauveri and the Krishna, which also drain into the Bay of Bengal and Narmada and the Tapti, which drain into the Arabian Sea.
- India stretches 3214 km from North to South.
- India stretches 2933 km for East to West.
- 82°30′E meridian helps in calculating the Indian Standard Time (IST) which is 5 hours 30 minutes ahead of the Greenwich Mean Time (GMT).
- The Tropic of Cancer (23.5°N) passes through the middle of India, it passes through eight states—Gujarat, Rajasthan, Madhya Pradesh, Chhattisgarh, Jharkhand, Paschim Banga Tripura and Mizoram.

Neighbours

- Total neighbours : 7 (Seven)

Country	State Touching
• Bangladesh	Paschim Banga, Asom, Mizoram, Tripura, Meghalaya.
• China	Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, Arunachal Pradesh.
• Nepal	Uttarakhand, Uttar Pradesh, Bihar, Paschim Banga.
• Pakistan	Jammu and Kashmir, Rajasthan, Punjab, Gujarat.
• Myanmar	Arunachal Pradesh, Nagaland, Manipur, Mizoram.
• Bhutan	Sikkim, Paschim Banga, Asom, Arunachal Pradesh.
• Afghanistan	Jammu and Kashmir.

Physiography

(Physical Divison of the Indian Subcontinent)

- The following are the five major physiographic divisions of India
  - (a) The Himalayan Mountains
  - (b) The Great Plain of North India
  - (c) The Peninsular Plateau
  - (d) The Coastal Plains
  - (e) The Islands

The Himalayan Mountains

- The Himalayas are the youngest fold mountains and the lofteist mountain chains in the world. The Himalayas run in the East-West direction along the entire Northern boundary of India for 2400 km from the Indus gorge in the West to the Brahmaputra gorge in the East.
- The average breadth of the Himalayas is between 250 km to 400 km.
- The total area of Himalayan mountain region is nearly 500000 sq kms.
- The Himalaya have 14 peaks, which is higher than 8000 m and 20 peaks, which is higher than 7500 m above sea level.

Important Peaks in India

Peaks	Height/Elevation/in mts
Godwin Austin (K_2)	8611
Kanchenjunga	8598
Nanga Parbat	8126
Gasherbrum	8068
Broad Peak	8047
Nanda Devi	7817
Rakoposhi	7788

The Himalayas consists of three parallel mountain ranges

(a) **The Greater Himalayas** It is also known as Himadri. This is the loftiest of the three ranges of Himalayas.

- All most all the high peaks of the Himalayas belong to this range. Mt Everest or Sagarmatha having the height of 8848 m is located in Nepal and Kanchenjunga which is 2nd highest peak and liest in Sikkim in India belong to this part of the Himalayas.
- This range has several passes.

Passes	State
Zozila and Burzila	Jammu and Kashmir
Shipkila and Baralapchala	Himachal Pradesh
Thagla, Nitipas and Lipulekh	Uttarakhand
Jelepla and Nathula	Sikkim
Bamdi-la	Arunachal Pradesh

- In the Northern part, there is another mountain range called Karakoram, the highest peak of this is Godwin Austin (K_2).
- To the South-East of this range lies the Ladakh range and the Zaskar range between which the Indus flows.

(b) **The Lesser Himalaya** They are also known as the Middle Himalaya or the Himachal. They have an average elevation of about 3500 to 5000 ms with an average width of 60 to 80 kms.

- Important ranges of the middle Himalaya are Pirpanchal, Nag Tiba, Mahabharat and Mussoorie range.
- Hill stations like Dalhousie, Dharmshala, Shimla, Mussoorie, Nainital, Darjeeling, Chair, Almora, Ranikhet and Chakorata are situated in this range.

(c) **The Outer Himalayas** It is the newest mountain range. This range is also known as the Shiwalik ranges. It has an average height of 900 to 1200 metres. Its breadth is only 10 to 50 km.

Purvanchal

- It is the Southern expansion of Himalayas.
- In Myanmar, the part of Purvanchal—Arakanyama which submerged and came out.
- North to South Expansion
  - (i) Misri hills : Arunachal Pradesh
  - (ii) Miri, Abor, Dafla : Arunachal Pradesh
  - (iii) Patkai Bun : Arunachal Pradesh
  - (iv) Naga hills : Nagaland
  - (v) Manipur hills : Manipur
  - (vi) Tripura hills : Tripura
  - (vii) Kohina hills : Asom
  - (viii) Garo, Khasi, Jaintiya : Meghalaya

The Great Plain of North India

- The great plains of North India stretch in the East-West direction between the Himalayas in the North and the plateau of Peninsular India in the South.
- Their width varies from 240 kms in the East in Bihar to 500 kms in the West in Punjab. These are amongst the largest plains of the world having as area about 650000 sq. kms and account for one fifth of the area of India. The plain extends for 3200 kms between the mouths of the Ganga and the Indus.
- The Plains consists of four types of soils
  - (a) **Bhabar** Highly porons (along the foothills of Shiwalik).
  - (b) **Bhangar** Composed of oldest alluvium. It is often impregnated with calcareous concentrations known as kaukar.
  - (c) **Khadar** Composed of newer alluvium and forms the flood plains along the river banks.
  - (d) **Tarai** Marsy land of excessive dampness. It marked the re-emergence of streams.
- The great plains of North India is brodly divided into four major regions
  - (a) The Rajasthan Plain
  - (b) The Punjab Haryana Plain
  - (c) The Ganga Plain
  - (d) The Brahmaputra Plain

The Great Indian Desert

To the South-West of the Sutlej Ganga plains. Stretches the great Indian Desert. This is sandy plains dotted with hillock and shifting sand-dunes West of Aravalli Hills. The only river here is Luni.

The Peninsular Plateau or Deccan Plateau

- The Peninsular plateau lies in the South of the Great plains of North India. It forms large triangle with its apex in the South at Cape Comorin.
- It is surrounded by the hills on all the three sides, to its North are the Aravali range, the Vindhya, the Satpura, the Bharmer and the Rajmahal Hills. The Western Ghats and the Eastern Ghats forms its Western and Eastern boundaries.
- The North-Western region of this plateau in covered by nearly horizontal sheets of lava. This region is called 'Deccan trap region'.
- It covers a total areas of about 16 lakh sq kms which is about half of the total land area of the country, it is, thus the largest physiographic unit of India.

Some of the important plateaus of the Peninsular India are following

(a) **Malwa Plateau** It roughly forms a triangle based on Vindhyan Hills, bounded by the Aravalli range in the West and Bundelkhand in the East. It drained by the North flowing Chambal and many of its right bank tributaries like the kali, the Sidh and the Parbati. It is composed of excessive lava flow and is covered with black Soil.

(b) **The Chhotanagpur Plateau** The North-Eastern part of the Indian plateau lying to East of the Rihand is known as Chhotanagpur plateau. The plateau is composed mainly of Gandwana rocks with patches of Archaean gravities and genesis and Deccan lava.

(c) **The Meghalaya Plateau** The Western part of the plateau is called the Garo Hills, the central part the khasi-jaintia Hills and the Eastern part, the Mikir Hills.

(d) **The Deccan Plateau** It is the largest plateau in India, covering an area of 700500 sq kms sloping Eastwards and Westwards. It lies between the Eastern and the Western Ghats and South of the line of the Satpura, Maikal and Hazaribagh ranges.

- The Eastern Ghats, lying 16 to 105 kms away from the East coast, are broken by the Mahanadi, the Godawari, the Krishna and the Pennar before they fall into the Bay of Bengal. The Javedi Hills, the Shevroy Hills and the Panchainalai Hills in Tamil Nadu are the outlines of Eastern Ghats.
- The Western Ghats rises abrupty from the North to the South Doda Betta (2637 m) is the highest peak of the Nilgiri Hills which is the second highest peak of the Peninsular plateau.
- Anaimudi (2695 m) which lies in the Annaimalai Hills is the highest peak of the Peninsular plateau.

Peninsular Mountains

(a) **The Aravalli Mountains** (Rajasthan)
- World's oldest mountain.
- Highest peak : Guru Shikhar (1722).
- Mount Abu is situated here.
- Rich in limestone.
- Mahi and Luni rivers flow here.

(b) **Vindhya**
- It is block mountain.
- It separates Northern India from Southern India.

(c) **Satpura**
- Block mountain.
- This mountain range is in between Narmada (in North) and Tapi (in South) rivers.
- Highest Peak : Dhoopgarh.

(d) **Western Ghats**
- Also called as Sahayadri.
- Expanded from Dadar and Nagar Haveli to Kanyakumari.
- Due to heavy rainfall laterite soil is found here.
- Ranges in Western Ghats (N-S)

Ajanta, Balaghat, Harsh Chandra	Maharashtra
Bababuddan	Karnataka

(e) **Nilgiri**
- Between Kerala and Tamil Nadu.
- Highest Peak : Doda Betta.

(f) **Annamalai**
- Highest Peak : Anaimudi, it is also the highest peak of Southern India.
- Between Kerala and Tamil Nadu.

(g) **Cardamom Hills**
- Between Kerala and Tamil Nadu.
- Highest Peak : Agastyamalai.

Independent Hills

(a) Raj Mahal Hills : Bihar, Relict Mountains.

(b) Parasnath Hills
- On Chhotanagpur Plateau
- Religious centre of Jains

(c) Girnar Hills (Gujarat)
- Highest Peak : Gorakhnath.

The Coastal Plains

Narrow strips of flat land on Eastern and Western coasts are known as the East coastal plains and the West coastal plains respectively. The Eastern coastal plains and the Western coastal plains meet at Kanyakumari.

- **The East Coastal Plains** This broader coastal plain spreads along the Bay of Bengal from Odisha in the North to Kanyakumari in the South.
- Its Northern part is knwon as Northern Circar plains and the Southern part is called Coromandal coast. Rivers like Mahanadi, Godavari, Krishna and Carveri from deltas on this plain.
- A large number of lagoons are also found here, Chilka and Pulicat lakes are fine examples of lagoons on the East coast.
- **The West Coastal Plains** This plain lies between the Arabian Sea and the Western ghats spreads from Gujarat in the North to Kanyakumari in the South.
- Its Northern part from Gujarat to Goa is called Konkan, while Southern part from Goa to Kanyakumari is known as Malabar.
- The Ashtamudi and the Vembard lakes are most important in this plain.
- **The Great Indian Desert** It lies to the West of the Aravali range.
- It extends over major part of Rajasthan and Sindh in Pakistan.
- This desert doesnot get much rain as the Aravali Range run parallel to the South-Western monsoon winds.
- Lake Sambhar is found here.

The Indian Islands

- India having a large number of Islands, has two important islands group, Andaman and Nicobar Islands in the Bay of Bengal and Lakshadweep Islands in Arabian Sea.
- **The Andaman and Nicobar** It is believed to be extensions of mountains. System in the North-Eastern part of the country. It is composed of 265 big and small islands.
- This group of islands is divided into three major groups viz North Andaman, Middle Andaman and South Andaman.
- The Nicobar group of islands consists of 7 big and 12 small islands. The Barren and Narcondam Islands North of Port Blair are Volcanic Islands.
- Saddle (737 m) in North Andaman is the highest peak of this island group.
- The Southern most point of our country Indira point lies in this island group in the Greater Nicobar.
- Ten degree channel separates Andaman from Nicobar.
- Loco channel separates Myanmar from North Andaman.
- **The Lakshadweep** It is in the Arabian Sea, is only a group of 25 Islands.
- Its capital is kavarati. The islands North of 11°N are known as Anindivi Islands while those South of this latitude are called Canvanore islands. The largest and the most developed island is Minicoy which separated from Cannore Islands by Nine degree channel.

Drainage System of India

- Rivers are the great source of water for irrigation, idustry and domestic purpose and offer innumerable sites for producing hydro electricity.

- Over 98% of water carried by the Indian rivers is housed into the Bay of Bengal, the rest in drained into the Arabian Sea or forms Inland drainage.
- Depending upon the origin of rivers two broad drainage systems of India are
  (a) the Himalayan river systems includes the Indus. The Ganga, the Brahmaputra and their tributaries.
  (b) the Peninsular river systems including the Mahanadi, the Godavari, the Krishna, the Cauveri, the Narmada, the Tapi and their tributaries.

The Himalayan river systems

It consists of three principle rivers and their tributaries
(a) The Indus (b) The Ganga (c) The Brahmaputra.

The Indus

- It is the Western most of the Himalayan rivers. Along with its tributaries (i) it forms one of the largest drainage system of the world.
- It rises near Mansarovar lake for the glacier of the Kailash range at an altitude of 5180 ms.
- It flows in a North-West direction between the Ladakh and the Zashkar ranges.
- The total length of the Indus is about 2880 km out of which only 709 km length is in India. 27.26% of the Indus basins fails in India.
- The important Himalayan tributaries are : Zaskar, Snyok, Gilgit, Gortang, Dras, Shigar, Hariza. It also receives the combined water of the five Eastern tributaries (called Panjad or Panchmad). The Jhelum, the Chenab, the Ravi, the Beas and the Sutles.

The Indus Drainage System

Name of rivers	Source	Length
Indus	Near Mansarovar lake	2880 (709 in India)
Jhelum	Verinag	724
Chenab	Near Bara lacha Pass	1180
Ravi	Near Rohtang Pass	725
Beas	Near Rohtang Pass	460
Satluj	Mansarovar Rakas lake	1450 (1050 in India)

The Ganga System

- The Ganga rises as Bhagirathi from the Gangotri glacier in Uttarkashi, River Alaknanda joins it at Devaprayag. There after it is flows as Ganga, after travelling in the hills, it enters plain area at Haridwar. Yamuna joins in Allahabad. It goes Eastwards to reach the Bihar plains, near Rajmahal hills it turns to South-East and South of Farakkan it is known as Ganga. It divides itself into Bhagirathi-Hugli in Paschim Banga and Padma-Meghna in Bangladesh. It joined by the Brahmaputra at Golundo. After meeting Meghna, the Ganga joins the Bay of Bengal.
- The Ganga, along with Brahmaputra forms the largest delta of the world. The delta, region was dense forests called Sunderbans (mangrove vegetation).
- The Yamuna is the largest and the most important tributary of the Ganga. Yamuna rises from the Yamnotri glacier in Garhwal, which is very close to Gangotri. Yamuna joins, the Ganga at Allahabad. The Chambal, the Sindh, the Betwa and the Ken are important tributaries of the Yamuna.

Drainage System

River	Source	Length in km
Ganga	Gangotri Glacier	2525
Yamuna	Yamnotri Glacier	1376
Chambal	Near Mhow	1050
Ramganga	Garhwal district	596
Ghaghra	Near Gurla Mandhota Peak	1080
Gandak	Tibet-Nepal border	425 (in India)
Kosi	Sikkim-Nepal-Tibet Himalaya	730 (in India)

The Brahmaputra System

- The Brahmaputra one of the largest rivers of the world rises in the Kailash range. It passes through Tibet, India and Bangladesh.
- It is known as Tsangpo in Tibet and Yarlung, Zangbo xingxiang in Chinese language and Padma in Bangladesh.
- Its important tributaries are Tista, Dibong, Lohit etc.
- World's largest fresh water island. Majuli is in this Brahmaputra river.
- It flows to Bay of Bengal after joining Ganga.

The Peninsular River System

East Flowing Rivers

- **The Mahanadi** The 857 kms long Mahanadi rises near Sihawa in Raipur district (Chhattisgarh). Its important tributaries are Ib, Mand, Hasdo, Sheonath, Ong, Jonk and Tel.
- **The Godavari** It is the largest river of Peninsular India and rises near Nasik in Maharashtra. It is also called "Dakshin Ganga" or "Vridha Ganga". Having the length of 1465 kms, it passes through Maharashtra, Chhattisgarh, Karnataka, Odisha and Andhra Pradesh, Manjra, Penganga, Wardha, Wainganga, Indrawati, Sabri, Parmara etc are its important tributaries.
- **The Krishna** Second largest river of Peninsular India, rises near Mahableshwar. It passes through Karnataka, Andhra Pradesh, Maharashtra. The Koyna, the Ghatprabha, the Malprabha, the Bhima the Tungabhadra, the Muri and the Munneru are its important tributaries.
- **The Cauveri** It is the most sacred river of South India and in designated as the "Ganga of the South". The source of this river lies at Talakaveri on the Brahmagiri range of hills in the Western Ghats. It passes through Tamil Nadu, Karnataka, Kerala. The Amarawati, Hemawati, Shimsa, Kabbani, Noyil and Bhawani are its chief tributaries.

The West flowing rivers

- **The Narmada** It is the largest of all West flowing rivers of Peninsular India and rises for Amarkantak in Madhya Pradesh. It springs from Amarkantak and flows through a rift valley between the Vindhyan range on the North and the Satpura range on the South. It forms estuary in gulf of khambhat. The Narmada forms the most specutacular and world famous. Dhuan Dhar (cloud of mist) falls at Jabalpur. Hiran and Tawan are its tributaries.
- **The Tapi** It is the second largest West flowing river of the Peninsular India. It is known as 'the twin' or 'the hand-maid' of the Narmada. It springs from the sacred tank of Multai on the Satpura plateau. The Tapi makes an estuary, as it enters the Gulf of Khambhat.
- **The Sabarmati** It is the name given to the combined streams—the Sabar and Hathmati. Hills of Mewar in the Aravalli range is the birth place of this river. It drains into the Gulf of Khambat.

Indian Soil

- Soil is an extremly important resources, especially in agricultural countries like India, Pakistan and Bangladesh.
- On the basis of genesis, colour, composition and location, the Indian Council of Agricultural Research (ICAR) has classified the soil of India into following categories

Alluvial Soil

- They are found throughout the Indo-Gangetic plain, along the coastal region (Konkan, Malabar, Coromandel and Northern circar) and river of Peninsula.
- It covers 40% of the land area, in fact the entire Northern plains are made up of these soils.
- These most productive soils are depositional soils and transpotted by rivers (Sutlej, Ganga and Brahmaputra), streams and winds. They are largely sandy loan in texture or are mixed with both silt and clay.
- There is an average proportion of phosphorous and potassium in alluvial soils, but it lacks nitrogen and organic material.
- Alluvial soils are divided into Banjar (old alluvial) and Khadar (new alluvial).
- **Crops Grown** Suitable for Kharif and Rabi crops like cereals, cottons, oil seeds and sugarcane.

Black Soils or Regur Soils

- These soils are of volcanic origin. These soils are black in colour and are known as Black Soils or Regur Soil.
- These soils are most typical of the Deccan trap (Basalt) region spread over North-West Deccan plateau and are made up of lava flows.
- The soil is rich in iron, lime and aluminium but lacks nitrogen, phosphorous and potash.
- Humas is almost absent in the soil.
- **Crops Grown** Cotton, Jawar, Wheat, Sugarcane, Linseed, Gram, Fruit and Vegetable.

Red Soils

- Formed by weathering of granite, guesis and schist rocks. It is mixture of clay and sand.
- The colour is red because of the presence of iron oxides.
- Red Soils cover the Eastern part of the Peninsular region comprising Chhotanagpur plateau, Odisha, Eastern Chhattisgarh, Telangana, the Nilgiris and Tamil Nadu plateau.
- The soil lacks nitrogen, phosphorus and humus.
- **Crops Grown** Suitable for the cultivation of coarse grains, pulses and oilseeds.

Laterite Soils

- The Laterite Soils are formed due to weathering of laterite rocks in high temperature and heavy rainfall with alternate dry and wet period.
- The organic matter, nitrogen, phosphate and calcium are low in laterite soils.
- They are found in Eastern and Western Ghats, Rajmahal Hills, parts of Kerala and Karnataka. Past regions of Chhotanagpur, Meghalaya plateau and Asom.
- **Crops Grown** Suitable for coarse grain.

Arid and Desert Soil

- Due to dry climate, high temperature and accelerated evaporation, these soils lack moisture and humus content, but rich in phosphates and calcium.
- They are found in West Rajasthan, Southern Punjab and Haryana and North Gujarat.
- **Crops Grown** With irrigation these soil can be better utilised for cultivation.

Saline Soils

- Also known as 'Usara' Soils.
- They contains a large proportion of salts of sodium, potassium and magnesium. They acquire salts largely because of dry climate and poor drainage.
- Saline Soils are found in the Rann of kutch, Sunderbans and port of coastal plains of Odisha and Kerala States.

Peaty and Organic Soils

- They occur in the areas of heavy rainfall where there is good proportion of vegetation, hence rich in humns and organic content.

- These soils are found in Northern Bihar, Southern Uttarakhand (Almora district) and coastal areas of Paschim Banga, Odisha and Tamil Nadu.

Forest Soils

- The soil is found mainly in Himalayan region, Eastern and Western Ghats and hilly region of Peninsular India.
- They are found in the forest areas where sufficient rainfall is available. They are loany and silty on valley sides and coarse grained on upslopes.
- The soil lacks potassium, phosphorus and lime, resulting into low fertility. It is more suitable for the plantation crops like tea, coffee and fruits.

Transport in India

- India's transport system comprises several modes of transport including rail, road, coastal shipping, air transport etc.

Road Transport

- The share of road in total traffic has been growing 13.8% of freight traffic and 15.4% of passenger traffic in 1950-51 to an estimated 61% of freight traffic and 85% of passenger traffic by the end of 2003-04.
- National Highways have 70934 km length comprising only 2.14% of the total length of roads, carry about 40% of the total traffic of India.
- A programme of 46 laning of about 13000 km of National Highways Development Programme (NHDP) has been introduced by the Central Government. This includes the "Golden Quadrilateral" comprising National Highways connecting the four metropolitican cities of Delhi, Mumbai, Chennai and Kolkata. It has (GQ) a length of 5846 km.
- Other such programmes include the creation of the North-South corridor connecting Srinagar to Kanyakumari and East-West corridor connecting Silchar to Porbandar. This component of NHDP has a total length of about 7142 kms.

Rail Transport

- Indian Railways network is the largest in Asia and second largest in the world. Railways was introduced in India in 1853, between Mumbai to Thane.
- There are three types of rail lines in India
  (a) Broad Gauge (1.676 m)
  (b) Meter Gauge (1.000 m) and
  (c) Narrow Gauge (0.762 m)
- Railways has been divided into 17 zones. In 2010, Kolkata Metro has been added as a new zone.

Zones	Headquarters
East West	Bhubaneshwar
South Western	Hubli
West Central	Jabalpur
North Central	Allahabad
South East Central	Bilaspur
North Western	Jaipur
East Central	Hajipur
Western	Mumbai
Central	Mumbai
Eastern	Kolkata
Southern	Chennai
Northern	New Delhi
North Eastern	Gorakhpur
South Central	Secunderabad
South Eastern	Kolkata
North East Frontier	Guwahati
Kolkata Metro	Kolkata

Air Transport

- Airways in India started in 1911.
- All the airways companies were nationalised in 1953 and were put under two corporations namely Indian Airlines and Air India. Now, both have been merged and named India (2007).

Lakes and Gulfs

- **Chilka Lake** Largest brackish water lake and also the largest lake of India—Odisha.
- **Wular Lake** Largest fresh water lake—Jammu and Kashmir.
- **Sambhar Lake** Salt produced lake—Rajasthan.
- **Dal Lake** Famous lake in Srinagar of Jammu and Kashmir. The lake is famous for shikaras, house boats.
- **Kaliveli Lake** Coastal lake of Tamil Nadu Wetland.
- **Kolleru Lake** Fresh water lake in Andhra Pradesh.
- **Pulicat Lake** Brackish water lake, lies at the border of Tamil Nadu and Andhra Pradesh.
- **Loktak Lake** Largest fresh water lake in NE—Manipur.
- **Gulf of Kachch** Tidal energy generation—Gujarat.
- **Gulf of Cambay** Tapti, Narmada, Mahanadi Sabarmati—Gujarat.
- **Gulf of Mannar** Asia's first marine biosphere reserve—Tamil Nadu.

Ports in India

- Indian ports are divided into three categories major, minor and intermediate.
- India has about 190 ports in all (12 major ports and rest of them are intermediate and minor).

Major Ports

Kolkata Port

- It is a river in port 128 km away from Bay of Bengal. It is situated on the banks of river Hooghly.
- Haldia is newly developed because excessive silting prevented the entry of large marine vessels in Kolkata.

Paradip Port

- Located in Odisha.
- Coast along the Bay of Bengal.
- It is used for export of raw iron to Japan.

Vishakhapatnam Port

- It is the deepest port of India.
- Located in Andhra Pradesh.
- It serves the Bhilai and Rourkela steel plants.

Chennai Port

- It is the oldest artificial harbour.
- In terms of traffic handling capacity, it comes in second 'rank' after Mumbai.

Ennore Port

- Declared major port in 2001.
- It is administered by Ennore Port Ltd.
- Provided with all the modern facilities.

Tuticorin Port

- Oldest ancient (Panday dynasty) famous port of India.
- It has an artificial deep sea harbour.

Kochi Port

- A fine natural harbour.
- It is located in Kerala coast.
- It handles the export of coffee and spices and import of petroleum and fertilizers.

New Mangalore Port

- 'Gateway of Karnataka'.
- It handles the export of iron ore of Kudremukh.

Marmugoa Port

- It is for naval operations.
- India's leading iron-ore port.

Mumbai Port

- India's busiest port.
- A natural port.
- Nhava Sheva (A new port) is being developed near Mumbai Port.

Jawaharlal Nehru Port Trust (JNPT)

- It occupies the fifth position in the World's fastest growing ports.

Kandla Port

- It was developed after partition of India for substituting Karachi port therefore called 'offspring of partition'.
- It is a tidal port and a free trade zone located in the Rann of Kachch.
- India has total coast 7516 kms.
- Largest coastline is Gujarat and Andhra Pradesh
- Over 90% International trade are caried out by ships.
- Inland water transport with 15000 km navigable waterways, hardly contribute 1% of transport in terms of tonne-km.
- After independence, India was left with five major ports.

Inland Water Transport

- India has total navigable waterways of 14544 km but only 5200 km on major rivers and 500 km on canals are suitable for mechanized crafts.
- Inland Water Transport Corporation Limited was set up in 1967 to look after this sector.

National Waterways

Uptill now, government has declared five National Waterways They are

NWW Estb. in	Stretches	Rivers	Lengths
1986	Allahabad-Haldia	Ganga-Bhagirathi-Hugly	1620 km
1988	Sadiya–Dhubri	Brahmaputra	891 km
1993	Kollam–Kottapuram	West coast canal along with Champakara and Udyogmandal canals	205 km
2007	Bhadrachalam Rajahmundry and Waziabad –Vijaywada	Krishna-Godvari	1095 km
2007	Mangalgadi–Paradeep	Mahanadi-Brahamani	623 km

Climatic Regions

- India has very diverse climatic conditions It can be divided into several climatic region as.

Tropical Rain Forest

- These forests are found in parts of Asom (including Mawsynram in Cherrapunji—highest rain fall in the world) and West coast plains of India in Kerala.
- Rain forests are found in high rainfall occuring areas.

Tropical Savanna Climate
It is found in most of the peninsular region of India.

Tropical and Subtropical Steppes
- It covers large area of plains in Punjab, Haryana, Kachch and part of West Gangetic plains and some parts of penisular India.

Tropical Desert
- These forests are part of Kachch and West Rajasthan.

Monsoon Type Climate
- In most of the Northern plains.
- Monsoon with dry winters.

Tidal Coastal Forests
- Salt-water trees like Sundari abound in the Ganga Delta (Sundarbans).
- Other delta regions along the East coast.

National Parks/Wild Life Sanctuaries

Name	Situated at
Kaziranga Sanctuary	Home of Asiatic lion, Gujarat
Manas Sanctuary	One horned rhino, Asom
Chandraprabha Sanctuary	Home of Asiatic lion, Uttar Pradesh
Ghana Bird Sanctuary or Keoladeo Bird Sanctuary	In Bharatpur, Rajasthan
Dachigam Sanctuary	Hangul, Kashmir
Corbett National Park	Home of tiger, Uttar Pradesh
Kanha National Park	In Madhya Pradesh
Shiva-puri National Park	In Madhya Pradesh
Hazaribagh National Park	In Bihar
Periyar Game Sanctuary	In Kerala
Dudhwa National Park	In Uttar Pradesh
Vedanthangal Bird Sanctuary	In Tamil Nadu
Nokrek National Park	In Meghalaya
Sariska Sanctuary	In Rajasthan
Ranthambhor National Park	In Rajasthan
Namdapha National Park	In Arunachal Pradesh
Keibul Lamjo	Floating National Park in Manipur
Palamau Tiger Project	In Bihar
Simlipal National Park	In Odisha
Ranganthittoo Bird Sanctuary	In Mysore, Karnataka
Nagarhole National Park	In Karnataka
Mudumalai Sanctuary	In Tamil Nadu

Note Total **Sanctuaries** in India are **490** and total **National Parks** are **88**.

Miscellaneous Information of India (Nicknames of Important Indian Places)

Nickname	Places	Nicknames	Places
Golden City	Amritsar	Sorrow of Bengal	Damodar river
Manchester of India	Ahmedabad	Sorow of Bihar	Kosi river
City of Seven Islands	Mumbai	Blue Mountains	Nilgiri
Queen of Arabian Sea	Kochi	Queen of the Mountains	Mussoorie (Uttarakhand)
Space City	Bengaluru	Sacred river	Ganga
Garden of India	Bengaluru	Hollywood of India	Mumbai

Important Indian Towns on Rivers

Towns	Rivers	Towns	Rivers
Allahabad	At the confluence of the Ganga,	Kota	Chambal
Patna	Yamuna and Saraswati Ganga	Jabalpur	Narmada
Varanasi	Ganga	Panji	Mandavi
Kanpur	Ganga	Ujjain	Kshipra
Hardwar	Ganga	Surat	Tapti
Badrinath	Alaknanda	Jamshedpur	Swarnarekha
Agra	Yamuna	Dibrugarh	Brahmaputra
Delhi	Yamuna	Guwahati	Brahmaputra
Mathura	Yamuna	Kolkata	Hooghly
Ferozpur	Sutlej	Sambalpur	Mahanadi
Ludhiana	Sutlej	Cuttack	Mahanadi
Srinagar	Jhelum	Serirangapatnam	Cauveri
Lucknow	Gomti	Hyderabad	Musi
Jaunpur	Gomti	Nasik	Godavari
Ayodhya	Saryu	Vijaywada	Krishna
Bareilly	Ram Ganga	Kurnool	Tungabhadra
Ahmedabad	Sabarmati	Tiruchirapalli	Cauveri

Some Important Crops

Crops	Cultivated at
Rice (Oryza Sativa)	In Paschim Banga, Uttar Pradesh, Andhra Pradesh, Tamil Nadu, Punjab
Wheat (Triticum)	In Uttar Pradesh, Punjab, Haryana, Madhya Pradesh, Rajasthan
Maize	In Uttar Pradesh, Bihar, Punjab
Bajra	In Rajasthan, Gujarat, Uttar Pradesh
Jowar	In Maharashtra, Karnataka, Madhya Pradesh, Andhra Pradesh
Sugarcane	In Uttar Pradesh, Maharashtra, Tamil Nadu Andhra Pradesh
Cotton	In Gujarat, Maharashtra, Punjab, Haryana, Tamil Nadu
Jute	In Paschim Banga, Jharkhand, Asom, Odisha, Tripura
Oil seeds	In Madhya Pradesh, Gujarat, Rajasthan, Tamil Nadu
Pulses	In Madhya Pradesh, Maharashtra, Rajasthan, Uttar Pradesh
Tea	In Asom, Paschim Banga, Himachal Pradesh, Jharkhand (Ranchi district.), Tripura, Manipur, Arunachal Pradesh
Coffee	In Karnataka, Kerala, Tamil Nadu, Andhra Pradesh
Rubber	In Kerala and Tamil Nadu
Silk	In Karantaka, Jammu and Kashmir, Andhra Pradesh, Asom, Paschim Banga, Bihar. In India all four varieties of silk are available : Mulberry, tussar, eri and muga. Mulberry is the main variety, while tussar is mainly found in Bihar.
Tobacco	In Andhra Pradesh, Gujarat, Karanataka, Tamil Nadu, Odisha and Bihar.

National Highways

National Highways	Places Connected
No 1	Delhi and Amritsar (via Ambala and Jalandhar)
No 1 A	Jalandhar and Uri (via Madhavpur, Jammu, Srinagar and Baramula)
No 1 B	Batot and Kishtwar (via Doda)
No 2	Delhi and Kolkata (via Mathura and Varanasi)
No 3	Agra and Mumbai (via Gwalior and Nasik)
No 4	Thane and Chennai (via Pune, Belgaum, Hubli, Bangaluru and Ranipet)
No 4 A	Belgaum to Panji
No 5	Behragoda and Chennai (via Cuttack,Vishakhapatnam and Vijaywada) Pongest N.H. in India
No 6	Dhuria and Kolkata (via Nagpur, Raipur and Sambalpur)
No 7	Varanasi and Kanyakumari (via Nagpur, Bengaluru and Madurai)
No 8	Delhi and Mumbai (via Jaipur, Ahmedabad and Vadodara)
No 8 A	Ahmedabad and Kandla (via Morbi)
No 9	Pune and Vijayawada (via Sholapur and Hyderabad)
No 10	Delhi and Farika proceeding to Indo-Pak border
No 11	Agra and Bikaner (via Jaipur)

Exercise (Geography)

1. Which one of these is not a cold current?
(a) Labrador (b) Canaries
(c) Falkland (d) Gulf Stream

2. Shooting stars are called
(a) comet (b) asteroids
(c) meteors (d) None of these

3. Match the following

List I	List II
A. British Colombia	1. USA
B. Bavaria	2. UK
C. Gibraltar	3. Canada
D. Rhode Islands	4. Germany
	5. Denmark

Codes

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

4. Which one among the following language has the largest numbers of speakers in the world?
(a) Bengali (b) French
(c) Mandarin (d) English

5. Match the following

List I	List II
A. Alluvial Soil	1. Cotton
B. Black Soil	2. Rice
C. Brown Soil	3. Tea
D. Red Soil	4. Wheat

Codes

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

6. 'Sal' is a very important tree of
(a) tropical dry deciduous forest
(b) tropical rain forest
(c) thorn forest
(d) alpine forest

7. Our milky way is ..... in shape.
(a) spiral (b) optical
(c) round (d) None of these

8. Monsoon retreat is marked by
1. clear sky.
2. high pressure conditions at the Bay of Bengal.
3. rise in temperature on land.
Which of the statements given above is/are correct?
(a) Only 1 (b) 1 and 2 (c) 2 and 3 (d) 1, 2 and 3

9. Consider the following statements
1. In India, Red Panda is naturally found in the Western Himalayas only.
2. In India, Slow Loris lives in the dense forest of the North-East.
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

10. Our galaxy is known as
(a) milky powder (b) milky way
(c) sun (d) solar system

11. Which one of the following is the astronomical unit of distance which is equal to 3.26 light years?
(a) Parsec (b) Splite
(c) Kilometre (d) None of these

12. Light year means
(a) light travels in one year, from one place to another place
(b) it is a measurement of year
(c) it is the distance between Earth and Sun
(d) None of the above

13. Match the following

List I	List II
A. Ursa Major	1. Star
B. Sirius	2. Constellation
C. Milky way	3. Satellite
D. Titan	4. Galaxy
	5. Planet

Codes

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

14. Light year is a unit of
(a) time (b) distance
(c) parsec (d) None of these

15. One light year is equal to
(a) 9.46×10^{12} km or $300000 \times 365 \times 24 \times 60 \times 60$ km
(b) 10.9×10 km or $60000 \times 365 \times 24 \times 60 \times 60$ km
(c) 8.1×10 km or $61000 \times 365 \times 24 \times 60 \times 60$ km
(d) None of the above

16. Polestar is always seen at one point in the sky whereas other stars are not. This is because
(a) polestar lies in the axis of spin of the Earth
(b) polestar lies on the North pole of the Earth
(c) it indicates North pole
(d) None of the above

17. The 'Gaseous Hypothesis' has given to understand the origin of Solar System, is given by
(a) Kant (b) Laplace
(c) James Jeans (d) None of these

18. Which is nearest planet to Earth?
(a) Venus (b) Mercury (c) Mars (d) Jupiter

19. Which is nearest planet to Sun?
(a) Venus (b) Mercury (c) Earth (d) Mars

20. Which is the biggest planet of our Solar System?
(a) Jupiter (b) Saturn
(c) Mars (d) None of these

21. Which planet has a unique type of ring?
(a) Jupiter (b) Saturn (c) Uranus (d) Venus

22. Which appears as 'Greenish Star'?
(a) Neptune (b) Saturn (c) Jupiter (d) Earth

23. Which one of these planet has fastest revolution period in our Solar System?
(a) Mercury (b) Venus (c) Uranus (d) Earth

24. Which is known as Red Planet?
(a) Mars (b) Jupiter (c) Saturn (d) Pluto

25. Ninth planet of our Solar System (according to distance from Sun) is
(a) Saturn (b) Pluto (c) Neptune (d) Venus

26. Closest star of our Solar System is
(a) Proxima Centuri (b) Sirius
(c) Ludo (d) None of these

27. Asteroids circle between
(a) Mars and Jupiter (b) Earth and Venus
(c) Jupiter and Saturn (d) None of these

28. Comet has a
(a) a head and a tail (b) light
(c) flame (d) None of these

29. 'Charon' is the only satellite of
(a) Pluto (b) Jupiter (c) Venus (d) Neptune

30. Which planet is second in size after Jupiter?
(a) Saturn (b) Earth (c) Pluto (d) Venus

31. How old is our Sun?
(a) 15 billion years (b) 25 billion years
(c) 5 billion years (d) 10 billion, years

32. Sun's glowing surface is known as
(a) photosphere (b) chromosphere
(c) hydrosphere (d) None of these

33. Sun is made up of
(a) Hydrogen (b) Helium
(c) Both 'a' and 'b' (d) Nitrogen

34. ..... is taking place on Sun.
(a) Fission (b) Fusion
(c) Reaction (d) None of these

35. Comets are celestial bodies moving around the Solar System in
(a) elliptical orbit usually accompanied by a long shining tail
(b) hyperbolic orbit and a long tail
(c) some time elliptical and hyperbolic orbit and shine head
(d) None of the above

36. 'Path Finder' mission has been sent to explore
(a) Mars (b) Venus (c) Neptune (d) Pluto

37. Which of the following bears the name of 'The oceans of storms and the sea of tranquility'?
(a) Mars (b) Moon
(c) Earth (d) None of these

38. The planets are kept in motion in their respective orbits by
(a) gravitation and centrifugal force
(b) rotation
(c) their sizes and shapes
(d) None of the above

39. Which one of the Indian states has the largest coastline?
(a) Gujarat (b) Andhra Pradesh
(c) Karnataka (d) Tamil Nadu

40. Which planet is known as 'Morning Star'?
(a) Venus (b) Earth (c) Mercury (d) Mars

41. The Solar eclipse achieves totality only in limited geographical regions because
(a) the size of all shadow of the Moon on the Earth is small compared to the cross section of the Earth
(b) trajectories of the Earth around the Sun and the Moon around the Earth are not perfect circles
(c) Sun rays can reach most of the peripheral regions of the shadow of the Moon due to atmospheric refraction
(d) None of the above

42. Tides are highest when
(a) Sun, Moon and Earth are in one line
(b) Sun and Earth are in one line
(c) Earth and Moon are in one line
(d) None of the above

43. Who was the first person to land on the Moon?
(a) Neil Armstrong and Edwin Aldrin
(b) Neelam Sanjeeva Reddy and Einstein
(c) Stephen Hawkins and Kingsley
(d) None of the above

44. Moon light takes ..... to reach Earth.
(a) 1.3 second (b) 2.1 second
(c) 3.2 second (d) 6.2 second

45. Which one among the following states is smallest in area?
(a) Andhra Pradesh (b) Gujarat
(c) Karnataka (d) Tamil Nadu

46. The orbits of planets around the Sun or satellites around the Earth can be
(a) anti-clockwise and elliptical
(b) circular and elliptical
(c) elliptical and parabolic
(d) parabolic and elliptical

47. Lunar eclipse does not occur every month because
(a) Moon revolves around the Sun
(b) Earth revolves around the Sun
(c) the Moon's orbit is not all the time in the same plane as of the Earth
(d) None of the above

48. What are Sun Spots?
(a) Dark patches on the surface of the Sun resulting from a localised fall in the temperature to about 4000°C
(b) It has a large fusion area
(c) Wide area of Sun
(d) None of the above

49. Maximum length of a day on the poles is
(a) 24 hours (b) 48 hours
(c) 3 months (d) 6 months

50. Seasons on the Earth are caused due to
(a) revolution of Earth around the Sun
(b) rotation of Earth around its own axis
(c) shape of the Earth
(d) None of the above

51. What is the distance between the Earth and the Sun?
(a) 149 million km (b) 111 million km
(c) 168 million km (d) 192.3 million km

52. At the core of Earth, the temperature is estimated to be around
(a) 1000°C (b) 1200°C (c) 2600°C (d) 4000°C

53. The most abundant element found on the Earth is
(a) Nitrogen (b) Oxygen
(c) Silicon (d) Hydrogen or Iron

54. Which of the following pair of elements are supposed to constitute the internal core of the Earth?
(a) Magnesium and Lead (b) Iron and Chromium
(c) Iron and Copper (d) Nickel and Iron

55. The heavier silicates named 'Sima' or 'Silica' and Magnesium are most abundant in the
(a) crust (b) core
(c) mantle (d) None of these

56. Earth rotates around its axis pointing towards
(a) Sun (b) Moon
(c) Pole Star (d) None of these

57. Which one of the following soil is most suited for tea plantation?
(a) Acidic (b) Alkaline (c) Alluvial (d) Regur

58. The speed of rotation of the Earth is the highest
(a) along the Equator
(b) along the Tropic of Cancer
(c) along the Tropic of Capricorn
(d) at the North Pole

59. Match the following

List I	List II
A. Winter Solstice	1. 21st Match
B. Autumnal Equniox	2. 21st June
C. Summer Solstice	3. 23rd September
D. Vernal Equinox	4. 22nd December

Codes

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

60. The Earth completes a revolution in
(a) 365 days 17 hours 8 minutes 9.54 seconds
(b) 365 days 18 hours 6 minutes 7.54 seconds
(c) 365 days 23 hours 59 minutes 58.97 seconds
(d) 365 days 5 hours 48 minutes 45.5 seconds

61. Which one of the following states does not produce coffee in India?
(a) Tamil Nadu (b) Andhra Pradesh
(c) Kerala (d) karnataka

62. Match the following

List I (National Highways)	List II (Routes)
A. NH-9	1. Pune—Machhilipatnam
B. NH-12	2. Pathankot—Sama Khiali
C. NH-15	3. Panvel—Edapally
D. NH-17	4. Jabalpur—Jaipur

Codes

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

63. The Sun appears to rise in the East and set in the West because of
(a) the rotation of the Earth from West to East
(b) the revolution of the Earth
(c) movement of the Sun
(d) None of the above

64. Which one of the following is located in the Bastar region?
(a) Bandhavgarh National Park
(b) Dandeli Sanctuary
(c) Rajaji National Park
(d) Indravati National Park

65. What does equinox mean?
(a) The two periods of the year when day and night are equal
(b) The climate of the place
(c) Revolution of Earth
(d) None of the above

66. 'Sidereal day' is the time during which
(a) the Earth makes a complete rotation with respect to a star
(b) the Earth makes a complete revolution
(c) the hottest day of the year
(d) None of the above

67. Which of the following towns is not on the "Golden Quadrilateral", being created for the roads-infrastructure of the country?
(a) Ajmer (b) Ahmedabad
(c) Jabalpur (d) Gaya

68. The longest day falls on
(a) June 21 (b) June 25 (c) June 26 (d) June 28

69. The shortest day falls on
(a) March 24 (b) December 22
(c) September 24 (d) September 22

70. Which of the following statements is not true?
(a) Rotation of the Earth causes variation in the duration of day and night
(b) Revolution of Earth causes change of the seasons
(c) Rotation of the Earth causes day and night
(d) Rotation of the Earth affects the movements of winds and ocean currents

71. Which of the following pairs is not correctly matched?
(a) 66° 30′ S latitude : Arctic Circle
(b) 180° E or 180° W longitude : International date line
(c) 0°E or 0°W longitude : Equator
(d) 23° 30′ N latitude : Tropic of Cancer

72. The extent of Equatorial Region is
(a) 12°N to 12°S (b) 10°N to 10°S
(c) 5°N to 5°S (d) None of these

73. The Indian Standard Time is ahead of GMT by
(a) $5\frac{1}{2}$ hours (b) $6\frac{1}{2}$ hours
(c) $4\frac{1}{2}$ hours (d) None of these

74. When it is 12° noon at Greenwich, what is the time at New York (74° W)?
(a) 7.04 AM (b) 8.04 AM
(c) 9.04 AM (d) None of these

75. Which one of the following continents lies at 20° N and 80°E?
(a) Africa (b) Asia
(c) North America (d) Europe

76. India extends between
(a) 68° E and $97\frac{1^\circ}{2}$ E (b) 67° E and $98\frac{1^\circ}{2}$ E
(c) 65° E and $90\frac{1^\circ}{2}$ E (d) None of these

77. Which one of the latitudes forms a great circle?
(a) 0° (equator) (b) $23\frac{1}{2}^{\circ}$
(c) $66\frac{1}{2}^{\circ}$ (d) 90°

78. When a ship crosses date line from West to East
(a) it gains one day (b) it loses one day
(c) it loses half a day (d) it gains half a day

79. International date line passes through
(a) Bering Strait (b) Pacific Ocean
(c) Greenwich (d) London

80. A ship coming from Japan on Monday, crosses the International date line. The next day in New York will be
(a) Monday (b) Sunday (c) Wednesday (d) Tuesday

81. World is divided into ... time zones.
(a) 15 (b) 24 (c) 90 (d) 100

82. USA is divided into ... time zones.
(a) 5 (b) 10
(c) 15 (d) None of these

83. Which is one of the four major components of the atmosphere?
(a) Oxygen, nitrogen, CO_2 and water vapour
(b) Oxygen, nitrogen, CO_2 and hydrogen
(c) Oxygen, nitrogen, CO_2 and neon
(d) Nitrogen, oxygen, argon and minor gases

84. The amount of insolation received at a place on the surface of the Earth depends upon
(a) its climate
(b) the longitude of the place
(c) its latitude
(d) the altitude of the place

85. Which of the following latitudes do the trade winds blow towards the Equator?
(a) 30° N and 30° S (b) 45° N and 40° S
(c) 40° N and 35° S (d) 60° N and 65° S

86. Nanda Devi peak forms a part of
(a) Asom Himalayas (b) Kumaun Himalayas
(c) Nepal Himalayas (d) Punjab Himalayas

87. 'Jet Streams', what is true regarding it?
1. High velocity winds.
2. Blow from West to East.
3. Blow in the mesosphere.
4. Blow in the upper troposphere near the tropopause.
Which of the statements given above is/are correct?
(a) 1, 2 and 3 (b) 1, 3 and 4 (c) 1, 2 and 4 (d) 2, 3 and 4

88. The trade winds are also called
(a) tropical easterlies (b) tropical westerlies
(c) whirlwinds (d) monsoon winds

89. In atmosphere, the atmospheric pressure
(a) increases with height
(b) decreases with height
(c) first increases and then decreases
(d) remains constant with height

90. In the Equatorial areas, the wind system is known as
(a) monsoon winds (b) trade winds
(c) westerly winds (d) doldrum winds

91. The sea breeze blows during
(a) day from land to sea (b) day from sea to land
(c) night from sea to land (d) night from land to sea

92. When it rains, the relative humidity in the atmospehre is
(a) 50% (b) 10% (c) 75% (d) 100%

93. What is the amount of albedo in the atmosphere?
(a) 50% (b) 42% (c) 15% (d) 34%

94. Which of the following constituents of atmosphere is important from the climate point of view?
1. Nitrogen, 2. Oxygen 3. CO_2
Which one is correct?
(a) 2 and 3 (b) 1 and 2
(c) 1, 2 and 3 (d) Only 3

95. Winds blow
(a) in the region of low pressure
(b) from region of low pressure to region of high pressure
(c) from a region of high pressure to a region of low pressure
(d) in regions of high pressure

96. Winds variously known as roaring forties, furious fifties and stormy sixties are
(a) polar winds (b) trade winds
(c) westerlies (d) cyclones

97. Which one of the following are the sequences of atmospheric layers?
(a) Tropopause, Tropospehre, Ionosphere, Stratosphere
(b) Troposphere, Tropopause, Stratosphere, Ionosphere
(c) Stratosphere, Ionosphere, Tropopause, Troposphere
(d) Ionosphere, Troposphere, Stratosphere, Tropopause

98. 'Lapse' is related to the decrease of
(a) temperature of 1°C at every 165 m
(b) humidity with an ascent of 450 feet
(c) wind velocity with an ascent of 400 feet
(d) pressure wth an ascent of 600 feet

99. Which one of the graphs is used for measuring relative humidity in the air?
(a) Hydrograph (b) Barograph
(c) Hygrograph (d) Seismograph

100. Trade winds blow in the Northern Hemisphere from
(a) North-East to South-East (b) North-East to South-West
(c) South-East to North (d) None of the above

101. Which one of the following is not a lagoon?
(a) Ashtamudi (b) Chilka lake
(c) Periyar (d) Pulicat lake

102. Match the following

List I (Winds)	List II (Countries)
A. Purga	1. Russian tundra belt
B. Brickfielder	2. Australia
C. Norwester	3. New Zealand
D. Tornadoes	4. Coastal US

Codes

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

	A	B	C	D
(b)	2	3	4	1

(d) None of these

103. Warm day winds blowing down the East slopes of Rockies are known as
(a) Westerlies (b) Mistral
(c) Chinook (d) Nor-Westers

104. Koppen divided world's climate in .....groups.
(a) six (b) five (c) fourteen (d) ten

105. Extreme type of climate is found in
(a) Savanna (b) Pampas (c) Tundra (d) Taigas

106. Coniferous trees are a characteristic feature of ..... climate.
(a) Savanna type (b) Monsoon type
(c) Tundra type (d) Taiga type

107. Which of the climatic regions is similar to the mediterranean type?
(a) The Taiga type (b) The China type
(c) The Tropical Savanna (d) The Subtropical Steppe

108. Wood pulp comes from
(a) equatorial region (b) coniferous forest region
(c) temperate region (d) mediterranean region

109. 'Mahogany' trees are found in the region of
(a) tropical evergreen forests (b) mediterranean forests
(c) tropical monsoon forests (d) coniferous forests region

110. 'Pampas' region is found in
(a) Africa (b) Australia
(c) North America (d) South America

111. Reindeer is a common animal found in the
(a) Steppe region (b) Tundra region
(c) Temperate region (d) Grassland region

112. Which is the characteristic of Taiga forests?
(a) Broad leaves (b) Dense leaves
(c) Pointed leaves (d) Canopy leaves

113. Which of the following environments supports the growth of Mangrove Swamp?
(a) Tidal flat (b) Monsoon
(c) Equatorial (d) Mixed

114. 'Lichens and Mosses' are the characteristic vegetations of
(a) hot desert region (b) mediterranean region
(c) tundra region (d) temperate region

115. The Congo and Amazon basin fall in the
(a) equatorial region (b) warm temperate region
(c) mediterranean region (d) cool temperate region

116. The mediterranean climate is characterised by
(a) high temperature and heavy rainfall
(b) hot summer and cold winter
(c) dry summer and humid winter
(d) very cold winter but not hot summer

117. Which one of the following is known as the "Coffee Port" of the world?
(a) Sao Paulo (b) Santos
(c) Rio de Janerio (d) Buenos Aires

118. Which of the following regions is characterised by high temperature, heavy rainfall and dense vegetation?
(a) Hot grassland region (b) Monsoon region
(c) Steppe (d) Equatorial region

119. Tropical Savanna is found in
(a) Venezuela, Sudan and Kenya
(b) North-West Europe
(c) Scandinavia and Canada
(d) India, Phillipines and North Chile

120. Which one of the following sets of states benefits the most from the Konkan Railway?
(a) Goa, Karnataka, Maharashtra, Kerala
(b) Madhya Pradesh, Maharashtra, Tamil Nadu, Kerala
(c) Tamil Nadu, Kerala, Goa, Maharashtra
(d) Gujarat, Maharashtra, Goa, Tamil Nadu

121. 'Taiga' refers to
(a) deciduous forests of Canada
(b) monsoon forests of China
(c) euqatorial forests of Amazon
(d) coniferous forests of Russian Siberia

122. The extensive treeless tracts of North America which are covered with tall coarse grass are called
(a) Pampas (b) Savanna (c) Prairies (d) Tundras

123. Willy Willy is
(a) a type of tree grown in temperate regions
(b) a wind that blows in a desert
(c) a tropical cyclone of the North-West Australia
(d) a kind of common fish found near Lakshadweep Islands

124. Teak and Sal are the principal trees in the forests known as
(a) dry deciduous
(b) tropical moist deciduous
(c) dry evergreen
(d) tropical moist evergreen

125. Match the following

List I (Important Days)	List II (Dates)
A. World Environment day	1. March 20
B. World Forestry Day	2. June 5
C. World Habitat Day	3. September 16
D. World Ozone Day	4. October 3
	5. December 10

Codes

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

126. High Velds are the temperate grasslands of
(a) Africa (b) South Africa
(c) Europe and Asia (d) Australia

127. The mediterranean lands are called the world's
(a) grazing lands (b) orchard lands
(c) forest lands (d) paddy lands

128. The tropical rain forests are dense and varied because of
(a) very little interference from man
(b) their remote and inaccessible locations
(c) poor economic development
(d) an abundance of moisture and warm temperature throughout the year

129. Temperate forests (mid-latitudes) include the trees of
(a) olive, maple and oak
(b) pine, fir and spruce
(c) teak, sal and bamboo
(d) rosewood, mahogany and rubber

130. Tropical deciduous forests are those
(a) which contain only a few species
(b) which do not contain valuable trees
(c) which contain generally short, stunted trees
(d) which shed their leaves during dry season

131. Originally there was only one land mass called
(a) Panthalasia (b) Pangaea
(c) Gondwanaland (d) None of these

132. Pangaea split into two parts called as
(a) Lauratia and Gondwanaland
(b) America and Europe
(c) India and China
(d) None of the above

133. Continental Drift Theory is given by
(a) Wagner (b) Karl Marx
(c) Hawkins (d) Malthus

134. Which is the exact example of residual mountains?
(a) Nilgiri (b) Satpura (c) Himalayas (d) Aravali

135. Damodor Valley lies in the area of
(a) block mountain
(b) volcanic mountain
(c) new fold mountain
(d) None of the above

136. Himalaya is a
(a) fold mountain (b) block mountain
(c) volcanic mountain (d) None of these

137. Which one of these is the example of old mountain?
(a) Aravali mountain range (b) Himalaya range
(c) Andes (d) None of these

138. Volcanic mountain is made up of erruption of
(a) volcano (b) continental drift theory
(c) thunderstorm (d) None of these

139. Dasht-e-lut is a
(a) range of mountain (b) desert area
(c) plain area (d) forest area

140. Match the following

List I	List II
A. The Gobi	1. North Africa
B. Thar Desert	2. India
C. Atacama Desert	3. North Chile
D. Takla Makan	4. Mongolia
E. Sahara	5. China

Codes

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

(d) None of the above

141. The igneous rocks are formed due to
(a) granitisation
(b) disintegration of Magma
(c) accumulation of sediments at the bottom of the Sea
(d) altering of metamorphic rocks

142. Earthquakes and volcanoes occur mostly in
(a) plateau region (b) folded and faulted region
(c) deep and sea plains (d) None of these

143. Earthquakes rarely occur in
(a) Mexico (b) New Zealand
(c) Brazil (d) Alaska

144. Artesian wells are found in
(a) igneous rocks (b) sedimentary rocks
(c) metamorphic rocks (d) None of these

145. In which type of rocks are coal and petroleum found?
(a) Sedimentary (b) Granite
(c) Igneous (d) Metamorphic

146. Iron is found in
(a) metamorphic rocks (b) basic igneous rocks
(c) igneous rock (d) None of these

147. The most abundant element found in Earth's Crust is
(a) O_2 (b) nitrogen (c) aluminium (d) silicon

148. 'Ring of Fire' lies in
(a) Atlantic Ocean (b) Indian Ocean
(c) Pacific Ocean (d) Antartic Ocean

149. Molten rock below the surface of the Earth is called
(a) laccolith (b) lava (c) magma (d) basalt

150. Which one of the following is not a metamorphic rocks?
(a) Slate (b) Quartzite (c) Granite (d) Marble

151. Carbonaceous rocks producing coal and oil belong to the category of rocks called
(a) inorganic (b) igneous
(c) metamorphic (d) sedimentary

152. The biggest ocean of the world is
(a) Atlantic Ocean (b) Pacific Ocean
(c) Indian Ocean (d) Arctic Ocean

153. Diego Garcia is in
(a) Arabian Sea (b) Bay of Bengal
(c) Indian Ocean (d) Gulf of Aden

154. Which is the largest Gulf in the world?
(a) The Gulf of Cambay (b) Arabian Sea
(c) The Gulf of Mexico (d) Bay of Bengal

155. The strait which separates Asia from America is
(a) the Palk Strait
(b) Bering Strait
(c) Strait of Gibraltar
(d) the Strait of Malacca

156. The Gulf of Mannar is located in the
(a) Bay of Bengal (b) Indian Ocean
(c) Pacific Ocean (d) None of these

157. 'Hudson Bay' is situated in
(a) North America (b) South America
(c) Asia (d) None of these

158. 'Seychelles' Island is located in
(a) Indian Ocean (b) Pacific Ocean
(c) Altantic Ocean (d) None of these

159. 'Palk Strait' separates India and
(a) Sri Lanka (b) Pakistan
(c) Bangladesh (d) None of these

160. The Kiel canal links the
(a) Mediterranean Sea and Black Sea
(b) Pacific Ocean and Atlantic Ocean
(c) North Sea and Baltic Sea
(d) Mediterranean Sea and Red Sea

161. Strait of Malacca separates
(a) Sumatra and Malaysia (b) Java and Brunei
(c) Sumatra and Java (d) Malaysia and Brunei

162. Hawaii Islands are located in
(a) North Atlantic Ocean (b) South Atlantic Ocean
(c) Pacific Ocean (d) None of these

163. South Equatorial current is a ... current.
(a) cold (b) warm
(c) mixed (d) None of these

164. West Australian current flows in
(a) Indian Ocean (b) Pacific Ocean
(c) Atlantic Ocean (d) None of these

165. 'Falkland Current' flows near the coast of
(a) Argentina (b) Brazil (c) Chile (d) Britain

166. 'Gulf Stream', flowing in North Atlantic Ocean, is a ... water current.
(a) cold (b) warm
(c) cold and warm (d) None of these

167. Match the following

List I	List II
A. Californian current	1. North Pacific Ocean
B. Peruvian current	2. South Pacific Ocean
C. Canary current	3. North Atlantic Ocean
D. Falkland current	4. South Atlantic Ocean

Codes

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

168. Which one of the following is the total coastline area of India?
(a) 7516 km (b) 8250 km
(c) 9000 km (d) None of these

169. Match the following

List I (National Highways)	List II (Cities)
A. NH-1	1. Delhi—Kolkata
B. NH-2	2. Mumbai—Agra
C. NH-3	3. Chennai—Thane
D. NH-4	4. Delhi—Amritsar

Codes

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

170. Out of total land mass, plain area covers
(a) 43.3% (b) 50%
(c) 75% (d) None of these

171. Which one of the neighbouring countries has largest boundary with India?
(a) China (b) Pakistan (c) Bangladesh (d) Nepal

172. McMahon Line divides India and China border but 'Maginot Line' divides
(a) India and Pakistan (b) Russia and Germany
(c) Germany and France (d) America and Canada

173. Which one of the following is the Great Desert of India?
(a) Rajasthan (b) Thar
(c) Sahara (d) None of these

174. The 'Blue Mountains' is the epithet applicable to
(a) the Satpura mountain (b) the Lushai hills
(c) the Nilgiri hills (d) None of these

175. Tropic of Cancer passes through
(a) Madhya Pradesh (b) Bihar
(c) Uttar Pradesh (d) Punjab

176. The largest Indian peninsular river is
(a) Ganga (b) Krishna
(c) Godavari (d) None of these

177. Mention the period of blowing of South-West monsoon winds in India.
(a) All the year round (b) From October to January
(c) From June to September (d) From April to July

178. The second largest river basin in India is
(a) Godavari basin (b) Brahamputra basin
(c) Krishna basin (d) Cauveri basin

179. Which one of the following rivers flows between Vindhya ranges and Satpura?
(a) Narmada (b) Tapti (c) Chambal (d) Godavari

180. At least 60% of commercial energy in India comes from
(a) coal (b) nuclear projects
(c) hydel (d) None of these

181. River Chambal flows through
(a) Rajasthan, Madhya Pradesh and Uttar Pradesh
(b) Rajasthan, Madhya Pradesh and Chhattisgarh
(c) Madhya Pradesh, Uttar Pradesh and Haryana
(d) Madhya Pradesh and Uttar Pradesh

182. North India receives rain in winter because of
(a) Western disturbances (b) North-East monsoon
(c) Retreating monsoon (d) South-West monsoon

183. Which is the largest food crop, produced in India?
(a) Rice (b) Wheat
(c) Jowar (d) None of these

184. In the following, the river which attains its maximum flow before monsoon is
(a) Jhelum (b) Sabarmati (c) Yamuna (d) Ganga

185. Tin yielding State in India is
(a) Bihar (b) Jharkhand
(c) Odisha (d) Chhattisgarh

186. The Rihand Dam was constructed on the river
(a) Chambal (b) Sone (c) Murali (d) Ganga

187. Teakwood can be found in
(a) Asom and Western Ghat forests
(b) Gujarat
(c) Rajasthan
(d) None of the above

188. The winter rain in Chennai is caused by
(a) retreating monsoon (b) South-West monsoon
(c) North-East monsoon (d) None of these

189. How many countries' boundary touches with Indian boundary?
(a) 6 (b) 7
(c) 5 (d) None of these

190. The length of India from North to South is
(a) 3214 km (b) 3200 km (c) 3000 km (d) 2933 km

191. Which one of the following is the Southernmost part of Indian territory?
(a) Indira Point (b) Kanyakumari
(c) Palk Strait (d) Kashmir

192. The factors which determine the climate of a place are
1. Soil 2. Latitude
3. Altitude 4. Vegetation

Which one is correct?
(a) 1 and 2 (b) 3 and 4
(c) 2 and 3 (d) Only 2

193. Which of the following types of soils has marked capacity to retain water?
(a) Red soil (b) Laterite soil
(c) Regur soil (Black soil) (d) Desert soil

194. Which soil is formed by deposition of river sediments?
(a) Regur (b) Brown
(c) Laterite (d) Alluvial

195. 'Red soil' is mostly used for growing
(a) jute (b) tea (c) millets (d) cotton

196. Saline soils are formed by intense evaporation and are frequently found in
(a) steppes (b) deltas
(c) tropical desert region (d) overgrazing

197. Out of the following statements about the major soil types, the wrong one is
(a) red soil rich in phosphorous, lime and nitrogen
(b) black soil is highly retentive of moisture and very productive
(c) alluvial soil is easy to plough
(d) laterite is typically a soil of tropical regions which receive heavy seasonal rainfall

198. Which of the following is the most important cause of soil erosion?
(a) Rain (b) Overgrazing
(c) Deforestation (d) Wind

199. Alluvial soil are rich soil for crop cultivation but are poor in
(a) humus (b) nitrogen and humus
(c) organic material (d) inorganic material

200. 'Black soil' is suitable for the cultivation of
(a) coffee (b) tea
(c) poppy (d) cotton

201. 'Red soil' is commonly found in
(a) Punjab and Haryana
(b) Himachal and Jammu and Kashmir
(c) Gujarat and Rajasthan
(d) Andhra Pradesh and Tamil Nadu

202. Lower content of 'Humus' is found in
(a) black soil (b) alluvial soil
(c) desertic soil (d) red soil

203. The soil formed by the deposition of silt brought by river is
(a) alluvial soil (b) black soil
(c) red soil (d) None of these

204. Highest peak of South India is
(a) Doda Betta (b) Annaimudi
(c) Kalsubai (d) None of these

205. 'Garo, Khasi and Jaintia' are located in
(a) Meghalaya (b) Tripura
(c) Asom (d) None of these

206. India's uppermost mountain range is
(a) Karakoram range (b) Zanskar range
(c) Kailash range (d) None of these

207. The northmost range is referred to
(a) the Himadri (b) the Himalayas
(c) Shahyadri (d) None of these

208. Oldest mountain range of India is
(a) Aravali range (b) Shivalik range
(c) Rajmahal mountains (d) None of these

209. The mountain peak K_2 is situated in
(a) Karakoram range (b) Shivalik range
(c) Zanskar mountains (d) Kailash range

210. 'Pir Panjal' in Jammu and Kashmir is a well known hill resort of
(a) Gulmarg (b) Kumaun
(c) Srinagar (d) None of these

211. Coffee is grown in
(a) Niligiri hills (b) Satpura range
(c) Asom (d) Bengal

212. Virginia tobacco is mostly cultivated in
(a) Bihar (b) Andhra Pradesh
(c) Gujarat (d) None of these

213. Which state in India produces the largest quantity of rubber?
(a) Andhra Pradesh (b) Kerala
(c) Tamil Nadu (d) None of these

214. Groundnut is largely grown in
(a) Gujarat (b) Maharashtra
(c) Madhya Pradesh (d) None of these

215. Saffron is largely grown in
(a) Jammu and Kashmir (b) Andhra Pradesh
(c) Tamil Nadu (d) Himachal Pradesh

216. 'Jute' is largely grown in
(a) Asom (b) Paschim Banga
(c) Haryana (d) Bihar

217. 'Soyabean' is largely grown in
(a) Madhya Pradesh (b) Uttar Pradesh
(c) Bihar (d) None of these

218. India is the largest producer as well as consumer of
(a) groundnut (b) pulses
(c) wheat (d) None of these

219. Which is the main source of irrigation of agriculture land in India?
(a) Well (b) Canals
(c) Tanks (d) Rivers

220. Which of the following States is the leading producer of tobacco?
(a) Andhra Pradesh (b) Bihar
(c) Tamil Nadu (d) Gujarat

221. 'Coconut' is largely cultivated in
(a) Kerala (b) Goa
(c) Tamil Nadu (d) Andhra Pradesh

222. Sowing season for Kharif crop is
(a) February to March (b) August to September
(c) May and July (d) October to December

223. Which is the most important Kharif crop?
(a) Wheat (b) Rice
(c) Jowar (d) None of these

224. Which one of the following are not Kharif crops?
(a) Bajra and maize (b) Sugarcane and groundnut
(c) Rice and jowar (d) Barley and mustard

225. Kharif crops are harvested in
(a) summer (b) late autumn
(c) winter (d) spring

226. The rabi season begins in
(a) autumn (b) winter
(c) early summer (d) spring

227. Major rabi crop in India is
(a) rice (b) wheat
(c) maize (d) barley

228. What type of climate is most suitable for the cultivation of spices in India?
(a) Hot and dry (b) Hot and moist
(c) Cold and dry (d) Cold and moist

229. Which of the following is the major cause of Green Revolution in India?
(a) Land reforms
(b) Increase in irrigation facilities
(c) Introduction of HYV seeds and fertilizers
(d) Improvement in agriculture marketing

230. Consider the following statements
1. The Green Revolution has been limited in its spatial coverage in India.
2. It has been confined mainly to Punjab, Haryana and West Uttar Pradesh.
(a) Both 1 and 2 are true (b) 1 is true but 2 is false
(c) Both 1 and 2 are false (d) 1 is false but 2 is true

231. Terrace farming is widely practiced in
(a) mountain area (b) Malabar coast
(c) plain (d) deccan plateau

232. Which of the following statements is incorrect?
(a) Wheat is grown in Punjab
(b) Tea is produced in Asom
(c) Coffee is grown in Kerala
(d) Saffron is grown in Himachal Pradesh

233. India leads in the production of
(a) mica (b) iron
(c) coal (d) None of these

234. Out of 100% mica production in India, Jharkhand produces
(a) 60% (b) 50%
(c) 70% (d) None of these

235. Manganese is mostly found in
(a) Odisha (b) Madhya Pradesh
(c) Karnataka (d) Rajasthan

236. The workable reserve of petroleum in India mostly comes from
(a) Gujarat and Maharashtra (b) Asom and Bengal
(c) Kerala and Gujarat (d) None of these

237. Magnetite deposits in India are found in
(a) Kerala, Odisha, Tamil Nadu (b) Tamil Nadu, Uttar Pradesh
(c) Kerala and Gujarat (d) None of these

238. The Kolar goldmines are located in
(a) Madhya Pradesh (b) Maharashtra
(c) Andhra Pradesh (d) Karnataka

239. Where are coal reserves largely concentrated in India?
(a) Godavari valley (b) Damodar valley
(c) Mahanadi valley (d) Eastern Ghats

240. The length of Suez Canal is approximately
(a) 120 km (b) 169 km (c) 175 km (d) 200 km

241. Which crop is generally sown to restore and maintain soil fertility?
(a) Barley (b) Jowar (c) Maize (d) Pulses

242. Under which climate conditions do the laterite soils develop?
(a) Wet tropical climate
(b) Hot and dry climate
(c) Cold temperate climate
(d) Mediterranean type of climate

243. The Appalachian coalfields belong to
(a) China (b) UK (c) Russia (d) USA

244. The Eastern coast of India is known as
(a) Coromandal coast (b) Konkan coast
(c) Eastern coast (d) None of these

245. Zojila Pass connects
(a) Kashmir and Tibet (b) Leh and Srinagar
(c) Kashmir and Jammu (d) None of these

246. Which of the following has the highest water salinity in the world?
(a) Dead Sea (b) Mediterranean Sea
(c) Caspian Sea (d) None of these

247. The widest gap across the Western Ghats is
(a) Mumbai (b) Thalghat
(c) Palghat (d) Noon ghat

248. North-East monsoon brings maximum rainfall to
(a) Kolkata (b) Chennai
(c) Chandigarh (d) Surat

249. The smallest Union Territory is
(a) Lakshadweep
(b) Chandigarh
(c) Daman and Diu
(d) Andaman and Nicobar Islands

250. Where exactly is Aksai Chin?
(a) N-E corner of Jammu and Kashmir
(b) N-E corner of Himachal Pradesh
(c) N-E corner of Arunachal Pradesh
(d) Along Siachin Glacier

251. The Tehri dam has been constructed on the river
(a) Ganga (b) Brahmputra (c) Yamuna (d) Bhagirathi

252. Farakka barrage was built to check
(a) water flowing into Bangladesh
(b) silting to Kolkata port
(c) erosion of Kolkata port
(d) All of the above

253. The Mumbai-Pune railway route passes through
(a) Bolan pass (b) Thalghat (c) Bhorghat (d) Balaghat

254. The seaport which does not have a petroleum refinery is
(a) Diamond Harbour (b) Mangalore
(c) Chennai (d) Kochi

255. Which State has the largest length of roads?
(a) Uttar Pradesh (b) Andhra Pradesh
(c) Maharashtra (d) Paschim Banga

256. Atacama is
(a) a desert region of Northern Chile
(b) the grasslands of Argentina
(c) the peninsular portion of Eastern Mexico
(d) a desert region in South California

257. In terms of area, the smallest State of India is
(a) Goa (b) Sikkim (c) Delhi (d) Kerala

258. First textile industry was set up at
(a) Mumbai in Maharashtra (b) Kolkata in Paschim Banga
(c) Hajipur Vaishali in Bihar (d) Meerut in Uttar Pradesh

259. Indira Gandhi Canal originates from
(a) Gandhi Sagar dam (b) Hirakud dam
(c) Harike barrage (d) Bhakhra dam

260. Which of the following States is highly flood prone as well as drought prone?
(a) Uttar Pradesh (b) Bihar
(c) Paschim Banga (d) Asom

261. Which one of the following organisations is responsible for production of topographical sheets?
(a) Geological Survey of India (GSI)
(b) Survey of India (SOI)
(c) National Mapping Organsiation
(d) None of the above

262. Areawise, India's rank in the world is
(a) 5th (b) 7th
(c) 3rd (d) None of these

263. The oldest oil refinery in India is situated at
(a) Digboi (b) Ankleshwar (c) Nunamati (d) Koyali

264. Which country is largest producer of aluminium in the world?
(a) Russia (b) USA
(c) Australia (d) None of these

265. Monazite in India is mostly found in
(a) Kerala (b) Bihar (c) Jharkhand (d) Odisha

266. The Salal Hydroelectric Power Project is located in
(a) Jammu and Kashmir (b) Uttar Pradesh
(c) Maharashtra (d) Tamil Nadu

267. Which of the following items is exported from India in large quantities?
(a) Readymade garments (b) Gems and jewellery
(c) Tea (d) Iron and Steel

268. The Bokaro Steel Plant was set up with the assistance of
(a) USSR (b) USA (c) Germany (d) UK

269. Durgapur Steel Plant was set up with the assistance of
(a) USSR (b) USA
(c) Germany (d) UK

270. 'Sea bird' is a
(a) newly developed seaport for navy
(b) it is a sea bird
(c) a naval ship
(d) a weapon

271. Which of the following is a natural harbour?
(a) Paradeep (b) Vishakhapatnam
(c) Mumbai (d) None of these

272. The biggest source of power in India is
(a) Thermal power (b) Hydroelectric power
(c) Nuclear power (d) Solar power

273. The Indian city famous for glass bangle industry is
(a) Lucknow (b) Agra
(c) Secunderabad (d) Ferozabad

274. Which is known as Electronic City of Bihar?
(a) Hajipur (b) Patna
(c) Tatanagar (d) None of these

275. The longest railway platform in India is at
(a) Kharagpur (b) Delhi
(c) Katni (d) None of these

276. In which of the States is the largest deposit of coal found?
(a) Bihar (b) Jharkhand
(c) Bengal (d) Odisha

277. Largest share of Steel production is contributed by
(a) Tata Steel Plant (b) Balco Steel Plant
(c) Rourkela Steel Plant (d) None of these

278. Which one of the following is the world's biggest refinery?
(a) Reliance Oil Refinery
(b) Digboi Refinery
(c) America Petroleum Refinery
(d) None of the above

279. In India, large number of 'Alcohol' is produced in
(a) Uttar Pradesh (b) Maharashtra
(c) Bihar (d) None of these

280. Which one of the States is the biggest manufacturer of processed food?
(a) Himachal Pradesh (b) Punjab
(c) Uttar Pradesh (d) None of these

281. India's share of trading in the world market is
(a) less than 1% (b) Only 1%
(c) Only 2% (d) None of these

282. Which one of the sectors has higher growth rate in India?
(a) Manufacturing sector (b) Agricultural sector
(c) Service sector (d) None of these

283. Which one of the following Indian cities is known as 'Manchester of India'?
(a) Ahmedabad (b) Mumbai
(c) Kolkata (d) None of these

284. The largest and the busiest inland waterway in the world is
(a) The great lakes and the river St Lawrence in USA
(b) Ganga and Brahmaputra in India
(c) River Rhine
(d) None of the above

285. White goods are
(a) durable consumption goods
(b) milk made products
(c) detergent base goods
(d) None of the above

286. The largest railway junction is
(a) Moscow (USSR) (b) London (UK)
(c) Kharagpur (India) (d) New York (USA)

287. 'Contours' are lines connecting places having
(a) equal height (b) equal pressure
(c) equal temperature (d) None of these

288. On the banks of which river, is New York situated?
(a) Hudson (b) Missouri
(c) Lake Superior (d) None of these

289. Which of the following is the biggest island in the world?
(a) Borneo (b) Iceland
(c) Greenland (d) Sri Lanka

290. The city of London is located on the banks of the river
(a) Thames (b) Rhine
(c) Volga (d) None of these

291. Which country is known as the 'Sugar Bowl of the World'?
(a) India (b) Cuba (c) Brazil (d) Indonesia

292. 'Maoris' are the original inhabitants of
(a) Maurtius (b) New Zealand
(c) America (d) Australia

293. The moist air masses that cause winter rains in the North-Western region of India are part of
(a) trade winds (b) westerlies
(c) local disturbances (d) retreating monsoons

294. The biggest river of Russia is
(a) Ob (b) Yenisei
(c) Volga (d) None of these

295. The biggest river of Australia is
(a) Murray (b) Darling
(c) Mitchell (d) None of these

296. The biggest country of the world areawise is
(a) USA (b) Russia (c) China (d) Canada

297. The biggest country of Europe in area is
(a) Spain (b) France (c) Sweden (d) Germany

298. Zambezi is the river of
(a) South Africa (b) Brazil
(c) Algeria (d) None of these

299. Which mountain traditionally serves as a boundary separating Europe from Asia?
(a) The Urals (b) The Alps
(c) The Caucasus (d) None of these

300. The largest silver producer in the world is
(a) Mexico (b) USA (c) Guatemala (d) Bolivia

301. Which country is the world's largest producer of wool?
(a) New Zealand (b) Australia
(c) USA (d) None of these

302. What is the name of the canal that joins together the Pacific Ocean and the Caribbean Sea Ocean?
(a) Panama (b) Suez
(c) Kiel (d) None of these

303. The continent of Africa is divided into two parts by the
(a) Atlas mountains (b) Sahara Desert
(c) River Congo (d) None of these

304. Tirana is the capital of the country known as
(a) Yugoslavia (b) Hungary
(c) Albania (d) None of these

305. Which is the most densely populated country in the world?
(a) Pakistan (b) India (c) China (d) Bangladesh

306. Highest peak of Antarctica is
(a) Vinson Massif (b) Mt Sidley
(c) Mt Amundsen (d) Mt Horlic

307. The town known as 'Venice of East' is
(a) Bangkok (b) Sikiang
(c) Tokyo (d) None of these

308. Which river is known as the 'Sorrow of China'?
(a) The Hwang Ho (b) The Sikiang
(c) The Mekong (d) None of these

309. Which is the largest Gulf in the world?
(a) Gulf of Mexico (b) Gulf of Cambay
(c) Persian Gulf (d) None of these

310. The city of Los Angeles is famous for
(a) film studios (b) golden beaches
(c) rocket launching station (d) None of the above

311. The largest of the Nordic countries is
(a) Sweden (b) Finland
(c) Scotland (d) None of these

312. Which one of the countries has no coastline?
(a) Pakistan (b) Hungary (c) Iraq (d) UAE

313. What was the earlier name of Ghana?
(a) The Gold Coast (b) The Ivory Coast
(c) Malabar (d) The Levant

314. Falkland islands are in
(a) Antarctica (b) South Atlantic
(c) North Atlantic (d) Indian Ocean

315. Vatican City is the residence of
(a) Pope (b) British Queen
(c) Italy President (d) None of these

316. A strip of land connecting two large land masses is called the
(a) Strait (b) Isthmus (c) Isotherm (d) Lagoon

317. Sudan, Niger, Kenya, Rhodesia and Mali lies in
(a) the Equatorial region (b) Tropical Grassland region
(c) Monsoon region (d) None of these

318. Suez provides a short sea trade route between
(a) far East, Arabian countries and countries on Eastern coast of Africa on one hand and Europe on the other
(b) Europe and Africa
(c) Africa and USA
(d) India and Europe

319. Water transportation has long been important because
(a) it is the cheapest means of moving heavy goods
(b) it is fastest means of transport
(c) easy to transport on it
(d) None of the above

320. Australia may be called a hollow continent because
(a) most people live along the coast
(b) there are desert in interior
(c) it is a continent
(d) None of the above

321. Chennai is hotter than Kolkata because
(a) Chennai is nearer to equator
(b) it is situated in South India
(c) its nearness to the sea
(d) None of the above

322. Out of the following which river crosses the equator twice?
(a) Amazon (b) Nile
(c) Zaire (d) Congo

323. Which one of the following conditions causes rainfall?
(a) Cooling of the dry air
(b) Cooling of the saturated air
(c) Increase in relative humidity
(d) Decrease in absolute humidity

324. Which one of the following is the largest canal?
(a) Sharda Canal (b) Lower Ganga Canal
(c) Upper Ganga Canal (d) Yamuna Canal (West)

Indira Gandhi Canal

325. Which one of the following cities is not connected by NH-3?
(a) Agra (b) Bhopal
(c) Nasik (d) Gwalior

326. Which one of the following straits joins the Pacific Ocean with the Arctic Ocean?
(a) Bass (b) Bering
(c) Davis (d) Magellan

327. 'Sargasso Sea' is located in
(a) North Pacific Ocean (b) North Atlantic Ocean
(c) South Atlantic Ocean (d) None of the above

328. The largest fish exporting region in the word is
(a) S-E Asian region (b) N-W Pacific region
(c) N-E Atlantic region (d) None of these

329. In the Northern hemisphere, currents are deflected to their right due to
(a) Centrifugal force (b) Coriolis force
(c) Cyclonic storms (d) None of these

330. Frontal rain is caused by
(a) cyclonic activity (b) westerlies disturbances
(c) monsoon disturbances (d) None of these

331. The wind is deflected due to the rotation of Earth is known as
(a) geostropic wind (b) westerlies
(c) monsoon disturbances (d) None of these

332. The purest form of iron among the following is
(a) steel (b) white cast iron
(c) grey cast iron (d) wrough iron

333. Which one of the following serves as host tree for silkworm to produce good silk?
(a) Banyan tree (b) Hibiscus
(c) Mulberry (d) Chrysanthemum

334. Which one of the following rivers flows through Maharashtra and Gujarat?
(a) Godavari (b) Mahi
(c) Tapti (d) Sabarmati

335. Match the following

List I	List II
A. Murray River	1. Arabian Sea
B. Congo River	2. Indian Ocean
C. Nile	3. Mediterranean Sea
D. Indus	4. Atlantic Ocean

Codes

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

336. Match the following

List I (Islands)	List II (Situation/Oceans)
A. Greenland	1. Atlantic
B. Borneo	2. Pacific
C. Sumatra	3. Indian
D. Baffin	4. Arctic

Codes

	A	B	C	D
(a)	1	2	3	4
(b)	1	2	4	3
(c)	4	3	2	1
(d)	None of these			

337. Match the following

List I (Lakes)	List II (Area/Countries)
A. Lake Superior	1. N America
B. Lake Victora	2. E Central Africa
C. Lake Baykal	3. Asia (Russia)
D. Lake Ladoga	4. Russia (Europe)

Codes

	A	B	C	D
(a)	1	2	3	4
(b)	2	3	1	4
(c)	4	3	2	1
(d)	None of these			

338. Match the following

List I	List II
A. Continental Islands	1. Those islands that rises from the continental shelf
B. Oceanic Islands	2. Those rise from bottom of the ocean
C. Tectonic Islands	3. Islands are created by movements of the Earth's crust
D. Coral Islands	4. Islands, the work of minute sea organisms, are called coral islands

Codes

	A	B	C	D
(a)	1	2	3	4
(b)	4	3	2	1
(c)	2	3	1	4
(d)	None of these			

339. Match the following

List I (Name)	List II (Importance)
A. Challenger Deep	1. Deepest Point
B. Sagarmatha	2. Highest Point
C. Sahara	3. Biggest Desert
D. Pacific	4. Biggest Ocean

Codes

	A	B	C	D
(a)	1	2	3	4
(b)	4	3	2	1
(c)	3	4	1	2
(d)	None of these			

340. Match the following

List I (Minerals)	List II (Where found)
A. Mica	1. Jharkhand
B. Gold	2. Karnataka
C. Gypsum	3. Rajasthan
D. Petroleum	4. Gujarat

Codes

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

341. Match the following

List I (Industries)	List II (Cities)
A. Cotton textiles	1. Surat
B. Woollen textiles	2. Amritsar
C. Silk textiles	3. Karnataka
D. Jute industries	4. Paschim Banga

Codes

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

342. Match the following

List I (Industries)	List II (Cities)
A. Heavy machinery	1. Ranipur
B. Leather goods	2. Agra
C. Railway coaches	3. Perambur
D. Aircrafts	4. Kanpur

Codes

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

343. Match the following

List I (Names)	List II (Territories)
A. The Gobi	1. Iran
B. Dastit-e-lut	2. Mongolia
C. Majave Desert	3. USA
D. Karakum	4. Turkmenistan

Codes

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

344. Match the following

List I (Crops)	List II (Countries)
A. Coffee	1. Malaysia
B. Cocoa	2. China
C. Cotton	3. Ivory Coast
D. Rubber	4. Brazil

Codes

	A	B	C	D
(a)	1	2	3	4
(b)	4	3	2	1
(c)	1	2	4	3
(d)	None of these			

345. Match the following

List I (Cereals)	List II (Countries)
A. Rice	1. China
B. Maize	2. USA
C. Millets	3. Russia
D. Barley	4. India

Codes

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

346. Match the following

List I	List II
A. Hindenburg Line	1. Between Germany and Poland
B. 49th Parallel	2. Between Germany and France
C. 38th Parallel	3. Between North and South Korea
D. Sigfried Line	4. Between Canada and USA

Codes

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

347. Match the following

List I (Persons)	List II (Hypotheses)
A. Jeans	1. Continental Drift
B. Jeffreys	2. Continental subsistence
C. Joly	3. Contraction of Earth
D. Wagner	4. Splitting of Earth

Codes

	A	B	C	D
(a)	1	2	3	4
(b)	4	3	2	1
(c)	4	3	1	2
(d)	None of these			

348. Match the following

List I	List II
A. Koraput	1. Penicillin
B. Kalamassery	2. Turbines
C. Pimpri	3. Machine Tool
D. Hardwar	4. Aircraft

Codes

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

349. Match the following

List I (Tiger Reserves)	List II (States)
A. Bandipur	1. Maharashtra
B. Kanha	2. Tamil Nadu
C. Melghat	3. Madhya Pradesh
D. Simplipal	4. Odisha
	5. Karnataka

Codes

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

350. Match List I with List II and select the correct answer using the codes given below the lists

List I (Industrial Centres)	List II (Industries)
A. Salem	1. Railway coaches
B. Kochi	2. Jute
C. Gurgaon	3. Iron and Steel
D. Rishra	4. Ship building
	5. Automobile

Codes

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

351. Match List I (Volcanoes of the world) with List II (Countries) and select the correct answer using the codes given below the lists

List I (Volcanoes of World)	List II (Countries)
A. Catopaxi	1. Indonesia
B. Kilimanjaro	2. Kenya
C. Vesuvius	3. Equador
D. Karakatoa	4. Itlay
	5. Canada

Codes

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

352. Consider the following types of natural vegetation
1. Deciduous forests 2. Thorny bushes
3. Evergreen forests
4. Grassland with scattered trees

What is the correct sequence of the occurrence of these vegetations as we follow the rule : Jodhpur, Nagpur, Thiruvananthapuram?

Codes

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

353. Match List I (Types of power) with List II (Locations of power plant) and select the correct answer using the codes given below the lists

List I (Type of Powers)	List II (Locations of Power Plant)
A. Nuclear	1. Srisailam
B. Geothermal	2. Kalpakkam
C. Hydro	3. Ahmedabad
D. Solar	4. Manikaran

Codes

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

354. Match the following

List I	List II
A. Phobos	1. Asteroid
B. Titan	2. Mars
C. Nebulae	3. Neptune
D. Ceres	4. Saturn
	5. Stars

Codes

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

355. Match the following

List I	List II
A. Damodar	1. Punjab
B. Nagarjuna	2. Odisha
C. Bhakhara	3. Paschim Banga
D. Hirakud	4. Andhra Pradesh
	5. Madhya Pradesh

Codes

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

356. Match the following

List I	List II
A. Hirakud	1. Sutlej
B. Pong	2. Mahanadi
C. Bhakhra Nangal	3. Beas
D. Tungabhadra	4. Cauveri
	5. Tungabhadra river

Codes

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

357. Match the following

List I	List II
A. Kanha	1. Bihar
B. Jim Corbett	2. Madhya Pradesh
C. Ranthambore	3. Uttarakhand
D. Palamau	4. Maharashtra
	5. Rajasthan

Codes

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

358. Match the following

List I	List II
A. Cinchona	1. Coir
B. Rubber	2. Quinine
C. Coconut	3. Lantere
D. Acacia	4. Tarnin

Codes

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

359. Match the following

List I (Minerals)	List II (Places)
A. Mica	1. Gudur
B. Petroleum	2. Bonai
C. Iron ore	3. Kathegudam
D. Coal	4. Digboi
	5. Chaibasa

Codes

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

360. Match the following

List I (Export Items)	List II (Countries Exporting)
A. Copper	1. Argentina
B. Petroleum	2. Brazil
C. Meat	3. Uruguay
D. Coffee	4. Venezuela
	5. Chile

Codes

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

361. Match the following

List I	List II
A. Pepper	1. Kashmir Valley
B. Coffee	2. Brahmaputra Valley
C. Tea	3. Annamalai Hills
D. Saffron	4. Coorg

Codes

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

362. Match the following

List I	List II
A. Jharia	1. Gems and Jewellery
B. Mughal Sarai	2. Major port
C. Haldia	3. Marshalling yard
D. Surat	4. Mining

Codes

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

363. Match the following

List I (Lines on Map)	List II (Denote)
A. Isobaths	1. Same magnetic declination
B. Isorymes	2. Equal travel line from a common centre
C. Isochrones	3. Equal depth
D. Isogonals	4. Equal frost

Codes

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

364. Match the following

List I	List II
A. Black soil	1. Uttar Pradesh
B. Red soil	2. Asom
C. Laterite soil	3. Tamil Nadu
D. Alluvial soil	4. Maharashtra

Codes

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

365. Match the following

List I (States)	List II (Trees)
A. Asom	1. Rosewood
B. Himachal Pradesh	2. Bamboo
C. Karnataka	3. Deodar
D. Kerala	4. Sandalwood

Codes

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

366. Match the following

List I (Regions)	List II (Soils)
A. Malwa Plateau	1. Alluvial
B. Dharwar Plateau	2. Laterite
C. Punjab Plains	3. Red
D. Western Ghats	4. Regur

Codes

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

367. Match the following

List I (States of India)	List II (Population Characteristics)
A. Kerala	1. Highest population density
B. Mizoram	2. Highest percentage of population growth
C. Uttar Pradesh	3. Highest percentage of urban population
D. Paschim Banga	4. Largest population size
	5. Reverse sex-ratio

Codes

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

Directions (Q. Nos. 368-400) *The following questions consist of two statements. One labelled as **'Assertion A'** and the other labelled as **'Reason R'**. In the context of the two statements, which of the following is/are correct?*

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

368. **Assertion (A)** Central Asia is very cold in winter.
Reason (R) Central Asia has a mediterranean type climate.

369. **Assertion (A)** We always see the same face of Moon from the Earth.
Reason (R) The Moon does not rotate from its axis.

370. **Assertion (A)** Plain of North India is irrigated through by canals.
Reason (R) Ganga and Yamuna are the important rivers of North India.

371. **Assertion (A)** Himalaya is a young new fold mountain of India.
Reason (R) Because it lies in Mukundpur, Vaishali in Bihar (Jhandha).

372. **Assertion (A)** Jharkhand produces at least 60% of bauxite.
Reason (R) Largest deposit of bauxite is found there.

373. **Assertion (A)** The desert soils in India are poor in mineral nutrients and in fertility.
Reason (R) Lack of rainfall is there and sand is a poor quality of soil.

374. **Assertion (A)** The rainy tropics constitute some of the largest blank spaces on the population map of the world.
Reason (R) Rainly tropics have enervating climate, dense forest, annoying insects and deadly diseases.

375. **Assertion (A)** The central part of Peninsular India is semi-arid in nature.
Reason (R) Semi-aridity is caused by the considerable distance the monsoon winds have to travel to cause precipitation there.

376. **Assertion (A)** Growth of cerals like rice and wheat is declining the world over as a result of net outcome of Green Revolution.
Reason (R) Monoculture of cereal crops for prolonged periods removes genetic ceiling strengthening resistance of plants to pests.

377. **Assertion (A)** The population density is the highest in the highly industries belt in India.
Reason (R) The opportunitis of livelihood are more in the belt.

378. **Assertion (A)** Beauxite is the chief ore of the Aluminium.
Reason (R) Beaxuite is found in the hilly regions of Uttar Pradesh.

379. **Assertion (A)** Gangetic plain is more fertile than any other region.
Reason (R) Because it receives havy rainfall.

380. **Assertion (A)** Lofty mountain tracts are colder than low plains.
Reason (R) Because it has a lot of distance from sea.

381. **Assertion (A)** The State of Jammu and Kashmir lies in the North-West of India.
Reason (R) It is border State and is surrounded by Pakistan, Afghanistan and China on three sides.

382. **Assertion (A)** The climate of Punjab is dry, here winter is very cold and summer is very hot.
Reason (R) Punjab gets most of its rainfall in the month of July and August. It also gets some rainfall in winter.

383. **Assertion (A)** The Rann of Kuchch, in the North-West, is marshy. Saurashtra, or Kathiawar Peninsula, in the West, is a palmtringed plain with forest Girnar hills in its middle.
Reason (R) Saurashtra and Kuchch and dry, whereas the rest of the State receives good rainfall from the Arabian Sea in summer monsoons.

384. **Assertion (A)** Kerala is quite rich is mineals, limenite, and monazite are found in huge quantity.
Reason (R) In the plain of coast there are minerals in huge quantity in the form of sand along the sea-shore.

385. **Assertion (A)** Red soil is found in most of South Indian Peninsular.
Reason (R) Peninsular Indian Plateau is made up of volcanic erruption.

386. **Assertion (A)** Largest cultivation of tea growing area lies in Asom.
Reason (R) Asom receives maximum rainfall.

387. **Assertion (A)** Andaman and Nicobar lies in the series form.
Reason (R) It is also a part of Eastern Mountain Range.

388. **Assertion (A)** Chilka lake is situated on the coast of Odisha.
Reason (R) It is a salt water biggest lake of India.

389. **Assertion (A)** Iron and steel industry is a raw material oriented industry.
Reason (R) Large quantity of water is required for cooling during the production of steel.

390. **Assertion (A)** In Delhi, vertical rays of the Sun fall on 21st June.
Reason (R) June is the summer period for Northern Hemisphere.

391. **Assertion (A)** The greatest of all sea routes is the North Atlantic route.
Reason (R) North Atlantic route is between Europe and North America, highly industrial regions.

392. **Assertion (A)** Itlay, Germany, France, Norway have abundant power resources.
Reason (R) They use their resources very intelligently.

393. **Assertion (A)** Disappearance of forests in India and Sri Lanka is a consequence of rising population and related pressures.
Reason (R) Because it is a human behaviour.

394. **Assertion (A)** Coal is maximum used to produce power generation in India.
Reason (R) It is the most abundant mineral.

395. **Assertion (A)** The solar eclipse occurs twice during a month but it is not always observed.
Reason (R) The Solar eclipse occurs on the day of the new Moon.

396. **Assertion (A)** We feel colder on mountains than on plains.
Reason (R) Temperature decreases with altitudes.

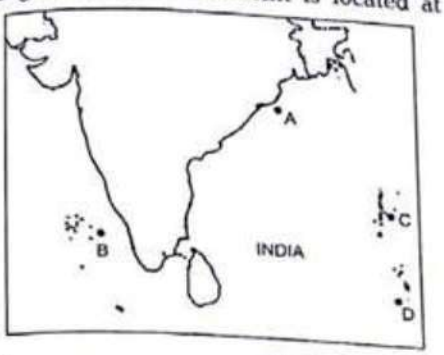
397. **Assertion (A)** Inside the Earth metals are present in molten stage.
Reason (R) Earth absorbs the Sun-rays.

398. **Assertion (A)** Downpour of rain lessens the humidity in the atmosphere.
Reason (R) Rains are caused when atmosphere cannot hold more moisture.

399. **Assertion (A)** Uttar Pradesh is called the 'Sugar Bowl' of India.
Reason (R) Uttar Pradesh is the leading producer of sugarcane.

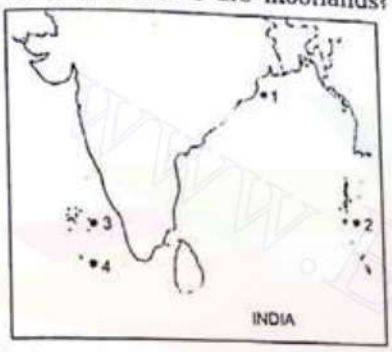
400. **Assertion (A)** Cotton is grown in alluvial soil.
Reason (R) Alluvial soil is very fertile.

401. In the given map, Indira Point is located at



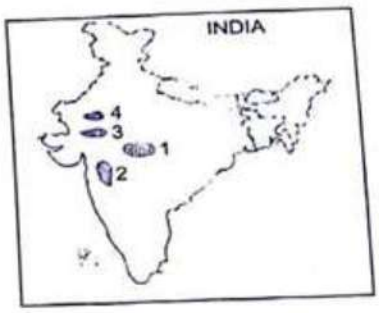
(a) A (b) B
(c) C (d) D

402. In the given rough outline map, which of the place(s) marked as 1, 2, 3 and 4 are moorlands?



(a) Only 1
(b) 1 and 4
(c) 2 and 3
(d) None of these

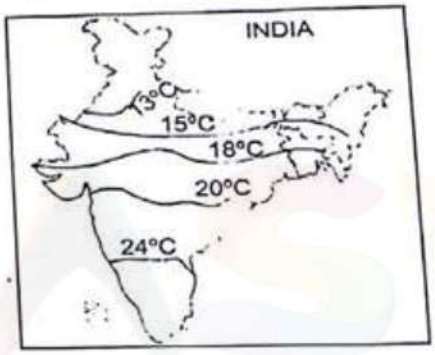
403. Match the features marked as 1, 2, 3 and 4 in the map as a range, a hill, a peak and a lake in the encircled areas with their names A-Harishchandra, B-Sambhar, C-Guru Shikhar and D-Mahadeo and select the correct answer using the codes given below



Codes

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

404. Consider the following statements regarding the rough outline map of India shown in the figure



I. Temperature decreases and moves from South to North.
II. Peninsular India has more than 20°C temperature over a large area.
III. Andhra Pradesh has more than 20°C temperature over a large area.

Which of the following statements is/are correct?
(a) I alone is correct (b) II alone is correct
(c) III alone is correct (d) None of the above

Directions (Q. Nos. 405-408) *The next four (04) items are based on the following table.*
Match List I with List II, List III and List IV and select the correct answer using the codes given below.

List I (Continent)	List II (Highest Mountain Peak)	List III (Longest River)	List IV (Lake)
A. Africa	1. Mount Everest	I. Danube	(i) Dead Sea
B. Asia	2. Mount Kilimanjaro	II. Yangtze	(ii) Lake Assal
C. Australia	3. Mount Elbrus	III. Nile	(iii) Caspian Sea
D. Europe	4. Mount Kosciusko	IV. Murray	(iv) Eyre Lake

405.

	List I	List II	List III	List IV
(a)	A	2	III	ii
(b)	B	3	II	i
(c)	A	2	II	ii
(d)	B	4	III	iv

406.

	List I	List II	List III	List IV
(a)	B	1	III	ii
(b)	C	2	II	i
(c)	B	1	II	i
(d)	C	4	II	iv

407.

	List I	List II	List III	List IV
(a)	C	4	IV	iv
(b)	D	4	IV	v
(c)	C	3	IV	i
(d)	D	2	III	ii

408.

	List I	List II	List III	List IV
(a)	A	2	II	iii
(b)	D	3	III	iv
(c)	A	2	III	iv
(d)	D	3	I	iii

Directions (Q. Nos. 409-416) *The next four* (04) *items are based on the following table.*
Match List I with List II, List III and List IV and select the correct answer using the codes below.

List I (Planet)	List II (Size/Distance from Sun/Temperature)	List III (Feature)	List IV (Time taken to revolve around the Sun)
A. Mercury	1. Hottest planet	I. Presence of living creatures	(i) 224.7 days
B. Venus	2. Smallest planet	II. Like yellow star	(ii) 365 days
C. Earth	3. Second largest planet	III. Brightest planet	(iii) 88 days
D. Saturn	4. Fifth largest planet	IV. With magnitude area	(iv) 29.5 years

409.

	List I	List II	List III	List IV
(a)	B	1	IV	ii
(b)	A	2	IV	iii
(c)	B	2	III	i
(d)	A	4	II	iv

410.

	List I	List II	List III	List IV
(a)	C	4	I	ii
(b)	D	2	III	i
(c)	C	4	II	iii
(d)	D	3	III	i

411.

	List I	List II	List III	List IV
(a)	B	2	II	iii
(b)	C	4	IV	ii
(c)	B	1	III	i
(d)	C	4	IV	iv

412.

	List I	List II	List III	List IV
(a)	A	3	II	i
(b)	D	2	III	ii
(c)	A	3	I	ii
(d)	D	3	II	iv

413.

	List I	List II	List III	List IV
(a)	A	3	III	i
(b)	B	2	II	i
(c)	A	2	I	ii
(d)	B	3	III	ii

414.

	List I	List II	List III	List IV
(a)	B	1	III	i
(b)	C	2	II	ii
(c)	B	2	I	iii
(d)	C	3	I	iii

415.

	List I	List II	List III	List IV
(a)	C	3	I	ii
(b)	D	2	III	iv
(c)	C	4	II	iv
(d)	D	2	Iv	iv

416.

	List I	List II	List III	List IV
(a)	A	3	II	i
(b)	D	3	IV	iii
(c)	A	3	I	ii
(d)	D	2	II	i

Directions (Q. Nos. 417-420) *The next four (04) items are based on the following table.*
Match List I with List II, List III and List IV and select the correct answer using the codes given below.

List I (Wind)	List II (Feature)	List III (Related Place)	List IV (Effect/Local Name)
A. Chinook	1. Cold	I. Australia	(i) To ripe the grapes quickly
B. Black Roller	2. Hot	II. America	(ii) Doctor wind
C. Norwester	3. With ice	III. Sahara Desert	(iii) Fast Rain
D. Foehn	4. Moderate	IV. France	(iv) To keep the pasture free from ice
E. Harmattan	5. Monsoon	V. Switzerland	(v) Storm
F. Shamal	6. Humid	VI. Mediterranean	(vi) Lebek
G. Koyambang	7. Polar	VII. Italy	(vii) Storm with dust
H. Sirocco	8. Commercial	VIII. India	(viii) Rain with hail

417.

	List I	List II	List III	List IV
(a)	A	2	III	v
(b)	B	2	III	i
(c)	A	2	II	iv
(d)	B	4	III	ii

418.

	List I	List II	List III	List IV
(a)	C	2	II	iv
(b)	D	2	V	i
(c)	C	4	IV	iii
(d)	D	7	IV	iv

419.

	List I	List II	List III	List IV
(a)	E	2	III	ii
(b)	F	8	VII	i
(c)	E	4	I	i
(d)	F	2	II	ii

420.

	List I	List II	List III	List IV
(a)	G	7	III	i
(b)	H	8	VI	ii
(c)	G	7	II	vii
(d)	H	6	VI	vi

421. South Pacific Island nation Samoa, positioned to the east of the International Date Line, on May 2011 decided to forego a day and shift to the time zone on its west. The reason for this shifting is to **(CDS 2011 II)**
(a) facilitate smooth internal administration throughout the country
(b) attain political stability in the country
(c) facilitate trade with Australia and New Zealand
(d) promote tourism industry in the country

422. Which one among the following is *not* an important factor of climate of an area? **(CDS 2011 II)**
(a) Latitude
(b) Longitude
(c) Altitude
(d) Distance from the sea

423. Renewable energy can be obtained from **(CDS 2011 II)**
(a) Fossils
(b) Radioactive elements
(c) Biomass
(d) Natural gas

Directions (Q. Nos. 424-426) *The following two (02) 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 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

424. **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. **(CDS 2011 II)**

425. **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. **(CDS 2011 II)**

426. Name the Continents that form a mirror image of each other **(CDS 2011 II)**
(a) North America and South America
(b) Asia and Africa
(c) Africa and South America
(d) Europe and Asia

427. Climate change resulting in the rise of temperature may benefit which of the countries/regions?
(a) South Africa **(CDS 2011 II)**
(b) East Indies islands comprising of Java, Sumatra and Borneo
(c) The Western Coasts of South America
(d) Russia and Northern Europe

428. Which of the following statements regarding ozone layer within the atmosphere is/are correct?
1. It absorbs most of the ultraviolet radiation found in the Sun's rays.
2. Chlorofluorocarbons are serious threat to the Ozone layer.

Select the correct answer using the codes given below
(a) Only 1 (b) Only 2 **(CDS 2011 II)**
(c) Both 1 and 2 (d) Neither 1 nor 2

429. 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 **(CDS 2011 II)**
(a) same as Greenwich (b) 1 hour fast
(c) 1 hour slow (d) 12 hours fast

430. The broken hills famous for zinc and lead are located in **(CDS 2011 II)**
(a) Turkey (b) France (c) Germany (d) Australia

431. Kanha National Park belongs to which one among the following biogeographical areas in the world? **(CDS 2011 II)**
(a) Tropical Sub-humid Forests
(b) Tropical Humid Forests
(c) Tropical Dry Forests
(d) Tropical Moist Forests

432. 'El Nino' associated with the formation of the South West Monsoon of India is **(CDS 2011 II)**
(a) an abnormally warm ocean current
(b) a periodic warm air-mass
(c) a periodic warm wind
(d) a periodic low pressure centre

433. Which of the following statements regarding red soils of India is/are correct? **(CDS 2011 II)**
1. The colour of the soil is red due to ferric oxide content.
2. Red soils are rich in lime, humous and potash.
3. They are porous and have friable structure.

Select the correct answer using the codes given below
(a) Only 1 (b) 1 and 3 (c) 2 and 3 (d) 1, 2 and 3

434. According to the Census 2011, which one among the following Union Territories has the least population? **(CDS 2011 II)**
(a) Daman and Diu (b) Dadra and Nagar Haveli
(c) Lakshadweep (d) Puducherry

435. Arrange the following oil refineries of India from West to East **(CDS 2011 II)**
1. Koyali 2. Bongaigaon
3. Mathura 4. Haldia

Select the correct answer using the codes given below
(a) 1-2-3-4 (b) 1-3-4-2 (c) 3-1-2-4 (d) 2-4-3-1

436. Match List I with List II and select the correct answer using the codes given below the Lists **(CDS 2011 II)**

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. Sourthern slopes of Alps

Codes

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

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

437. Consider the following statements about black soil of India **(CDS 2011 I)**
1. Black Soil becomes sticky when it is wet.
2. 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

438. Consider the following statements with regard to the mining industry of India **(CDS 2011 I)**
1. The spatial distribution of minerals is uneven.
2. 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

439. The rainfall distribution pattern over the Ganga basin decreases from the **(CDS 2011 I)**
(a) West to East and North to South
(b) East to West and North to South
(c) West to East and South to North
(d) East to West and South to North

440. Mr X has been invited to participate in a conference to be held at Buenos Aires. He has chosen the following shortest flight route
Mumbai to Frankfurt (non-stop)
Frankfurt to Sao Paulo (non-stop)
Sao Paulo to Buenos Aires (non-stop)
Which one of the following seas will likely to be flown over by Mr X? **(CDS 2011 I)**
(a) Tasman Sea (b) Labrador Sea
(c) Beautfort Sea (d) Black Sea

441. Why do Fold Mountains have enormous thickness of sedimentary rocks? **(CDS 2011 I)**
(a) Due to deposition of sediments in a valley for millions of years
(b) Due to accumulation of sediments in a geosyncline
(c) The plains were folded into mountains
(d) The sediments were folded into recumbent and nappe folds

442. The Vindhyan system of rocks is important for the production of **(CDS 2011 I)**
(a) precious stones and building materials
(b) iron ore and manganese
(c) bauxite and mica
(d) copper and uranium

443. Which of the following best explain why the lower course of a river is sometimes choked with sediments? **(CDS 2011 I)**
1. The valley of a river is widest in its lower course.
2. The velocity of a river in its lower course is low.
3. The delta sometimes develops in a river's lower course.
4. 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) Both 2 and 4

444. Which one among the following best explains the reason for the Eastern and Western boundaries of the Pacific Ocean experiencing frequent earthquake? **(CDS 2011 I)**
(a) There are deep ocean trenches along these margins
(b) High mountain stretch along the continental margins adjacent to this ocean
(c) The currents of the vast Pacific Ocean continue to dash against the continental margins
(d) These margins coincide with the plate margins

445. Match List I with List II and select the correct answer using the codes given below the Lists **(CDS 2011 I)**

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

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

446. Why South-East Asia has the largest concentration of peasant population at the global scale? **(CDS 2011 I)**
(a) The area is dominated by shifting cultivation due to favourable terrain character
(b) Intensive subsistence farming is practised in the region
(c) The region has favourable and healthier climate
(d) The area has a large forested area which is cleared for cultivation of various crops

447. Which among the following monoculture crops provide(s) immediate cash to the farmers? **(CDS 2011 I)**
1. Tea in Asom 2. Rubber in Africa
3. Sugarcane in Malaysia 4. Coffee in Brazil
(a) Only 1 (b) 2 and 3 (c) 3 and 4 (d) 1 and 4

448. Match List I with List II and select the correct answer using the codes given below the Lists **(CDS 2011 I)**

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. 50-100 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

449. 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? **(CDS 2011 I)**
(a) It would not make any difference
(b) Difference between seasons will be reduced
(c) The Earth would become very hot
(d) The Earth would become very cold

450. Currently half of the world's population live in just six countries. Identify them from the following **(CDS 2011 I)**
(a) India, China, Pakistan, Brazil, Bangladesh, Indonesia
(b) India, China, Bangladesh, South Africa, Pakistan, Indonesia
(c) China, India, United States, Indonesia, Brazil, Pakistan
(d) China, India, Bangladesh, United States, Pakistan, Indonesia

451. The angular speed of a whirlwind in a Tornado towards the centre **(CDS 2011 I)**
(a) decreases rapidly (b) increases
(c) remains constant (d) slowly becomes zero

452. Global Positioning System (GPS) is associated with **(CDS 2011 I)**
1. determining latitude and longitude
2. constellation of satellites
3. US system of GPS and Russian system of GLONASS
4. navigation

Select the correct answer using the codes given below
(a) 1, 2 and 4 (b) Both 1 and 4
(c) Both 2 and 3 (d) 1, 2, 3 and 4

453. Which one among the following statement is correct? **(CDS 2011 I)**
(a) In summer season, the duration of day is more in Northern hemisphere
(b) In winter season, the duration of day is more in Northern hemisphere
(c) In summer season, the duration of day is less in Northern hemisphere
(d) In winter season, the duration of day is more in Southern hemisphere

454. What is the similarity between Milwaukee Deep, Java Trench and Challenger Deep? **(CDS 2011 I)**
(a) They all are trenches in the Pacific Ocean
(b) They are the deepest points of the Atlantic, Indian and Pacific Oceans, respectively
(c) They all are trenches in the India Ocean
(d) They all are deeps of the Atlantic Ocean

455. The interest of the Vijayanagar and Bahmani rulers clashed in three separate and distinct areas in Deccan. Which one among the following was not directly associated with this intense conflict? **(CDS 2011 I)**
(a) Tungabhadra doab
(b) Krishna-Godavari delta/basin
(c) Cauveri interior delta
(d) Marathawada country

456. The agricultural production in different parts of India is very much affected by varying intensities of floods and droughts. Which one of the following measures would *not* be sustainable in this respect? **(CDS 2010 II)**
(a) Provision for extensive irrigation facilities
(b) Change in the crop calendar
(c) Avoidance of flood and drought prone areas for agriculture
(d) Emphasis on selection of crops best suited to flood and drought conditions

Directions (Q. Nos. 51-52) *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 items 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

457. **Statement I** Wind is deflected to the right in Northern hemisphere and to the left in Southern hemisphere from its normal course. **(CDS 2010 II)**
Statement II Earth rotates from West to East.

458. **Statement I** Most of the east flowing rivers over the Deccan Plateau have deltas at their mouth.
Statement II These rivers have courses through soft rocks of the Deccan plateau. **(CDS 2010 II)**

459. Match List I with List II and select the correct answer using the codes given below the lists. **(CDS 2010 II)**

List I (Region)	List II (Characteristic Vegetation)
A. Selvas	1. Mosses and Lichens
B. Savanas	2. Epiphytes
C. Tundra	3. Tropophytes
D. Monsoon lands	4. Grasses and trees

Codes

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

460. Which one of the following is the correct sequence of the given tiger reserves of India from North to South? **(CDS 2010 II)**
(a) Dudwa-Kanha-Indravati-Bandipur
(b) Kanha-Bandipur-Dudwa-Indravati
(c) Indravati-Kanha-Dudwa-Bandipur
(d) Dudwa-Kanha-Bandipur-Indravati

461. Which of the following statements is/are correct with respect to the Chilean Earthquake (February 2010)? **(CDS 2010 II)**
I. Scientists estimated that the Earth's axis of rotation had moved by 3 inches due to the earthquake.
II. Santa Maria island off the coast near Concepcion, Chile' second largest city, may have been raised by 2 m.

Select the correct answer using the codes given below
(a) Only I (b) Only II
(c) Both I and II (d) Neither I nor II

462. Which of the following statements with regard to the expansion of the desert in Rajasthan is/are correct? **(CDS 2010 II)**
I. The predominant wind direction in Rajasthan is Northeast to Southwest, so the tendency for desertification has been more in that direction.
II. The Thar desert is dominantly a monsoon driven sand desert where wind erosion is a major problem during the summer months. While the Aravalli range is a major barrier in the spread of the desert, rampant mining creating cuts in the range is leading to the spread of the desert.

Select the correct answer using the codes given below
(a) Only I (b) Only II
(c) Both I and II (d) Neither I nor II

463. Which one of the following pairs is not correctly matched? **(CDS 2010 II)**
(a) Kuroshio : Warm ocean current
(b) Labrador : Warm ocean current
(c) Benguela : Cold ocean current
(d) Oyashio : Cold ocean current

464. Which one among the following is the idealized global pattern of surface wind from the Equator to Pole? **(CDS 2010 II)**
(a) Doldrum-Westerlies-Trade Wind-Easterlies
(b) Easterlies-Westerlies-Trade Wind-Easterlies
(c) Doldrum-Trade wind-Westerlies-Easterlies
(d) Westerlies-Trade Wind-Doldrum-Easterlies

465. The Earth is an oblate spheroid and *not* a perfect sphere. This is because **(CDS 2010 II)**
I. the Earth has a rotational motion and the rotational speed increases as one goes from the poles towards the equator.
II. the equator experiences greater gravitational pull from the sun.
III. the intensity of sunlight received at the equator is greater than that at the poles.

Select the correct answer using the codes given below
(a) Only I (b) I and II
(c) Only III (d) I, II and III

466. Which one of the following is the correct sequence of increasing velocity of wind? **(CDS 2010 II)**
(a) Light breeze-Fresh breeze-Gale-Hurricane
(b) Fresh breeze-Light breeze-Hurricane-Gale
(c) Light breeze-Gale-Fresh breeze-Hurricane
(d) Hurricane-Light breeze-Gale-Fresh breeze

467. Which one of the following mountain ranges separates Europe from Asia? **(CDS 2010 II)**
(a) Apenine (b) Black Forest
(c) Ural (d) Sulaiman

468. Which one among the following is *not* a Baltic nation? **(CDS 2010 II)**
(a) Lativia (b) Slovakia
(c) Lithuania (d) Estonia

469. During the Indian monsoon season **(CDS 2010 II)**
(a) the Westerly jet stream alone exists in the Indian region
(b) the Easterly jet stream alone exists in the Indian region
(c) both Westerly and Easterly jet streams exist in the Indian region
(d) both Westerly and Easterly jet streams disappear

470. Which one of the following is the correct sequence of the following topographical features found from upper to lower course of a river? **(CDS 2010 II)**
(a) Ox-bow lake-Rapids-Estuary
(b) Rapids-Estuary-Ox-bow lake
(c) Rapids-Ox-bow lake-Estuary
(d) Estuary-Ox-bow lake-Rapids

471. The Earth moves around the Sun in an elliptic trajectory due to gravity. If another Sun like star is brought near the Earth, what will be the shape of the trajectory?. **(CDS 2010 II)**
(a) Ellipse (b) Parabola.
(c) Circle (d) It will be undeterministic

472. Which one of the following countries does *not* have a border with China? (CDS 2010 II)
(a) Myanmar (b) Afghanistan
(c) Thailand (d) Kazakhstan

473. Consider the following statements. (CDS 2010 II)
I. The Earth does not move along its orbit at a constant rate.
II. The Earth moves fastest at perihelion and slowest at aphelion.
The above statements are true of which one of the following laws?
(a) Kepler's second law
(b) Newton's second law of motion
(c) Ohm's law
(d) Newton's law of gravitation

474. Which of the following three rivers of the peninsula India have the Amarkantak region as their source? (CDS 2010 II)
(a) Narmada, Krishna, Godavari
(b) Son, Mahanadi, Narmada
(c) Godavari, Krishna, Cauvery
(d) Chambal, Betwa, Luni

475. Consider the following statements. (CDS 2010 II)
I. A hurricane acquires its spin from the coriolis effect.
II. The diameter of the hurricane decreases as it moves away from low latitudes.
III. The diameter of a hurricane is never below 150 km.
Which of the statements given above is/are correct?
(a) Only I (b) II and III (c) I and III (d) I, II and III

476. Which of the following factors influence ocean currents? (CDS 2010 II)
I. Rotation of the Earth.
II. Air pressure and wind.
III. Ocean water density
IV. Revolution of the Earth
Select the correct answer using the codes given below
(a) I and II (b) I, II and III
(c) I and IV (d) II, III and IV

477. Which among the following states of India have common borders with Pakistan? (CDS 2010 II)
(a) Jammu and Kashmir, Himachal Pradesh, Punjab and Rajasthan
(b) Punjab, Jammu and Kashmir, Rajasthan and Gujarat
(c) Jammu and Kashmir, Punjab, Haryana and Rajasthan
(d) Punjab, Himachal Pradesh, Gujarat and Rajasthan

478. Which among the following pairs are correct? (CDS 2010 II)

I. Cirque and Col	Glacial topogrpahy
II. Barkhans and Yardans	Desert topography
III. Eddies and Potholes	Fluvial topography

Select the correct answer using the codes given below
(a) I, II and III (b) I and II (c) II and III (d) I and III

479. Which one of the following is a correct sequence in the increasing order of salinity concentration? (CDS 2010 II)
(a) Gulf of California-Baltic Sea-Red Sea-North Sea
(b) Baltic Sea-North Sea-Gulf of California-Red Sea
(c) Red Sea-Gulf of California-North Sea-Baltic Sea
(d) North Sea-Gulf of California-Baltic Sea-Red Sea

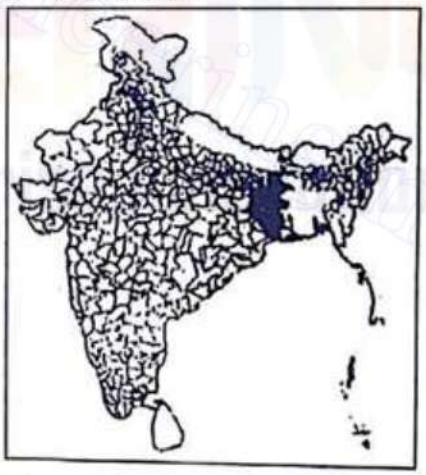
480. Consider the following places of Kashmir region (CDS 2010 II)
1. Srinagar 2. Gilgit 3. Kargil 4. Banihal
Arrange the above place from North to South using the codes given below
(a) 1-2-3-4 (b) 4-3-2-1 (c) 2-3-1-4 (d) 2-1-3-4

481. Which one of the following statements on biosphere reserves is not correct? (CDS 2010 I)
(a) In 1973, UNESCO launched a worldwide programme on man and biosphere
(b) Biosphere reserves promote research on ecological conservation
(c) Nanda Devi Biosphere reserve is located in Madhya Pradesh
(d) Biosphere reserves are multipurpose protected areas to preserve the genetic diversty in ecosystems

482. Which one of the following statements is not correct regarding the Himalayas? (CDS 2010 I)
(a) Himalayas have nappe and recumbent folds
(b) Himalayas rose up from the Tethys Sea
(c) Himalayas contain three mountain ranges-Shiwaliks, Great Himalayas and Kunlun ranges
(d) The orogeny took place in the Tertiary Era

483. Which one of the following is not associated with monsoon climate in India? (CDS 2010 I)
(a) El Nino temporary warm currents
(b) South-equatorial warm currents of Indian Ocean
(c) Western disturbances
(d) Cyclones of Bay of Bengal

484. On the below map of India, the shaded districts are those in which a particular tribal group constitutes more than 50% of the tribal population. What is that particular tribal group? (CDS 2010 I)



(a) Gonds (b) Bhils (c) Nagas (d) Santhals

485. Which among the following Rajdhani trains covers the longest distance? (CDS 2010 I)
(a) 2433 Chennai Central
(b) 2431 Trivandrum Central
(c) 2435 Dibrugarh Town
(d) 2429 Bangluru City Junction

486. Consider the following features of a border district of India and identify the district using the codes given below
Situated at the height of 10000 feet, which is enchanted with scenic beauty, the district is

surrounded by two nations in the North and South-West. River Nyamjang-chu runs through it. Potato, maize and millet are the main crops of the district. Besides monasteries, tourist attractions of the district and its surrounding places include Sella Pass, P Tso, Lake, War memorial, Jaswant Garh, etc. Losar is one of the prominent festivals of the district.

(CDS 2010 I)

(a) Lohit (b) Tawang
(c) Kangra (d) West Sikkim

487. Which is the correct arrangement of the following rivers from North to South? **(CDS 2010 I)**
(a) Godavari, Penner, Cauveri, Periyar
(b) Penner, Godavari, Periyar, Cauveri
(c) Godavari, Cauveri, Penner, Periyar
(d) Cauveri, Godavari, Periyar, Penner

488. Match List I with List II and select the correct answer using the codes given below the Lists **(CDS 2010 I)**

List I (Sphere of the Earth)	List II (Main Constituent of the Sphere)
A. Lithosphere	1. Living objects
B. Hydrosphere	2. Mixture of gases
C. Atmosphere	3. Water
D. Biosphere	4. Soil

Codes

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

489. Which of the following seas are enclosed? **(CDS 2010 I)**
1. Andaman Sea
2. Arab Sea
3. Sea of Azov
4. Bering Sea

Select the correct answer using the codes given below
(a) 1 and 2 (b) 3 and 4 (c) 2 and 3 (d) 1 and 4

490. An earthquake epicentre is the **(CDS 2010 I)**
(a) point where the seismograph is located
(b) point within the Earth where the movement along the fault occurs
(c) approximate centre of a group of related earthquakes
(d) point on the surface directly above where the rupture along the fault zone occurs

491. The concept of sustainable development relates to **(CDS 2010 I)**
(a) consumption levels (b) exhaustible resources
(c) social equity (d) intergenerational equity

492. The jet streams are **(CDS 2010 I)**
(a) wind systems with a pronounced seasonal reverse at a direction
(b) winds blowing from the subtropical high-pressure belts towards the subpolar low-pressure belts
(c) narrow meandering bands of swift winds which blow in the midlatitudes near the tropopause and encircle the globe
(d) winds blowing from the subpolar low-pressure belts towards the subtropical high-pressure belts

493. If the movement of the Earth's crust or a major climatic change makes an old stream young, it is called **(CDS 2010 I)**
(a) consequent stream (b) rejuvenation
(c) subsequent stream (d) aggradation

494. Tsunamis are not caused by **(CDS 2010 I)**
(a) hurricanes
(b) earthquakes
(c) undersea landslides
(d) volcanic eruptions

495. Which of the following statements with regard to rainfall in India is/are correct? **(CDS 2010 I)**
1. Most of the rainfall in India is due to the South-West monsoon.
2. In South India, rainfall decreases away from the Eastern Ghats.

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

496. Deltas are common in India for the east-flowing river systems, whereas they are nearly absent on the West coast, because West-flowing rivers **(CDS 2010 I)**
(a) are few
(b) have lesser water volume and carry less run-off silt
(c) originate in dry areas
(d) originate largely in the Western Ghats and have a short distance to cover to the sea

497. Which one of the following projects of the NHPC (National Hydroelectric Power Corporation) has the largest power generation capacity (installed)?
(a) Baira-Siul (b) Chamera-I **(CDS 2010 I)**
(c) Loktak (d) Salal

498. Which one of the following trains/railways passes through Germany, France, Austria, Hungary and Romania? **(CDS 2010 I)**
(a) Trans-Siberian (b) Cape-Cairo
(c) Orient Express (d) Union and Central Pacific

499. Which one of the following does not have a heavy water plant? **(CDS 2010 I)**
(a) Narora (b) Sriharikota
(c) Kakrapar (d) Kota

500. At high altitudes, pressure cooker is preferable for cooking, because the boiling point of water
(a) reduces due to higher atmospheric pressure **(CDS 2010 I)**
(b) reduces due to lower atmospheric pressure
(c) increases due to reduced gravitational force
(d) reduces due to increased ozone content in the atmosphere

501. Match List I with List II and select the correct answer using the codes given below the Lists **(CDS 2009 II)**

List I (River)	List II (Source)
A. Ganga	1. Amarkantak
B. Son	2. Gaumukh
C. Godavari	3. Mahabaleshwar
D. Krishna	4. Trimbakeshwar
	5. Mansarovar

Codes

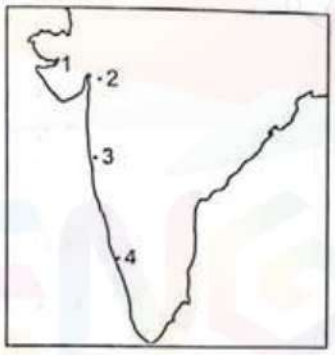
	A	B	C	D		A	B	C	D
(a)	1	2	4	5	(b)	2	1	3	4
(c)	4	3	1	2	(d)	2	1	4	3

502. The channel separating the Andaman Island from the Nicobar Islands is known as **(CDS 2009 II)**
(a) Coco channel (b) 10° channel
(c) Duncan passage (d) Somboraro channel

503. Consider the following statements **(CDS 2009 II)**
I. Sueze Canal is an important link between developed countries and developing countries.
II. It joins the Mediterranean Sea with the Gulf of Suez
III. It is not a sea level canal.
Which of the statement given above is/are correct?
(a) I and II (b) I and III (c) II and III (d) Only I

504. Which one of the following countries is located South of the equator? **(CDS 2009 II)**
(a) Cameroon (b) Sudan (c) Nigeria (d) Rwanda

505. In the map given above four petrochemical centres are marked with numbers. Match them with the following four places and select the correct answer using the codes given below **(CDS 2009 II)**



A. Koyali B. Trombay
C. Jamnagar D. Mangalore

Codes

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

506. What is the correct sequence of the location of the following sea ports of India from South to North? **(CDS 2009 II)**
(a) Cochin, Thiruvananthapuram, Calicut, Mangalore
(b) Calicut, Thiruvananthapuram, Cochin, Mangalore
(c) Thiruvananthapuram, Cochin, Calicut, Mangalore
(d) Thiruvananthapuram, Calicut, Mangalore, Cochin

507. The hill range that separates the state of Manipur from the state of Nagaland is known as **(CDS 2009 II)**
(a) Arakan hills (b) Patkai hills
(c) Barail hills (d) Manipur

508. Which continent of the world does not have a desert?
(a) Australia (b) Europe **(CDS 2009 II)**
(c) Asia (d) North America

509. Israel has common borders with **(CDS 2009 II)**
(a) Lebanon, Syria, Jordan and Egypt
(b) Turkey, Syria, Jordan and Yemen
(c) Lebanon, Syria, Turkey and Jordan
(d) cyprus, Turkey, Jorden and Egypt

510. The pacific Islands from new Guinea South east-wards to the Fiji Islands' group is called **(CDS 2009 II)**
(a) the Polynesia (b) the Mellanesia
(c) the Micronesia (d) the Autralasia

511. Radio waves are reflected back to Earth from the **(CDS 2009 II)**
(a) Troposphere (b) Exosphere
(c) Stratosphere (d) Ionosphere

512. What is the name of the strait where 'Adams bridge' is situated? **(CDS 2009 II)**
(a) Bering Strait (b) Cook Strait
(c) Palk Strait (d) Taiwan Strait

513. Consider the following statements **(CDS 2009 II)**
I. Jim Corbett National Park is the oldest National Park of India.
II. It was one of the nine Tiger Reserves created at the launch of the Project Tiger in 1973.
III. Initially it was named as 'Hailey National Park'.
Which of the statements given above are correct?
(a) I and II (b) I, II and III (c) II and III (d) I and III

Directions (Q. Nos. 514-515) *The following items 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

514. **Assertion (A)** Convectional rains occur during pre-monsoon summer in India. **(CDS 2009 II)**
Reason (R) Such rains occur due to adiabatic cooling.

515. **Assertion (A)** The Himalayan meadows are suitable for transhumance.
Reason (R) In these areas transport facility to move from one place to another is good. **(CDS 2009 II)**

516. In a significant climate responsive project, in which one of the following places recently an abandoned thermal power plant has been converted into a mega solar power generating station which poised to give a huge fillip to India's renewable energy ambition? **(CDS 2009 II)**
(a) Talcher (Odisha) (b) Namrup (Asom)
(c) Jamuria (Paschim Banga) (d) Jaisalmar (Rajasthan)

517. Which water separates Australia from New Zealand?
(a) Cook Straits (b) Megallan **(CDS 2009 II)**
(c) Tasman sea (d) Great Barrier Reef

518. The ageing index in India has increased from 14% in 1951 to > 21% in 2001. With respect to this which of the following effects is/are correct? **(CDS 2009 II)**
I. Decline in the proportion of child population.
II. Increase in the proportion of old population.
Select the correct answer from the codes gives below
(a) Only I (b) Only II
(c) Both I and II (d) Neither I nor II

519. Consider the following statements (CDS 2009 II)
I. In the month of July the Inter Tropical Convergence Zone is located in the Indo Gangetic plain.
II. Northen Inter-Tropical Convergence Zone is the zone of clouds and heavy rainfall.
Which of the statement given above is/are correct?
(a) Only I (b) Only II
(c) Both I and II (d) Neither I nor II

520. Match List I with List II and select the correct answer using the codes given below the Lists. (CDS 2009 II)

List I (Place)	List II (Famous for)
A. Balaghat	1. Oil field
B. Katni	2. Iron ore
C. Singrauli	3. Manganese
D. Kalol	4. Bauxite
	5. Coal

Codes

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

521. Which of the following factors is/are responsible for high concentration of jute mills in the Hugli basin? (CDS 2009 II)
I. Nearness to coal fields.
II. Convenient dry climate for spinning and weaving.
Select the correct answer using the code given below
(a) Only I (b) Only II
(c) Both I and II (d) Neither I nor II

522. A collection of gas dust which appears as a bright ball of light in the sky with a glowing tail is called (CDS 2009 II)
(a) Star (b) Comet
(c) Constellation (d) Galaxy

523. Which one of the following zones of the atmosphere is rich in ozone gas? (CDS 2009 I)
(a) Mesosphere (b) Troposphere
(c) Stratosphere (d) Ionosphere

524. Consider the following statements : (CDS 2009 I)
1. National Parks are a special category of protected areas of land and sea coasts where people are an integral part of the system.
2. Sanctuaries are concerned with conservation of particular species.
3. Biosphere Reserves are connected with the habitat of a particular wild animal.
Which of the statements given above is/are correct?
(a) 1, 2 and 3 (b) 2 only (c) 1 and 2 (d) 1 and 3

Directions (Q. Nos. 525-529) *The following four (4) items consist of two statements, one labelled as 'Assertion (A)' and the other as 'Reason (R)'. You are to examine these two statements carefully and select the correct 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 indvidually true, but R is the correct explanation of A
(c) A is true, but R is false
(d) A is false, but R is true

525. **Assertion (A)** Venus is the brightest object in the sky after the Sun.
Reason (R) Venus is the second planet from the Sun in our solar system. (CDS 2009 I)

526. **Assertion (A)** Despite low evaporation and stable stratification of the atmosphere, salinity is high in polar regions.
Reason (R) Sea water freezes leaving the remaining water saline than before. (CDS 2009 I)

527. **Assertion (A)** Physiological density is preferable to arithmetic density as an index of population density.
Reason (R) Physiological density is based on arable land while arithmetic density is based on total area. (CDS 2009 I)

528. **Assertion (A)** Water in an open pond remains cool even on a hot summer day.
Reason (R) Water on heating evaporates and heat energy gets converted into latent heat. (CDS 2009 I)

529. Because of which one of the following factors, clouds do not precipitate in deserts? (CDS 2009 I)
(a) Low pressure (b) Low humidity
(c) High wind velocity (d) High temperature

530. Which one of the following pairs is not correctly matched? (CDS 2009 I)

	Country	Currency
(a)	Brazil	Reais
(b)	China	Yuan
(c)	Mexico	Pesos
(d)	Thailand	Ringgit

531. In which one of the following Islands of India is an active volcano found? (CDS 2009 I)
(a) Car Nicobar Island
(b) Nancowry Island
(c) Barren Island
(d) Maya Bunder Island

532. Match List I with List II and select the correct answer using the codes given below the Lists (CDS 2009 I)

List I (Pass)	List II (State)
A. Zoji La Pass	1. Sikkim
B. Bara Lacha Pass	2. Uttarakhand
C. Jelep La Pass	3. Himachal Pradesh
D. Niti Pass	4. Jammu & Kashmir

Codes

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

533. Which one of the following longitudes determines the Indian Sandard Time? (CDS 2009 I)
(a) 85.5° E (b) 86.5° E
(c) 84.5° E (d) 82.5° E

534. Which one of the following is the oldest mountain range in India? (CDS 2009 I)
(a) Himalayas (b) Aravali
(c) Satpura (d) Nilgiri

535. Match List I with List II and select the correct answer using the codes given below the List: **(CDS 2009 I)**

List I (River)	List II (Tributary)
A. Brahamaputra	1. Musi
B. Krishna	2. Tawa
C. Narmada	3. Bhavani
D. Cauveri	4. Dikhow

Codes

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

536. Which one of the following lakes in India has the highest water salinity? **(CDS 2009 I)**
(a) Dal (b) Chilika
(c) Wular (d) Sambhar

537. Which of the following sequences of the oil refineries of India as they occur from South to North is correct? **(CDS 2009 I)**
(a) Kochi-Mangalore-Mumbai-Koyali
(b) Koyali-Mumbai-Mangalore-Kochi
(c) Kochi-Mumbai-Mangalore-Koyali
(d) Mangalore-Kochi-Mumbai-Koyali

538. Match List I with List II and select the correct answer using the codes given below the Lists **(CDS 2009 I)**

List I (Multipurpose River Project)	List II (Hydel Power Station)
A. Rihand	1. Hirakud
B. Gandak	2. Balmikinagar
C. Chambal	3. Pipri
D. Mahanadi	4. Kota

Codes

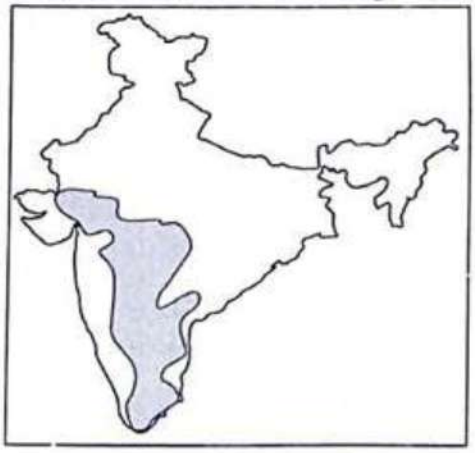
	A	B	C	D		A	B	C	D
(a)	3	4	2	1	(b)	1	2	4	3
(c)	3	2	4	1	(d)	1	4	2	3

539. Which one of the following pairs is not correctly matched? **(CDS 2009 I)**

List I (National Park)	List II (State)
A. Kanha National Park	Madhya Pradesh
B. Sultanpur National Park	Haryana
C. Ranthambhore National Park	Gujarat
D. Bandipur National Park	Karnataka

540. Which one of the following oil fields of India is the oldest and still producing oil? **(CDS 2009 I)**
(a) Bombay High (b) Digboi
(c) Ankleshwar (d) Naharkatiya

541. The shaded area in the map given below is the major producer of which one of the following? **(CDS 2009 I)**



(a) Cotton (b) Groundnut
(c) Wheat (d) Mustard

542. Which one of the following States is the largest producer of black pepper in India? **(CDS 2009 I)**
(a) Tamil Nadu (b) Kerala
(c) Karnataka (d) Andhra Pradesh

543. In which of the following state is Kakrapar nuclear power station located? **(CDS 2008 II)**
(a) Karnataka (b) Tamil Nadu
(c) Maharashtra (d) Gujarat

544. Which one of the following statements is not correct? **(CDS 2008 II)**
(a) All meridians run in a ture North-South direction
(b) Meridians are spaced farthest apart at the Equator and converge to common points at the poles
(c) All meridians are always parallel to one another
(d) An indefinite number of meridians may be drown on a globe

545. Match List I with List II and select the correct answer using the codes given below the Lists **(CDS 2008 II)**

List I	List II
A. Slate	1. Igneous rock
B. Lignite	2. Metamorphic rock
C. Bauxite	3. Non-ferrous mineral
D. Granite	4. Sedimentary rock

Codes

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

546. Which one of the following rivers flows into the Arabian Sea? **(CDS 2008 II)**
(a) Indravati (b) Godavari
(c) Cauveri (d) Narmada

Answers

1. (d)	2. (c)	3. (b)	4. (c)	5. (d)	6. (a)	7. (a)	8. (a)	9. (c)	10. (b)
11. (a)	12. (a)	13. (c)	14. (a)	15. (a)	16. (a)	17. (a)	18. (a)	19. (b)	20. (a)
21. (b)	22. (a)	23. (a)	24. (a)	25. (b)	26. (a)	27. (a)	28. (a)	29. (a)	30. (a)
31. (a)	32. (a)	33. (c)	34. (b)	35. (a)	36. (a)	37. (b)	38. (a)	39. (a)	40. (a)
41. (a)	42. (a)	43. (a)	44. (a)	45. (d)	46. (a)	47. (c)	48. (a)	49. (d)	50. (a)
51. (a)	52. (d)	53. (b)	54. (d)	55. (a)	56. (a)	57. (a)	58. (a)	59. (c)	60. (d)
61. (b)	62. (b)	63. (a)	64. (d)	65. (a)	66. (a)	67. (d)	68. (a)	69. (b)	70. (a)
71. (a)	72. (c)	73. (a)	74. (a)	75. (b)	76. (d)	77. (a)	78. (a)	79. (a)	80. (b)
81. (b)	82. (b)	83. (d)	84. (c)	85. (a)	86. (b)	87. (c)	88. (a)	89. (b)	90. (b)
91. (b)	92. (d)	93. (d)	94. (a)	95. (c)	96. (c)	97. (b)	98. (a)	99. (c)	100. (d)
101. (c)	102. (a)	103. (c)	104. (a)	105. (c)	106. (d)	107. (b)	108. (b)	109. (a)	110. (d)
111. (b)	112. (b)	113. (a)	114. (c)	115. (a)	116. (c)	117. (b)	118. (d)	119. (a)	120. (a)
121. (d)	122. (c)	123. (d)	124. (b)	125. (d)	126. (a)	127. (b)	128. (d)	129. (a)	130. (d)
131. (b)	132. (a)	133. (a)	134. (a)	135. (a)	136. (a)	137. (a)	138. (a)	139. (b)	140. (a)
141. (b)	142. (b)	143. (c)	144. (b)	145. (a)	146. (c)	147. (a)	148. (c)	149. (c)	150. (c)
151. (d)	152. (b)	153. (c)	154. (c)	155. (b)	156. (b)	157. (a)	158. (a)	159. (a)	160. (c)
161. (a)	162. (c)	163. (b)	164. (a)	165. (a)	166. (a)	167. (a)	168. (d)	169. (d)	170. (a)
171. (a)	172. (b)	173. (c)	174. (a)	175. (c)	176. (a)	177. (c)	178. (a)	179. (a)	180. (a)
181. (a)	182. (a)	183. (a)	184. (d)	185. (b)	186. (a)	187. (a)	188. (d)	189. (a)	190. (a)
191. (a)	192. (c)	193. (c)	194. (c)	195. (c)	196. (c)	197. (a)	198. (b)	199. (b)	200. (d)
201. (d)	202. (b)	203. (a)	204. (b)	205. (a)	206. (a)	207. (a)	208. (a)	209. (a)	210. (a)
211. (b)	212. (b)	213. (b)	214. (a)	215. (a)	216. (b)	217. (a)	218. (b)	219. (d)	220. (a)
221. (c)	222. (b)	223. (c)	224. (d)	225. (b)	226. (b)	227. (b)	228. (b)	229. (c)	230. (a)
231. (a)	232. (d)	233. (c)	234. (b)	235. (a)	236. (d)	237. (d)	238. (b)	239. (b)	240. (d)
241. (d)	242. (d)	243. (a)	244. (a)	245. (b)	246. (a)	247. (b)	248. (a)	249. (a)	250. (a)
251. (d)	252. (c)	253. (d)	254. (a)	255. (a)	256. (a)	257. (a)	258. (c)	259. (b)	260. (b)
261. (b)	262. (b)	263. (a)	264. (a)	265. (a)	266. (a)	267. (b)	268. (a)	269. (d)	270. (c)
271. (a)	272. (a)	273. (d)	274. (a)	275. (d)	276. (b)	277. (c)	278. (a)	279. (a)	280. (a)
281. (c)	282. (c)	283. (b)	284. (b)	285. (d)	286. (c)	287. (a)	288. (a)	289. (c)	290. (a)
291. (b)	292. (b)	293. (a)	294. (c)	295. (b)	296. (b)	297. (b)	298. (a)	299. (a)	300. (a)
301. (a)	302. (a)	303. (c)	304. (c)	305. (d)	306. (a)	307. (a)	308. (a)	309. (b)	310. (a)
311. (a)	312. (a)	313. (b)	314. (b)	315. (a)	316. (b)	317. (a)	318. (a)	319. (a)	320. (b)
321. (a)	322. (d)	323. (d)	324. (b)	325. (b)	326. (b)	327. (b)	328. (b)	329. (b)	330. (b)
331. (d)	332. (b)	333. (d)	334. (c)	335. (c)	336. (c)	337. (a)	338. (a)	339. (a)	340. (a)
341. (a)	342. (a)	343. (c)	344. (b)	345. (c)	346. (b)	347. (b)	348. (b)	349. (b)	350. (b)
351. (c)	352. (b)	353. (a)	354. (b)	355. (b)	356. (d)	357. (d)	358. (a)	359. (a)	360. (a)
361. (a)	362. (d)	363. (d)	364. (b)	365. (d)	366. (c)	367. (b)	368. (c)	369. (c)	370. (b)
371. (c)	372. (a)	373. (a)	374. (a)	375. (a)	376. (a)	377. (a)	378. (c)	379. (c)	380. (c)
381. (d)	382. (b)	383. (b)	384. (a)	385. (b)	386. (c)	387. (a)	388. (b)	389. (b)	390. (d)
391. (a)	392. (a)	393. (c)	394. (d)	395. (a)	396. (c)	397. (d)	398. (a)	399. (d)	400. (d)
401. (d)	402. (a)	403. (a)	404. (b)	405. (a)	406. (c)	407. (a)	408. (d)	409. (b)	410. (a)
411. (c)	412. (d)	413. (c)	414. (a)	415. (c)	416. (b)	417. (c)	418. (b)	419. (a)	420. (d)
421. (c)	422. (b)	423. (c)	424. (b)	425. (d)	426. (c)	427. (d)	428. (c)	429. (b)	430. (d)
431. (c)	432. (a)	433. (b)	434. (c)	435. (b)	436. (a)	437. (c)	438. (c)	439. (a)	440. (d)
441. (b)	442. (a)	443. (c)	444. (d)	445. (d)	446. (b)	447. (c)	448. (c)	449. (b)	450. (c)
451. (b)	452. (d)	453. (a)	454. (b)	455. (b)	456. (c)	457. (a)	458. (a)	459. (c)	460. (a)
461. (a)	462. (c)	463. (b)	464. (c)	465. (a)	466. (a)	467. (c)	468. (b)	469. (a)	470. (c)
471. (d)	472. (c)	473. (a)	474. (b)	475. (d)	476. (b)	477. (b)	478. (b)	479. (c)	480. (c)
481. (c)	482. (c)	483. (b)	484. (d)	485. (b)	486. (b)	487. (c)	488. (d)	489. (c)	490. (c)
491. (d)	492. (c)	493. (b)	494. (a)	495. (c)	496. (b)	497. (b)	498. (c)	499. (b)	500. (b)
501. (d)	502. (b)	503. (b)	504. (d)	505. (a)	506. (c)	507. (b)	508. (b)	509. (b)	510. (b)
511. (d)	512. (c)	513. (d)	514. (a)	515. (b)	516. (d)	517. (c)	518. (d)	519. (a)	520. (d)
521. (b)	522. (d)	523. (c)	524. (b)	525. (a)	526. (d)	527. (a)	528. (a)	529. (d)	530. (d)
531. (c)	532. (c)	533. (d)	534. (b)	535. (b)	536. (d)	537. (a)	538. (c)	539. (c)	540. (b)
541. (a)	542. (b)	543. (d)	544. (c)	545. (b)	546. (d)				