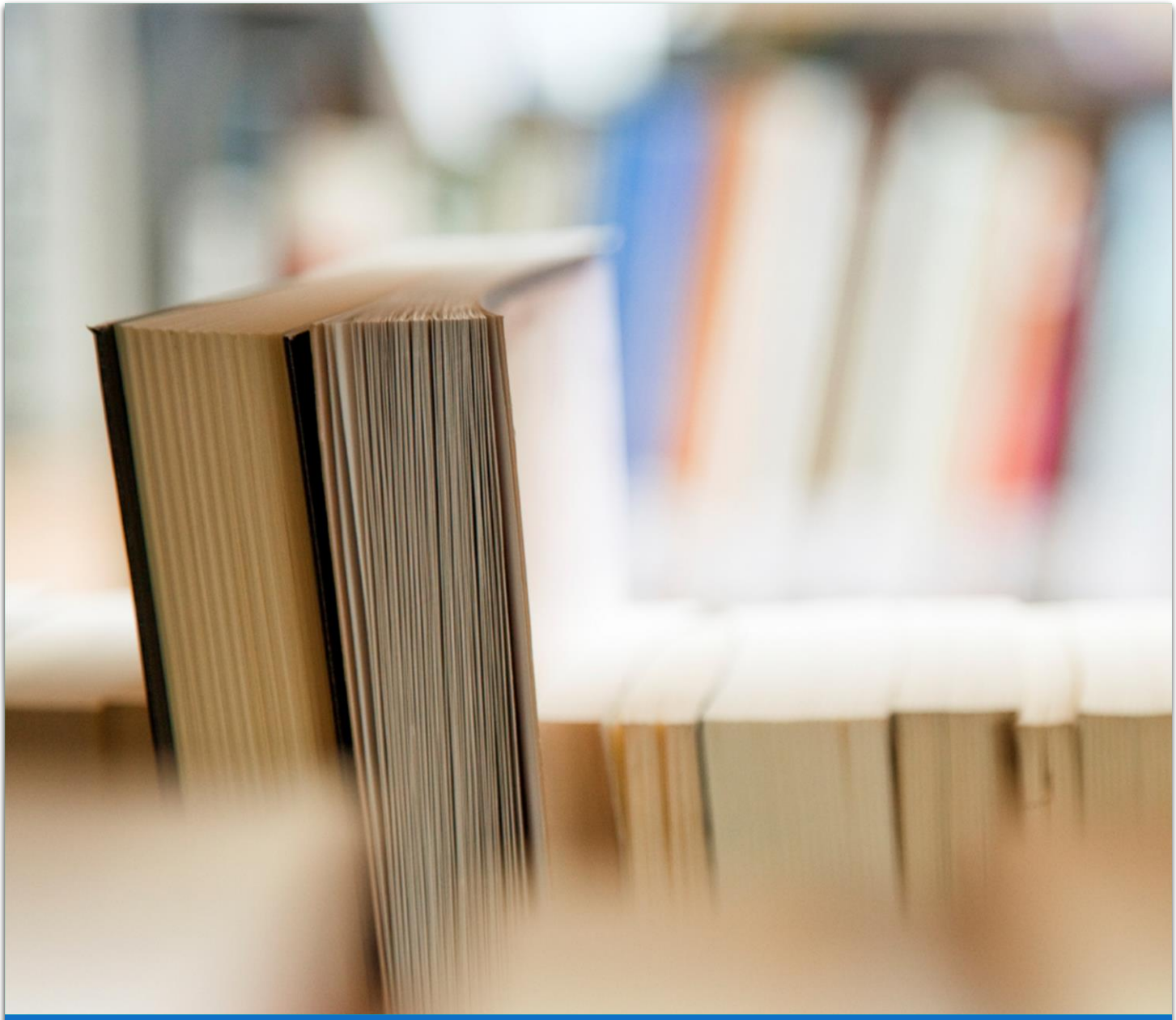

Geography

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Geography Code: 80

Contents

Unit – 1: Geomorphology

Sub Unit – 1: Earth Movement

1.1.1 Endogenetic and Exogenetic forces
1.1.2 Structure of the Earth
1.1.3 Volcano and eruption types Lahar
1.1.4 Earthquake, Richter's scale and Tsunami
1.1.5 Isostacy
1.1.6 Fold and Fault
1.1.6.1 Types of fold
1.1.6.2 Types of Faults
1.1.7 Theories of Mountain Building
1.1.7.1 Thermal contraction theory by Jeffrey
1.1.7.2 Geosynclinal theory of Kober
1.1.7.3 Hypothesis of Sliding Continent by Daly
1.1.7.4 Thermal Convection Current Theory by A. Holmes
1.1.7.5 Radio- activity and Surface History of Earth
1.1.8 Types of rocks and minerals
1.1.8.1 Igneous Rock
1.1.8.2 Sedimentary Rock
1.1.8.3 Metamorphic Rock
1.1.9 Geological Time Scale

Sub Unit – 2: Origin of Continents and ocean basins

1.2.1 Continental Drift Theory
1.2.2 Sea Floor Spreading
1.2.3 Plate Tectonic

Sub Unit – 3: Cycles of Erosions and Landforms

1.3.1 Some Fundamental concepts:
1.3.1.1 Some Popular books and the authors:
1.3.2 Denudation and erosion:
1.3.3 Weathering:
1.3.3.1 Process of Mechanical Weathering
1.3.3.2. Process of Chemical Weathering:
1.3.4 Mass wasting:
1.3.4.1Landslide and avalenches:
1.3.5 Landforms and evolutions:
1.3.5.1 River:
A) Types of Streams:
B) Drainage Patterns:
C) Depositional landforms:

D) Deposition on different position of River channels:
E) Landform evolution:
1. Cycle of Erosion by W.M.Davis:
2. Morphological Analysis by Penck:
1.3.5.2 Glacier and periglacial:
A) Landform evolution in periglacial:
B) Landform evolution in glacial:
C) Some Landforms:
1.3.5.3 Aeolian Landforms:
A. Classification of sand dunes
B) Landform evolution:
1.Cycle by Davis:
2. Cycle by L.C.King:
3. Gilbert
C)The role of lateral planation by stream in the formation of pediments:
1.3.5.4 Coastal:
A) Types of coasts:
B) Coastal Dunes:
C) Web cut platform:
D) Landform evolution:
1.3.5.5 Karst:
A) Landform evolution:
1.3.6 Theories and Process of Slope Development:
A) Types of slope:
B) Theories:
a) Slope decline
b) Slope replacement
c) Parallel slope retreat

Unit – 1: Sub Unit-I
Earth Movement

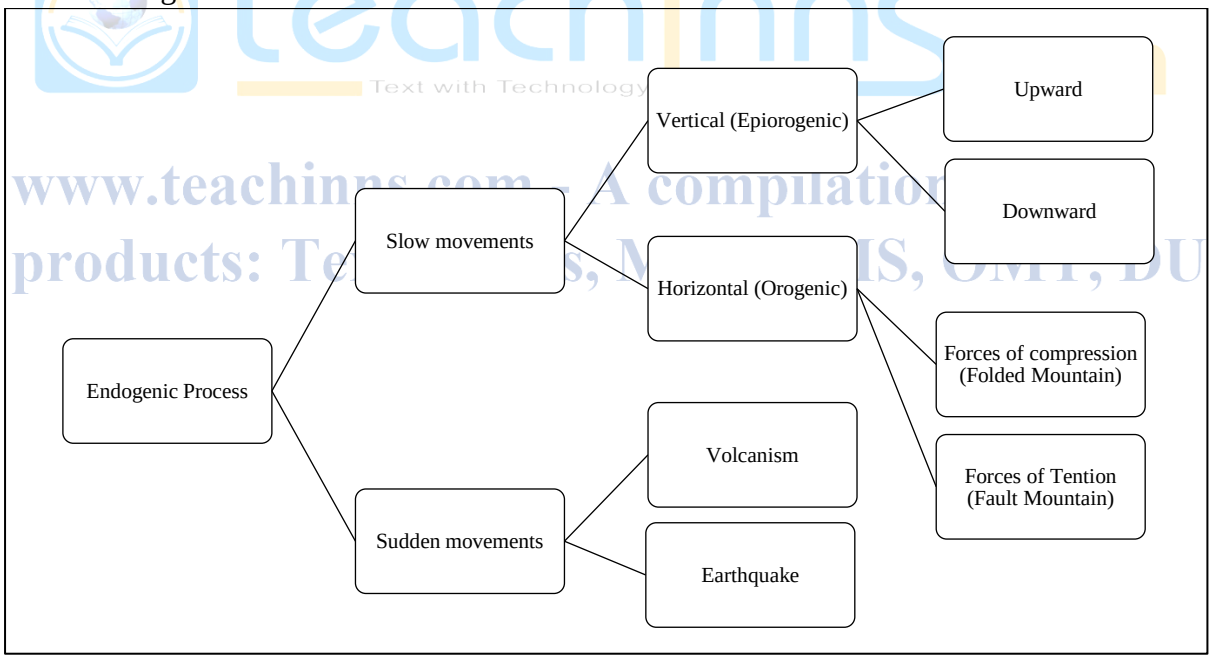
Immanuel Kant, a geographer argued that gaseous clouds (nebulae) slowly rotate, gradually collapse and flatten due to gravity, eventually forming stars and planets.

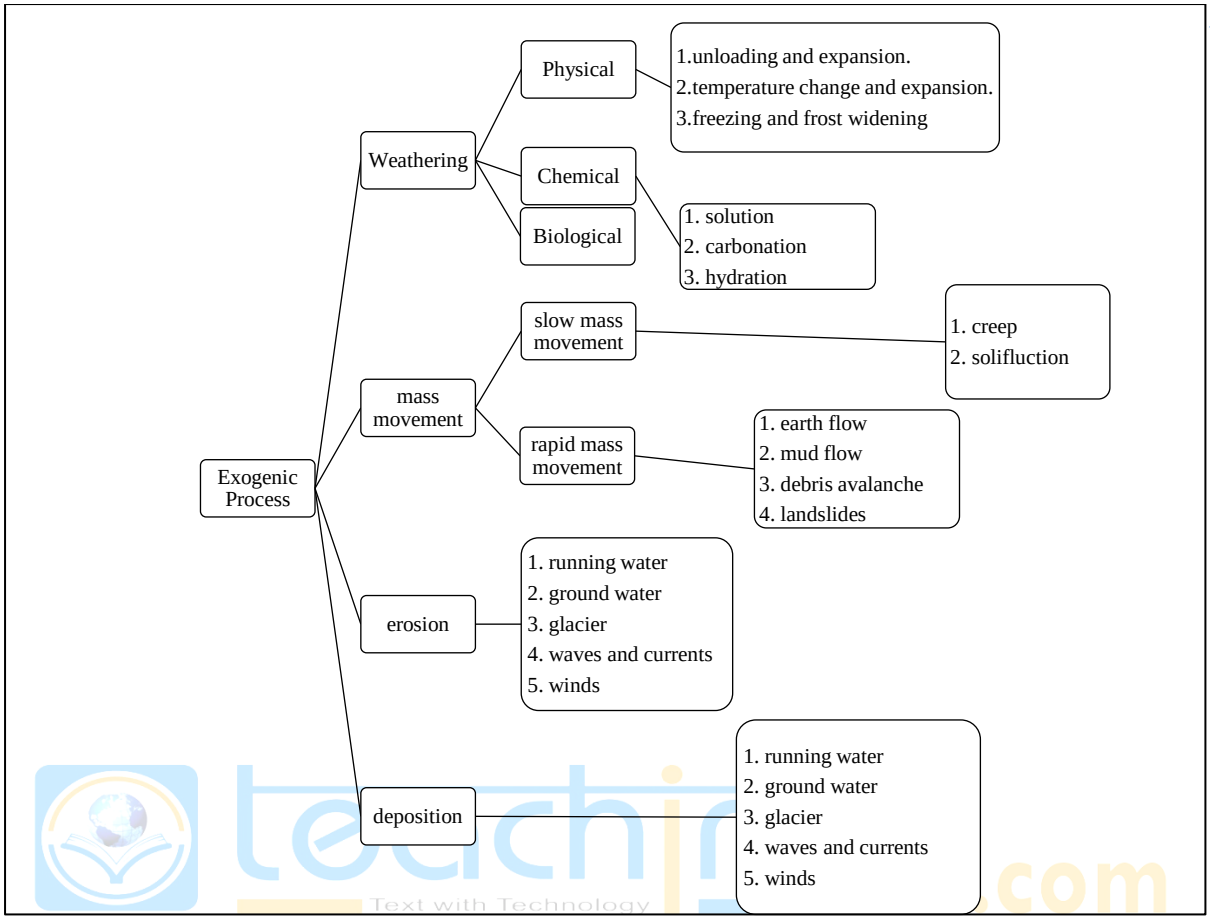
In our solar system the Earth is third planet from the Sun. The earth crust (Lithosphere) is harder; the inner part of the earth is semi liquid to liquid. Earth has atmosphere and hydrosphere. It sustains life (biosphere). The living beings are present on Lithosphere and hydrosphere; and a little amount in atmosphere.

Surface to Upper Mantle, the solid outer part of the earth is called Lithosphere. Plates are also present in this sphere. Lithosphere is divided into two groups – i) Oceanic lithosphere and ii) Continental lithosphere

1.1.1 Endogenetic and Exogenetic forces:

Endogenous processes such as volcanoes, earthquakes, and plate tectonics uplift and expose continental crust to the exogenous processes of weathering, of erosion, of deposition and of mass wasting.





Example and explanation: The Peninsular plateau are a tableland. It is composed of the old crystalline, igneous and metamorphic rocks. The Peninsular plateau is considered the oldest land mass as it was formed due to the drifting of the Gondwana land.

1.1.2 Structure of the Earth:

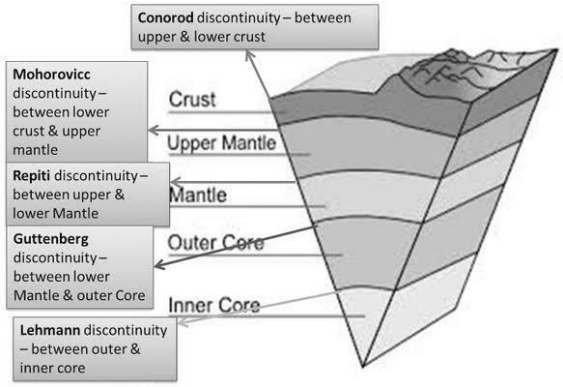
Layers: The five layers are the lithosphere, asthanospheric, mesospheric mantle, outer core, and the inner core.

Depth from Surface in Kms.	Layer
0–60	Lithosphere (locally varies between 5 and 200 km)
0–35	Crust (locally varies between 5 and 70 km)
60–210	Asthenosphere
35–60	Uppermost part of mantle
35–2,890	Mantle
210-270	Upper mesosphere (upper mantle)
660–2,890	Lower mesosphere (lower mantle)

2,890–5,150	Outer core
5,150–6,360	Inner core

Discontinuities:

1. Conrad Discontinuity- Upper Crust and Lower Crust.
2. Moho Discontinuity – Crust and Mantle.
3. Repetti Discontinuity – Upper Mantle and lower Mantle.
4. Gutenberg Discontinuity – Mental and Core
5. Lehmann Discontinuity – Outer Core and Inner Core



Layers and discontinuities

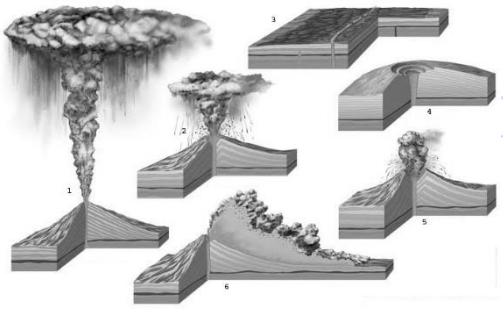
1.1.3 Volcano and eruption types Lahar

Volcano is a weak place, where liquid or semi liquid magma (asthanospheric material) can come out (i.e. lava) and make a cone shaped landform in crust.

Volcanic eruption can damage all three spheres (Lithosphere, Hydrosphere and Atmosphere) of the earth.

Types of Magmatic eruptions:

1. Plinian
2. Vulcanian
3. Icelandic
4. Hawaiian (Hawai, Mauna Loa)
5. Strombolian
6. Peléan


Types of Magmatic eruptions

Types of eruption by their sound:

1. Effusive
2. Explosive

Types according to the property of magma:

1. Basaltic magma (less viscus-iceland, Deccan trap of India)
2. Andesitic magma (medium viscus- Indonasian Crakatoa)
3. Rhyolitic Magma (highly viscus- Yellowstone national park of USA)

Some volcanoes are covered with snow and ice. If they erupt, melted snow and ice mixes with mud and volcanic ash and flows down through mountain. This type of volcanic flow is called Lahar.

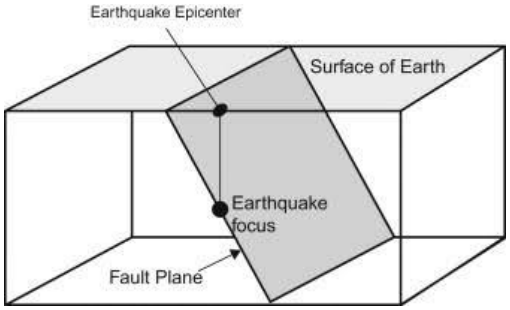
1.1.4 Earthquake, Richter's scale and Tsunami

An earthquake is shaking of earth, resulting of sudden release of energy stored in Lithosphere. It releases seismic waves (P, S, L waves).

Focus is the location where the earthquake originates.

Epicenter is a point on the Earth's surface just above the focus.

The Richter magnitude of an earthquake is determined from the logarithm of the amplitude of waves recorded by seismometer. In seismograph reading difference between 5 and 4, it gives 10 times greater reading from 4. At the same time, it releases 31.6 times larger energy from 4.



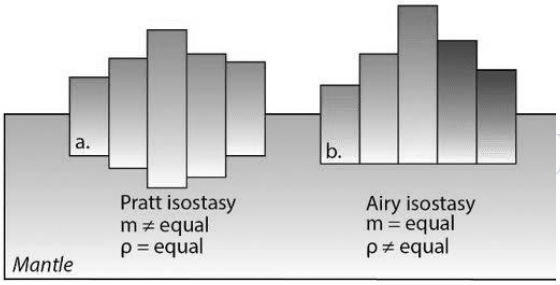
Focus and Epicenter

A series of waves in a water body caused by the displacement of a large volume of water, generally in an ocean caused by Earthquakes, volcanic eruptions and other underwater explosions is called Tsunami.

1.1.5 Isostacy:

The general term 'isostasy' was introduced in 1882 by the American geologist C Dutton. The principal models of isostasy are:

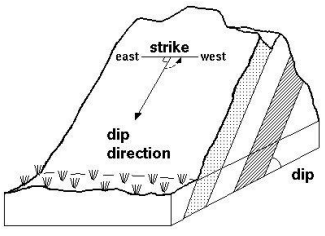
1. Airy's model – where different topographic heights are accommodated by changes in crustal thickness, in which the crust has a constant density.
2. The Pratt's model – where different topographic heights are accommodated by lateral changes in rock density. He introduces line of compensation concept.



Isostacy: Models of Pratt and Airy

1.1.6 Fold and Fault:

Dip and strike: The strike line of a bed, fault, or other planar feature, is a line representing the intersection of that feature with a horizontal plane. The dip gives the steepest angle of descent of a tilted bed or feature relative to a horizontal plane.



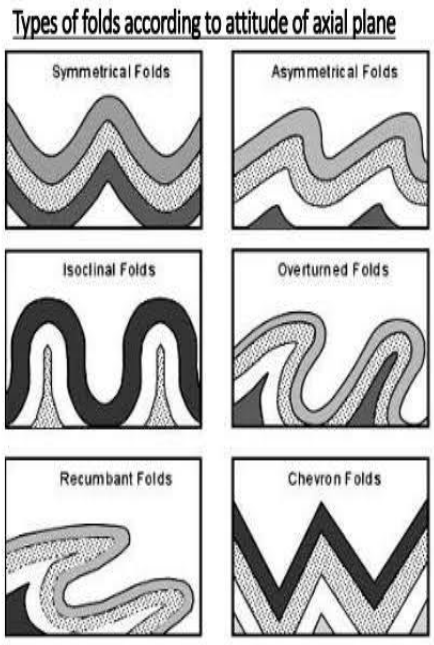
Dip and Strike

1.1.6.1 Types of fold:

Anticline: linear, strata normally dip away from axial center, oldest strata in center irrespective of orientation.

Syncline: linear, strata normally dip toward axial center, youngest strata in center irrespective of orientation.

Antiform: linear, strata dip away from axial center, age unknown, or inverted.
Synform: linear, strata dip toward axial center, age unknown, or inverted.
Monocline: linear, strata dip in one direction between horizontal layers on each side.
Chevron: angular fold with straight limbs and small hinges
Recumbent: linear, fold axial plane oriented at low angle resulting in overturned strata in one limb of the fold.
Nappe: Nappes form when a mass of rock is forced (or "thrust") over another rock mass, typically on a low angle fault plane.
Disharmonic: Folds in adjacent layers with different wavelengths and shapes.



Types of folds

1.1.6.2 Types of Faults:

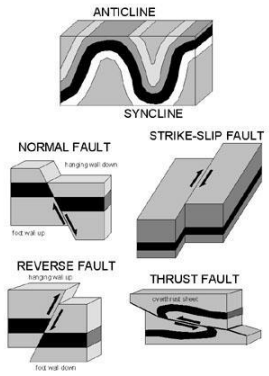
Based on the direction of slip, faults can be categorized as:

1.Strike-slip, where the offset is predominantly horizontal, parallel to the fault trace;

2.Dip-slip, offset is predominantly vertical and/or perpendicular to the fault trace; or

3.Oblique-slip, combining strike and dip slip.

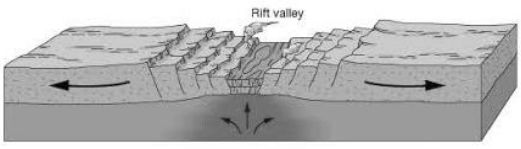
The several types are also- a) Normal fault, b) Reverse fault, c) Thrust fault etc.



Types of faults

Fault forming landforms:

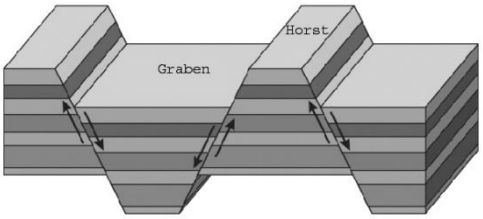
1. **Rift Valley:** A **rift valley** is a linear shaped lowland between several highlands or mountain ranges created by the action of a geologic **rift** or fault. A **rift valley** is formed on a divergent plate boundary, a



Rift valley

crustal extension or spreading apart of the surface, which is subsequently further deepened by the forces of erosion. Very frequently Sevier earthquake is happen by this process.

2. **Horst and Graben:** A horst is a raised block of the Earth's crust that has lifted, or has remained stationary, while the land on either side (graben) has subsided.



Horst and Graben

1.1.7 Theories of Mountain Building:

The concept of the geosyncline was introduced by the American geologist James Hall in 1859**.**

1. Thermal contraction theory by Jeffrey:

In his opinion folded mountains are formed by following causes-

i) Thermal radiation of outer part of the earth makes itself shrinking

ii) Reduction of rotational speed of earth also reduced.

2. Geosynclinal theory of Kober:

As per his opinion folded mountain is formed in geosyncline. Geosyncline deposits in between rigid masses. By the lateral movement of rigid masses following stages are happened:

i) Lithogenesis, ii) Orogenesis, iii) Gliptogenesis

3. Hypothesis of Sliding Continent by Daly:

In his opinion-

i) Geosyncline is deposit on the continental mass.

ii) Continue deposition on geosyncline make itself heavier.

iii) Underneath continental land mass cannot take stress of the geosyncline.

iv) A part of continental mass slides under the asthenosphere.

v) At the same time lateral stress on geosyncline stress make folded mountain.

4. Thermal Convection Current Theory by A. Holmes

In his opinion-

i) The surface of the earth and ocean floor is solid.

ii) Inner part of the earth is liquid and hot i.e. asthenosphere.

iii) Due to presence of hot and liquid state of the asthenosphere it has some rotational currents.

iv) By this current the solid surfaces are moving slowly.

5. Radio- activity and Surface History of Earth:

Jolly believes -

i) Sima is less drencher than sima.

Iii) Sima increases volume after melting, and get less dense.

1.1.8 Types of rocks and minerals:

The outer part of earth is formed by solid components are called rocks. There are three types of rocks - i) Igneous ii) Sedimentary and iii) Metamorphic rocks.
Rocks are formed by the components are called minerals.

Previous Year Questions Analysis with Proper Explanation

June - 14

1. Which of the following is strongly presumptive fault line scarps?
(A) Superimposed drainage across a fault
(B) Poor correlation between rock resistence and topographic forms
(C) Frequent severe earthquakes
(D) Actual Fault Plane identified along a scarp

Answer: - B

Explanation: -

Insequent streams have an almost random drainage often forming dendritic patterns. These are typically tributaries and have developed by a headward erosion on a horizontally stratified belt or on homogeneous rocks. These streams follow courses that apparently were not controlled by the original slope of the surface, its structure or the type of rock.

June - 15

1. Which of the following is formed due to tectonic forces?
(A) Rift valley
(B) Hanging valley
(C) Super imposed valley
(D) Antecedent valle

Answer: - A

Explanation: -

A rift valley is a linear shaped lowland between several highlands or mountain ranges created by the action of a geologic rift or fault. A rift valley is formed on a divergent plate boundary, a crustal extension or spreading apart of the surface, which is subsequently further deepened by the forces of erosion. Very frequently sevier earthquake is happen by this process.

2. Match **List - I** with **List - II** and select the correct answer from the codes given:

List – I	**List - II**
(a) Basalt	(i) Geneis
(b) Granite	(ii) Quartzite
(c) Sandstone	(iii) Schist
(d) Shale	(iv) Slate

Codes:

	(a)	**(b)**	**(c)**	**(d)**
(1)	(ii)	(i)	(iv)	(iii)
(2)	(i)	(ii)	(iii)	(iv)
(3)	(iv)	(ii)	(i)	(iii)
(4)	(iii)	(i)	(ii)	(iv)

Answer: D

Explanation: -
A metamorphic rock is a type of rock which has been changed by extreme heat and pressure
Examples:
Basalt ⟶ Amphibolites
Granite ⟶ Gneiss
Sandstone ⟶ Quartzite
Shale ⟶ Slate

3. Consider the following statements regarding kants view on the origin of the earth:
(a) Kant introduced the Newtonian law of gravitation in his theory.
(b) Kant developed his theory accepting the principle of conservation of angular momentum.
(c) Though Laplace put forward the nebular hypothesis of origin of the earth, Kant is regarded by many as the real propounder of the nebular hypothesis.
Which of the statements are correct?
(A) (a) and (b)
(B) (b) and (c)
(C) (a) and (c)
(D) (a), (b) and (c)
Answer: D
Explanation: -
Immanuel Kant, a geographer argued that gaseous clouds (nebulae) slowly rotate, gradually collapse and flatten due to gravity, eventually forming stars and planets.In our solar system the Earth is third planet from the Sun. The earth crust (Lithosphere) is harder; the inner part of the earth is semi liquid to liquid. Earth has atmosphere and hydrosphere. It sustains life (biosphere). The living beings are present on Lithosphere and hydrosphere; and a little amount in atmosphere.

4. Excessive folding results in:
(A) Reverse fault
(B) Geosyncline
(C) Nappe formation
(D) Block disintegration
Answer: C
Explanation: -
Nappes form when a mass of rock is forced (or "thrust") over another rock mass, typically on a low angle fault plane.

Model Question with Proper Explanation

1. Which of the following is not a type of Endogenetic movement?
   (a) Upliftment
   (b) Folding
   (c) Mass movement
   (d) Faulting

Answer: C
Explanation:
Endogenetic Movements. Endogenetic forces sometimes produce sudden movements and at the other times produce slow movements. Sudden movements like earthquakes and volcanoes cause mass destruction over the surface of the earth. While diastrophic movements are rather slow.

Mass wasting, also known as slope movement or mass movement, is the geomorphic process by which soil, sand, regolith, and rock move downslope typically as a solid, continuous or discontinuous mass, largely under the force of gravity, frequently with characteristics of a flow as in debris flows and mudflows.

2. Which of the following volcanoes was thought to be extinct but it erupted violently?
   (a) Mt. Stromboli
   (b) Mt. Fujiyama
   (c) Mt. Etna
   (d) Mt. Vesuvius

Answer: D
Explanation:
Vesuvius is the only one to have erupted within recent history, although some of the others have erupted within the last few hundred years. Many are either extinct or have not erupted for tens of thousands of years.

3. Which of the following type of volcanoes eject most thick lavas?
   (a) Vesuvian type
   (b) Pelean type
   (c) Strombolian type
   (d) Vulcanian type

Answer: B
Explanation:
A Pelean eruption is associated with explosive outbursts that generate pyroclastic flows, dense mixtures of hot volcanic fragments and gas described in the section Lava, gas, and other hazards. Pelean eruptions are named for the destructive eruption of Mount Pelée on the Caribbean island of Martinique in 1902. The fluidized slurries produced by these eruptions are heavier than air but are of low viscosity and pour down valleys and slopes at great velocities. As a result, they are extremely destructive.

4. Which of the following types of volcanoes erupts with great intensity and forms cauliflower shaped volcanic clouds in the sky?

(a) Pelean Type
(b) Vulcanian Type
(c) Vesuvian Type
(d) Fissure Type

Answer: B

Explanation:

Feb 5, 1997 - In a "Vesuvian" eruption, as typified by the eruption of Mount Vesuvius in Italy in A.D. 79, great quantities of ash-laden gas are violently discharged to form *cauliflower-shaped cloud* high above the *volcano*.

5. Among the following, which one is formed by the process of fissure eruption?

(a) Mt. Stromboli
(b) Columbia and Snake plateau
(c) Mt. Sulawesi
(d) Cascade Range

Answer: B

Explanation:

Fissures are usually found in or along rifts and rift zones, such as Iceland and the East African Rift. Fissure vents are often part of the structure of shield volcanoes.

Unit – 2: Climatology

Sub Unit – 1: Composition and structure of atmosphere

2.1.1 Components
2.1.1.1 Major constituents of dry air, by volume
2.1.2 Structure of Atmosphere
2.1.2.1 Homosphere
a) Troposphere
b) Stratosphere
c) Mesosphere
2.1.2.2 Hetarosphere
d) Thermosphere
e) Magnetosphere
f) Exosphere

Sub Unit – 2: Temperature of atmosphere

2.2.1 Process of heating of atmosphere
2.2.2 Heat Budget of Earth
2.2.3 Factors of distribution of temperature
2.2.4 Vertical distribution of temperature
2.2.5 Horizontal distribution of temperature
2.2.6 Regional distribution of temperature

Sub Unit – 3: Atmospheric pressure and circulation

2.3.1 Air pressure and atmospheric circulation
Wind direction and related laws
Low and high pressure zones
Pressure Gradient Force
The Coriolis effect
Ferrel's Law
2.3.2 Factors of air pressure
2.3.3 Air pressure measuring instruments
2.3.4 Horizontal distribution of air pressure and pressure belts
2.3.5 General circulation of the atmosphere
2.3.6 Classification of Winds
2.3.6.1 Permanent winds or Primary winds or Prevailing winds or Planetary Winds or Macro Scale winds
a) Trade Winds (tropical easterlies)
b) Westerlies
c) Polar easterlies
2.3.6.2 Secondary Winds or Periodic Winds
a) Monsoons
b) Land Breeze and Sea Breeze
c)Valley Breeze and Mountain Breeze
2.3.6.3Tertiary Winds or Local Winds
2.3.6. Jet stream
2.3.7 Walkar circulation and El-nino-southern oscillation (ENSO)
Normal Conditions
Effects of El Nino

Sub Unit – 4: Metrological Hazards

Some concepts:
a) water vapor and evaporation
b) Condensation:
c) Latent heat:
d) Humidity:
e) Humidity capacity
f) Absolute humidity
g) Specific humility
h) Relative humidity
i) Dew Point
2.4.2 Stability and instability of the atmosphere
Stability
Instability
2.4.3 FOG
2.4.4 CLOUD
Classification
Rainfall and Precipitation
2.4.6 Front genesis
2.4.7 AIRMASS
Characteristics
Classification
2.4.8 Cyclone
Tropical Cyclone
B. Haricanes
2.4.9 Thunderstorms
2.4.10 Tornedo
2.4.11 Hail Storm
2.4.12 Heat waves
2.4.13 Cold waves
2.4.14 Drought
2.4.15 Cloudburst
El Nino
2.4.17 La Nina
2.4.18 storm surge

Sub Unit – 5: Climatic classification

2. 5. 1 Koppen
2. 5. 2. Thornthwaite

Sub Unit – 6: Climatic change

2.6.1 Air Pollution:
2.6.2 Global Warming:
2.6.3 Acid Rain:
2.6.4 Ozone Depletion:
2.6.5 Desertification:
2.6.6 Rio summit or Earth Summit or Agenda 21
2.6.7 Kyoto Protocol:
2.6.8 Paris Agreement:

Unit – 2: Climatology: Sub Unit – 1

Composition and Structure of Atmosphere

The atmosphere of Earth is the layer of gases, commonly known as air that surrounds the planet Earth and is retained by Earth's gravity. The atmosphere of Earth protects life on Earth by creating pressure allowing for liquid water to exist on the Earth's surface, absorbing ultraviolet solar radiation, warming the surface through heat retention (greenhouse effect), and reducing temperature extremes between day and night.

2.1.1 Components:

The atmosphere is made up of nitrogen (78%) and oxygen (21%). The rest of the gases combined only account for about 1% of the atmosphere. Along with all of these different gases, the atmosphere also holds many tiny, floating particles and droplets of liquid that scientists collectively call aerosols.

2.1.1.1 Major constituents of dry air, by volume:

Gas Name	Formula	Volume in %
Nitrogen	N_2	78.084
Oxygen	O_2	20.946
Argon	Ar	0.9340
Carbon dioxide)	CO_2	0.041332
Neon	Ne	0.001818
Helium	He	0.000524
Methane	CH_4	0.000187
Krypton	Kr	0.000114

2.1.2 Structure of Atmosphere:

It surrounds the earth from all sides. Generally, it **extends up to about 1600 kilometers** from the earth's surface. 97 % of the total amount of weight of the atmosphere is limited up to the height of about 30 kilometers.

2.1.2.1 Homosphere:

a) Troposphere:

It extends from Earth's surface to an average height of about 12 km (7.5 mi; 39,000 ft),although this altitude varies from about 9 km (5.6 mi; 30,000 ft) at the geographic poles to 17 km (11 mi; 56,000 ft), at the Equator, the troposphere is bounded above by the tropopause, Here the normal lapse(temperature in Earth's atmosphere falls with altitude) rate -6.4 °C/Kms.

b) Stratosphere:

The stratosphere extends from the top of the troposphere to about 50 km (31 miles i.e. Stratopause) above the ground. The infamous ozone layer is found within the stratosphere. The altitudinal range of the layer is 15 to 35 kilometers.

c) Mesosphere:

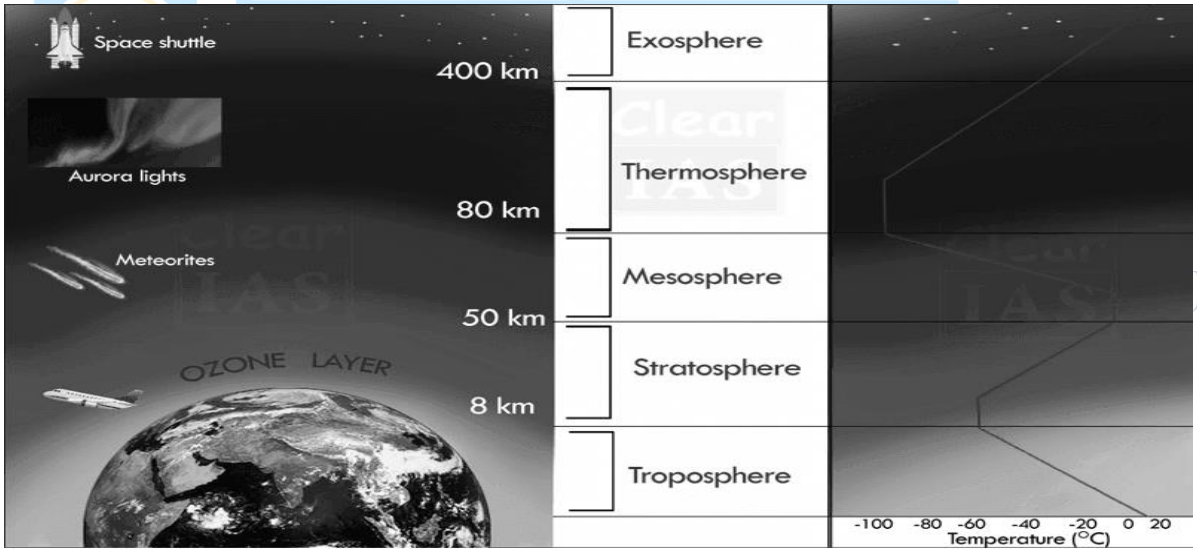
The mesosphere is the third highest layer of Earth's atmosphere, occupying the region above the stratosphere and below the thermosphere. It extends from the stratopause at an altitude of about 50 km (31 mi; 160,000 ft) to the mesopause at 80–85 km (50–53 mi; 260,000–280,000 ft) above sea level.

2.1.2.2 Hetarosphere:

d) Thermosphere:

The thermosphere is the second-highest layer of Earth's atmosphere. It extends from the mesopause (which separates it from the mesosphere) at an altitude of about 80 km (50 mi; 260,000 ft) up to the thermopause at an altitude range of 500–1000 km (310–620 mi; 1,600,000–3,300,000 ft).

This layer is completely cloudless and free of water vapor. However, non-hydrometeorological phenomena such as the aurora borealis and aurora australis are occasionally seen in the thermosphere.



Ionosphere

It is also a part of thermosphere. The layer reflects radio waves that are retransmitted from the earth and again back to the earth.

Except those layers following two layers are present-

e) Magnetosphere:

It is a region of space surrounding an astronomical object in which charged particles are manipulated or affected by that object's magnetic field.

f) Exosphere:

The exosphere, the highest layer, is extremely thin and is where the atmosphere merges into outer space. It is composed of very widely dispersed particles of hydrogen and helium.

As per scientific explanation Magnetosphere and Exosphere are not the part of the atmosphere.

Temperature of atmosphere

2.2.1 Process of Heating of Atmosphere:

Following heads are the heating and cooling processes in the atmosphere
a. Radiation
b. Absorption
c. Reflection
d. Scattering
e. Transmission
f. Conduction
g. Convection
h. Advection (Wind)

2.2.2 Heat Budget of Earth:

Earth's heat-budget or Earth's radiation balance refers to the net flow of energy into Earth in the form of shortwave radiation and the outgoing infrared long-wave radiation into space.
This balance between incoming and outgoing heat is known as Earth's heat budget.100 units of incoming solar radiation, m34 % are scattered or reflected back to space by the atmosphere and Earth's surface.
Of these 34 units, 6 units are scattered by the air, water vapor, and aerosols in the atmosphere; 20 units are reflected by clouds; and 4 units are reflected by Earth's surface.
The 66% units of incoming solar radiation make it into Earth's atmosphere. This is equivalent to 240 watts per square meter (66% of 342 W/m^2).
The atmosphere and clouds absorb 17 units of this incoming solar radiation, leaving 51 units of solar radiation that is absorbed at Earth's surface. These incoming 51 units consist of shorter wavelength solar radiation (mostly in the visible region of the electromagnetic spectrum), which is absorbed by land, water, and vegetation.

2.2.3 Factors of Distribution of Temperature:

The factors are following-
a. Latitudes
b. Altitude
c. Distance from the coast
d. Nature of land and water
e. Nature of ground surface (soil)
f. Ground slope
g. Prevailing winds
h. Ocean currents
The World's Coldest: Denali or Mount McKinley, USA.
The Warmest Place in the World: Al-Aziziyah, Libya.

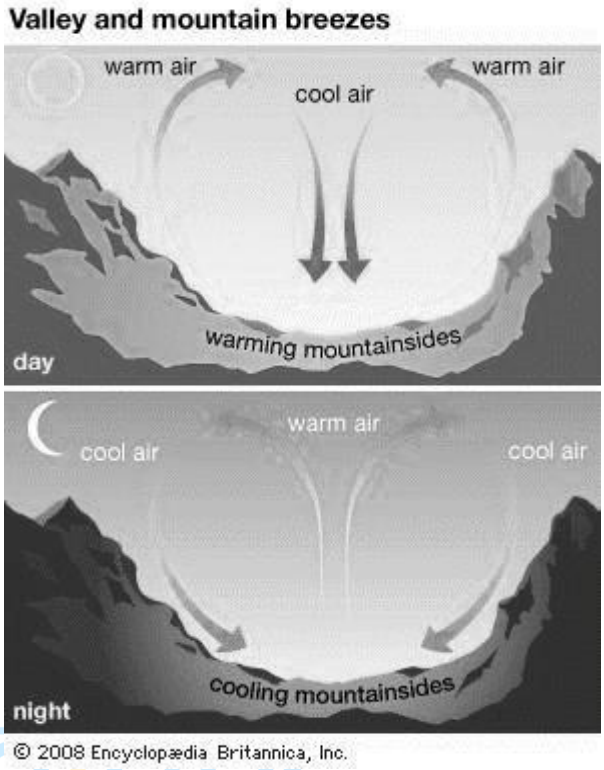
2.2.4 Vertical Distribution of Temperature:

Inversion of Temperature: -
Temperature decreases with increasing height in the troposphere but the rate of decrease varies according to seasons, duration of sunshine and location. On an average, the rate of decrease of temperature with increasing altitudes in a stationary column of air with absence of any vertical motion is 6.5°C per 1000 meters.

Ideal Conditions for Temperature Inversion:

These conditions are following:

a) Long winter nights.
b) Cloudless clear sky
c) Dry air
d) Calm atmosphere
e) Ice covered surface



2.2.5 Horizontal Distribution of Temperature:

The following factors are responsible for uneven distribution of temperature-

Latitude
Presence of land and water
Relief and altitude
Ocean currents
Winds
Vegetation
Nature of the slope etc.

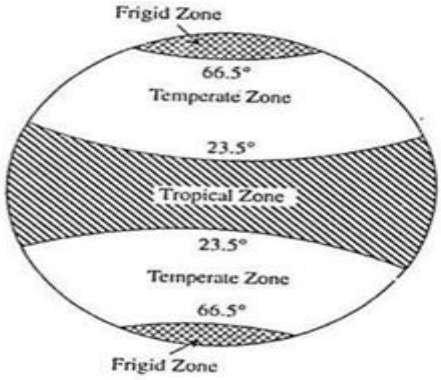
2.2.6 Regional Distribution of Temperature:

According to ancient Greek thinkers the globe is divided into three temperature zones on the basis of latitudes.

1.Tropical Zone -Tropical zone extends between the tropics of Cancer (23°30″ N) and Capricorn (23°30″ S).

2.Temperate Zone - Temperate zone extends between 23°30″ and 66°30″ latitudes in both the hemispheres.

3.Frigid Zone -Frigid zone extending between 66°30″ latitude and the poles in both the hemispheres is characterized by more oblique sun's rays throughout the year resulting into exceptionally very low temperature.



Temperature zones according to the views of ancient Greek thinkers.

Previous Year Questions Analysis with Proper Explanation

June - 15

1. An aircraft is flying at an altitude of 10 km. At that altitude the temperature is —40°C. What is the ambient temperature on the ground :
(A) 24°C
(B) 25°C
(C) 30°C
(D) 20°C
Answer: B
Explanation: -
The troposphere is bounded above by the tropopause, Here the normal lapse(temperature in Earth's atmosphere falls with altitude) rate -6.4 °C/Kms.

December - 15

1. The fall in temperature in troposphere is known as:
(A) Adiabatic rate
(B) Lapse rate
(C) Temperature rate
(D) Thermal loss
Answer: B
Explanation: -
the troposphere is bounded above by the tropopause, Here the normal lapse(temperature in Earth's atmosphere falls with altitude) rate -6.4 °C/Kms.

2. Which one of the following atmospheric layers reflect radio waves that are transmitted from the earth and again back to the earth ?
(A) Mesosphere
(B) Ionosphere
(C) Troposphere
(D) Stratosphere
Answer: B
Explanation: -

Ionosphere
It is also a part of thermosphere. The layer reflects radio waves that are retransmitted from the earth and again back to the earth.

3. Which one of the following is devoid of atmosphere ?
(A) Mesosphere
(B) Stratosphere
(C) Magnetosphere
(D) Thermosphere
Answer: C
Explanation: -
Magnetosphere: It is a region of space surrounding an astronomical object in which charged particles are manipulated or affected by that object's magnetic field.

4. At which of the following altitudinal ranges ozone is found in concentrated form ?
(A) 10 - 25 km
(B) 15 - 35 km
(C) 35 - 50 km
(D) 50 - 65 km
Answer: B
Explanation: -
Stratosphere:
The stratosphere extends from the top of the troposphere to about 50 km (31 miles i.e. Stratopause) above the ground. The infamous ozone layer is found within the stratosphere. The altitudinal range of the layer is 15 to 35 kilometers.

Model Question with Proper Explanation

1. Which of the following volcanic belt has highest occurrence of volcanic eruptions?

(a) Mid-Atlantic belt
(b) Mid-Continental belt
(c) Circum-Pacific belt
(d) None of these

Answer: C
Explanation:
The Ring of Fire, also referred to as the Circum-Pacific Belt, is a path along the Pacific Ocean characterized by active volcanoes and frequent earthquakes. The majority of Earth's volcanoes and earthquakes take place along the Ring of Fire

2. Which of the following volcanic belt is along the zone of convergence of continental plate margins?

(a) Mid-Atlantic belt
(b) Circum-Pacific belt
(c) Mid-Continental belt
(d) None of these

Answer: C
Explanation:
Mid-Continental Belt representing Alpine-Himalayan chains of Eurasia and northern Africa and epicenters of east African fault zone. This belt represents the collision or subduction zones of continental plates. About 21 per cent of the total seismic events occur in this belt.

3. The World's most active volcano was is

(a) Cotopaxi
(b) Fujiyama
(c) Kilaueu
(d) Vesuvius

Answer: C
Explanation:
Kilauea volcano on Hawaii is the world's most active volcano, followed by Etna in Italy and Piton de la Fournaise on La Réunion island.

4. Volcanic mountains are

(a) Openings through which volcanoes erupt
(b) Accumulated volcanic materials in the form of cones
(c) Volcanic craters
(d) None of the above

Answer: B

Explanation: Volcano Mountain is a cinder cone in central Yukon Territory, Canada, located a short distance north of Fort Selkirk, near the confluence of the Pelly and Yukon Rivers. Volcano Mountain is called Nelrúna in the Northern Tutchone language.

5. Volcanism is observed in which of the following?

(a) Convergent plate margins
(b) Divergent plate margins
(c) Intra plate faults
(d) All of the above

Answer: D

Explanation:

Sixty percent of all active volcanoes occur at the boundaries between tectonic plates. Most volcanoes are found along a belt, called the "Ring of Fire" that encircles the Pacific Ocean. Some volcanoes, like those that form the Hawaiian Islands, occur in the interior of plates at areas called "hot spots."

Unit –3: Oceanography

Sub Unit – 1: Oceanic Bottom Relief

3.1.1 Introduction:
3.1.2 Some theories on origin of oceans:
3.1.2.1 Continental Drift Theory:
3.1.2.2 Sea Floor Spreading Theory:
3.1.2.3 Plate Tectonic Theory:
3.1.3 Ideal cross section of the ocean floor:
Continental Slope:
Continental Shelves:
Continental Rise:
Deep Ocean Basins:
Abyssal Plain:
Abyssal Hills:
Seamounts and Guyots:
Deep Ocean Trenches:
Mid-Oceanic Ridges:
3.1.3 Bottom Topography of Pacific Ocean:
3.1.4 Bottom Topography of Atlantic Ocean:
3.1.5 Bottom Topography of Indian Ocean:
3.1.6 Bottom Topography of Arctic Ocean:
3.1.7 Tsunami:

Sub Unit – 2: Physical and Chemical Composition of Oceanic Water

3.2.1 Density of ocean water:
3.2.2 Temperature distribution of ocean water:
3.2.3 Salinity of ocean water:
3.2.3.1 Origin of salinity:
3.2.3.2 Impact of salinity on characteristics of ocean water:
3.2.3.3 Salinity of different seas and oceans: Brine

Sub Unit – 3: Tides and Oceanic Waves

3.3.1 Tides
Sun's Tidal Effect
Types of Tidal ranges
Apogee and perigee
3.3.2 Components of waves
3.3.2.1 Origin of ocean waves
A) Geometry of ocean waves
B) Relation between wind and waves
C) Wave motion
D) Rotation of water particulars in sea waves
E) Motion of wave form
F) Breakers
3.3.2.2 Wave types
3.3.3 Classification of shore lines

3.3.3.1 Fore shore
3.3.3.2 Back shore

Sub Unit – 4: Oceanic Currents

3.4.1 Ocean currents
3.4.1.1 Factors controlling ocean currents
A) Horizontal currents
1) Controlling factors of ocean currents
2) Factors except oceans
3) Factors of ocean water
4) Changing factors of ocean currents
B) Vertical Current
3.4.2.2 Ocean currents of Pacific Ocean
3.4.2.3 Ocean currents of Atlantic Ocean
3.4.2.4 Ocean currents of Indian ocean
3.4.3 Impact of ocean currents
3.4.4 Sea level rises
3.4.5 Ocean acidification

Sub Unit – 5: Oceanic Deposition

3.5.1 Corals reefs
3.5.1.1 Theories of formation Corals reefs
3.5.2 Ocean deposits
1. On the Basis of Location
A) Pelagic deposits
B) Terrigenous deposits
2. On the Basis of Depth
A) Deep sea deposits (Below 100 fathoms)
a) Pelagic Deposits
b) Terrigenous Deposits
B) Shallow sea deposits (between low tide water and 100 fathoms)
c) Littoral deposits (Between high and low tide water)
3. Classification on the Basis of Origin of Sediments
1. Littoral deposits (derived from land)
2. Hemipelagic deposits (Partly from land and partly from marine origin)
3. Eupelagic deposits (Of marine and cosmic origin)

Unit –3: Oceanography: Sub Unit – 1

Oceanic Bottom Relief

3.1.1 Introduction:

An ocean is a large area of water between continents. Oceans are very big and they join smaller seas together. Together, the oceans are like one "ocean", because all the "oceans" are joined. Oceans cover 72% of our planet and rest remains in continents.

The ***Challenger*** **expedition** was done by the Royal Society of London in 1872 to 1876. It was a scientific program that made many discoveries to lay the foundation of oceanography.

3.1.2 Some Theories on Origin of Oceans:

3.1.2.1 Continental Drift Theory:

In 1914 A. Wegner introduces the theory. He believed one united landmass (Pangea) and an ocean mass (Panthalassa) were present in past. Pangea divided into different continents. Those are floated over oceans by tidal force. At last those continents and oceans make the present form of the planet.

Evidences:

1. Jig-saw-fit
2. location of Glacier of Post Carboniferous
3. Fossil study
4. Evidence of formation of mountains
5. Pole Wandering
6. Presence of Island Arc

3.1.2.2 Sea Floor Spreading Theory:

In 1960, Professor Herry Hess and Robert W. Ditz introduce the concept. Seafloor spreading is a process that occurs at mid-ocean ridges, where new oceanic crust is formed through volcanic activity and then gradually moves away from the ridge.

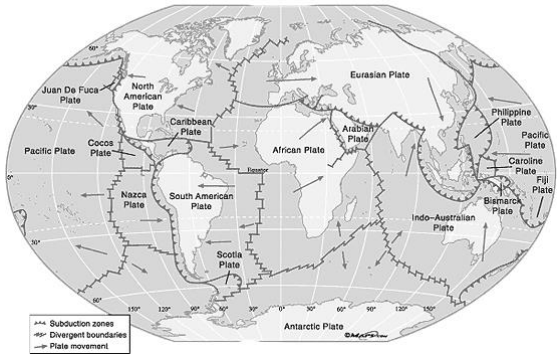
Evidences:

1. Ocean floor sampling by Glomar challenger (American National Science Foundation and University of California Scripps Institution of Oceanography and built by Levingston Shipbuilding Company in Texas.)
2. Study of the deposited materials in ocean floor. Oceanic crust is denser than continental crust.
3. Higher proportion of radioactive elements are present in Continents than ocean floor.
4. Presence of earthquake centers in ocean floor.
5. Paleomagnetic evidence by F. J. Vine and D. H. Mathews.

3.1.2.3 Plate Tectonic Theory:

The word 'Plate' first time used by J. T. Wilson in 1965. In 1967 Makenzie and Parker discuss elaborately about plate. W. J. Morgan and Le Pichon discussed about plate tectonic in 1968. Lithosphere is formed by seven large and many medium to small plates. Plate Tectonic is a scientific concept. Plate can float on Asthenosphere. Asthenosphere is in semi liquid to liquid state.

1. Types of plates:
A) Continental plates
B) Oceanic plates
2. Types of plate boundaries:
A) Destructive plate boundaries - Himalaya
B) Constructive plate boundaries- Mid-oceanic ridge of Atlantic Ocean
C) Transverse plate boundaries – San Andrean fault (dextral motion)



Subduction zone, Divergent Boundaries and plate movement direction

Subduction: it is a geological process that takes place at destructive plate boundary.
Sinistral motion - left side towards to the observer.
dextral motion - right side towards to the observer.

3.1.3 Ideal Cross Section of the Ocean Floor:

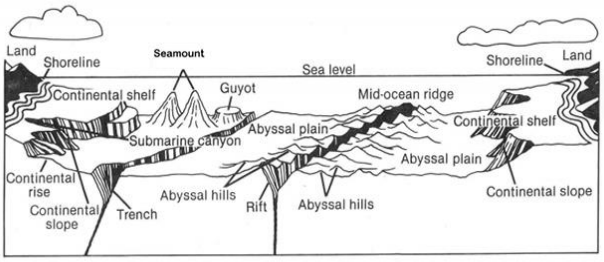
An oceanic basin may be covered by seawater. Geologically, there are other undersea geomorphological features such as –

1. **Continental Shelves:**

A continental shelf is a portion of a continent that is submerged under an area of relatively shallow water known as a shelf sea.

2. **Continental Slope:**

It descends at an average angle in excess of 4° from the shelf break at the edge of the continental shelf to the beginning of the ocean basins.



Different types of landforms under the ocean

A submarine canyon is a steep-sided valley cut into the seabed of the continental slope, sometimes extending well onto the continental shelf, having nearly vertical walls.

A **turbidity current** is most typically an underwater current of usually rapidly moving, sediment laden water moving down a slope. Heezen and Ewing (1952) studied this event.

3. **Continental Rise:**
   It is a sediment underwater feature found between the continental slope and the abyssal plain.

4. **Deep Ocean Basins:**
   a) **Abyssal Plain:**
      It is an underwater plain on the deep ocean floor, usually found at depths between 3,000 metres and 6,000 metres. It is lying between the foot of a continental rise and a mid-ocean ridge

   b) **Abyssal Hills:**
      An abyssal hill is a small hill that rises from the floor of an abyssal plain. Abyssal hills have relatively sharply defined edges and climb to heights of no more than a few hundred meters.

   c) **Seamounts and Guyots:**
      A seamount is a large geologic landform that rises from ocean floor.

   d) **Deep Ocean Trenches:**
      Oceanic trenches are topographic depressions of the sea floor, relatively narrow in width, but very long.

5. **Mid-Oceanic Ridges:**
   A mid-ocean ridge is a seafloor mountain system formed by plate tectonics. It typically has a depth of ~ 2,600 meters and rises about two kilometers above the deepest portion of an ocean basin.

3.1.3 Bottom Topography of Pacific Ocean:

The Pacific Ocean is the largest and deepest ocean in the Earth. It extends from the Arctic Ocean in the north to the Southern Ocean in the south and is bounded by the continents of Asia and Australia in the west and the two Americas in the east. It covers an area of 165,250,000 square kilometers. It covers 46% of Earth's water surface.

A. Oceanic Ridges:
Albatross, Coco, Hawaii rise, Chatham rise, Lord Ho rise etc.

B. Deep Ocean Basins:
Allusion, Philippine, West Carolyn, East Carolyn, Fiji, East Australian, South Australian, South-east Pacific, South-west Pacific, Pacific-Antarctic etc.

C. Deep Ocean Trenches:
Allusion trench, Qurile and Japan Trench, Philippine Trench, Nero or Mariana Trench, Peru-Chili Trench, Challenger, Aldrich etc.

3.1.4 Bottom Topography of Atlantic Ocean:

The Atlantic Ocean is the second largest of the world's oceans, with an area of about 106,460,000 square kilometers. It covers approximately 20 percent of earth's surface and about 29 percent of its water surface area.

A. Oceanic Ridges:

Mid oceanic Ridge (Almost 3 km above pertaining to the Mid-Atlantic Ridge from the floor of Atlantic Ocean)

B. Deep Ocean Basins:

Labrador, North east Atlantic, North west Atlantic, Cape Verde, Gini, Brazil, South East Atlantic, Argentina, Agulhas, Atlantic-Indian-Antarctica etc.

C. Deep Ocean Trenches:

South Sandwich Trench, Puerto Rico Trench etc.
Allusion trench,

3.1.5 Bottom Topography of Indian Ocean:

The Indian Ocean is the third-largest of the world's oceanic divisions, covering 70,560,000 km^2 and 19.8% of the water on the Earth's surface. It is bounded by Asia to the north, Africa to the west, and Australia to the east. To the south it is bounded by the Southern Ocean or Antarctica.

A. Oceanic Ridges:

Carlsberg, Lakshadweep and Maldives, Madagascar,

B. Deep Ocean Basins:

Arab, Oman, Somali, Mauritius, Natal, Agulhas, Indian –Antarctic, Andaman, East Indian Arctic Basin etc.

C. Deep Ocean Trenches:

Sunda Trench,

3.1.6 Bottom Topography of Arctic ocean:

The **Arctic Ocean** is the smallest and shallowest of the world's major oceans. It is also known as the coldest of all the oceans.

D. Oceanic Ridges:

East Zan Mayen ridge, Pits Bergen ridge, Lomonosov ridge, Trans current fault ridge etc.

E. Deep Ocean Basins:

Greenland basin, Norway Basin, northern Polar basin.

3.1.7 Tsunami:

An earthquake is shaking of earth, resulting of sudden release of energy stored in Lithosphere. It releases seismic waves (P. S, L waves).

Focus is the location where the earthquake originates.

Epicenter is a point on the Earth's surface just above the focus. The Richter magnitude of an earthquake is determined from the logarithm of the amplitude of waves recorded by

seismometer. In seismograph reading difference between 5 and 4, it gives 10 times greater reading from 4. At the same time, it releases 31.6 times larger energy from 4.

A series of waves in a water body caused by the displacement of a large volume of water, generally in an ocean caused by Earthquakes, volcanic eruptions and other underwater explosions is called **Tsunami.**

Previous Year Questions with Proper Explanation

December - 14

1. The Challenger Expedition of 1874 was headed by the country:
(A) United States of America
(B) United Kingdom
(C) U.S.S.R.
(D) India
Answer: B
Explanation: -
The ***Challenger*** **expedition** was done by the Royal Society of London in 1872 to 1876. It was a scientific program that made many discoveries to lay the foundation of oceanography.

December - 15

1. Which one of the following is correct arrangement of oceans in ascending order of their six?
(A) Indian - Arctic - Atlantic - Pacific
(B) Arctic - Indian - Atlantic - Pacific
(C) Pacific - Atlantic - Indian - Arctic
(D) Atlantic - Pacific - Arctic – Indian
Answer: B
Explanation: -

- The Pacific Ocean is the largest and deepest ocean in the Earth. It covers an area of 165,250,000 square kilometers. It covers 46% of Earth's water surface.
- The Atlantic Ocean is the second largest of the world's oceans, with an area of about 106,460,000 square kilometers. It covers approximately 20 percent of earth's surface and about 29 percent of its water surface area.
- The Indian Ocean is the third-largest of the world's oceanic divisions, covering 70,560,000 km^2 and 19.8% of the water on the Earth's surface.

- The Arctic Ocean is the smallest and shallowest of the world's major oceans. It is also known as the coldest of all the oceans.

2. Over the past century world sea levels has risen by around :
(A) 15 cm
(B) 25 cm
(C) 35 cm
(D) 45 cm
Answer: A
Explanation: -
Global sea level has been rising over the past century, and the rate has increased in recent decades. In 2014, global sea level was 2.6 inches above the 1993 average the highest annual average in the satellite record (1993-present). Sea level continues to rise at a rate of about one-eighth of an inch per year

July - 16

1. Identify the correct statement pertaining to the Mid-Atlantic Ridge from the floor of Atlantic Ocean among the following:
(A) Almost 3 km above
(B) Almost 4 km above
(C) Almost 5 km above
(D) Almost 6 km above
Answer: A
Explanation: -
The mid-ocean ridge wraps around the globe for more than 65,000 km like the seam of a baseball. The average depth to the crest (top) of the ridge is 2500 m, but it rises above sea-level in Iceland and is more than 4000 m deep in the Cayman Trough

January - 17

1. The general depth of abyssal plains varies between
(A) 1000 – 6000 metres
(B) 2000 – 6000 metres
(C) 3000 – 6000 metres
(D) 4000 – 6000 metres
Answer: C
Explanation: -
An abyssal plain is an underwater plain on the deep ocean floor, usually found at depths between 3,000 metres (9,800 ft) and 6,000 metres (20,000 ft). Lying generally between the foot of a continental rise and a mid-ocean ridge, abyssal plains cover more than 50% of the Earth's surface.

Model Question with Proper Explanation

1. Which of the following is a central eruption type of volcano?

(a) Mt. Pelee
(b) Columbia Snake
(c) Antrim
(d) None of these

Answer: A

Explanation:

A central eruption is the "ejection of debris and lava flows from a central point, forming a more or less symmetrical volcano" (Bates and Jackson, 1980, p. 102). The 1991 eruption of Mount Pinatubo and the 1980 explosive eruption of Mount St. Helens, after the lateral blast, are examples of central eruptions.

2. Which of the following is a dormant volcano?

(a) Mt. Kilimanjaro (Tanzania)
(b) Barren Island (Andaman and Nicobar)
(c) Mt. Etna (Italy)
(d) Mt. Fuji (Japan)

Answer: B

Explanation:

"The only live volcano in the Andaman and Nicobar islands is erupting once again. The Barren Island volcano, located 140-km north-east of Port Blair, dormant for more than 150 years started erupting in 1991 and has since then shown intermittent activity," CSIR-NIO said in a statement here.

3. Consider the following option and choose the one which correctly depicts and extinct volcano?

(a) They erupt through a central pipe or small opening
(b) They have not erupted regularly but are known to erupt
(c) They erupt frequently
(d) They retain the features of volcanoes but have not erupted at all

Answer: D

Explanation:

A dormant volcano is an active volcano that is not erupting, but supposed to erupt again. An extinct volcano has not had an eruption for at least 10,000 years and is not expected to erupt again in a comparable time scale of the future.

4. Which of the following correctly describes volcanism?

(a) A vent or opening through which heated materials or earth come out
(b) Volcanoes that erupt quietly but have less viscous laves
(c) All the processes related to movements of heated materials from deep inside the Earth
(d) None of the above

Answer: C

Explanation:

A volcano is a hole in Earth's surface through which magma (called lava when it reaches Earth's surface), hot gases, ash, and rock fragments escape from deep inside the planet. The word volcano also is used to describe the cone of erupted material (lava and ash) that builds up around the opening.

5. Which of the following statements is correct?

(a) Active volcanoes never become dormant
(b) Volcanic activity is confined to low and middle latitudes
(c) A volcanic plug is made of viscous lava
(d) Active volcanoes are always explosive

Answer: D

Explanation:

Some small volcanoes only erupt once in their lives, while other volcanoes erupt multiple times. Kilaeua volcano in Hawaii, which has been erupting continuously since 1983, is the world's most active volcano. While some volcanoes erupt at regular intervals, there are always exceptions to the rule.

UNIT -4: Geography of Environment

Sub Unit-1: Ecosystem & Ecology

4.1.A.I Ecosystem: Meaning and Definitions
4.1.A.Ii Properties of Ecosystems
4.1.A.Iii Types of Ecosystems
4.1.A.Iv Components of Ecosystem
4.1.A.V Functioning of Ecosystem
4.1.A.Vi Ecosystem Productivity
4.1.A.Vii Stability of Ecosystem
4.1.A.Viii Ecosystem Instability
4.1.B.I Ecology: Meaning and Definitions
4.1.B.Ii Aims and Scope of Ecology
4.1.B.Iii Sub-Divisions of Ecology
4.1.B.v Summary of Ecological Principles
4.1.B.V Ecological Niche
4.1.B.Vi Deep Ecology Vs. Shallow Ecology Biodiversity
4.1.C.Iv Wetlands, Mangroves and Corals
4.1.C.V Table 24.6: National Parks in India
4.1.C.Vi Tiger Reserves and Project Tiger
4.1.C.Vii Project Elephant
4.1.D.I Plant System
4.1.D.Iii Animal Kingdom
4.1.E.1 Ecological Production and Energy Flow
4.1.F.1 Circulation of Matter in the Ecosystem
4.1.G.1 Man and Environmental Processes
4.1.H.1 Biome: Meaning and Concept

Sub Unit -2: Environment and Environmental Pollution

4.2.1 Global Warming
4.2.2 Environmental Degradation

Sub Unit-3: Programmes and Policies on Environment

4.3.1 Global Warming and International cooperation's
4.3.2 First Earth Summit
4.3.3 Second Earth Summit
4.3.4 Kyoto Protocol
4.3.5 Paris Climate Agreement
4.3.6 Gaia Hypothesis
4.3.7 Sustainable Development

Sub Unit-1
Ecosystem & Ecology

4.1.A.I Ecosystem: Meaning and Definitions

The term 'ecosystem' was first used by A.G. Tansley in 1935 who defined ecosystem as 'a particular category of physical systems, consisting of organisms and inorganic components in a relatively stable equilibrium, open and of various sizes and kinds'. According to Tansley the ecosystem is comprised of two major parts viz. biome (the whole complex of plants and animals of a particular spatial unit) and habitat (physical environment) and thus 'all parts of such an ecosystem-organic and inorganic, biome and habitat-may be regarded as interacting factors which, in a mature ecosystem, are in approximate equilibrium, it is through their interactions that the whole system is maintained' (A.G. Tansley, 1935). F.R. Fosberg (1963) has defined ecosystem as 'a functioning, interacting system composed of one or more living organisms and their effective environment, both physical and biological'.

According to R.L. Lindeman (1942) the term ecosystem applies to 'any system composed of physical-chemical-biological processes, within a space-time unit of any magnitude'. In E.P.

Odum's view (1971) 'living organisms and their non-living (abiotic) environment are inseparably interrelated and interact upon each other. Any unit that includes all of the organisms (i.e. the Community) in a given area interacting with the physical environment so that a flow of energy leads to clearly defined trophic structure, biotic diversity and material cycle (i.e. exchange of materials between living and non-living parts) within the system is an ecological system or ecosystem'.

According to A.N. Strahler and A.H. Strahler (1976), 'the total assemblage of components interacting with group of organisms is known as ecological system or more simply, an ecosystem. Ecosystems have inputs of matter and energy, used to build biological structure (the biomass), to produce and to maintain necessary internal energy levels. Matter and energy are also exported from an ecosystem. An ecosystem tends to achieve a balance of the various processes and activities within it'.

Based on the contents of above definitions of ecosystem provided by various scientists it may be pointed out that 'ecosystems are therefore unities of organisms connected to one another and to their environment' (P.A. Furley and W.W. Newey. I983), 'and the ecosystem is thus the sum or all-natural organisms and Substances within an area, and it can be viewed as a basic example of an open system in physical geography' (C.C Park, 1980). Stressing the importance of ecosystem C.C Park further says that 'ecosystems are regarded by many ecologists to be the basic units of ecology because they are complex, interdependent and highly organised systems, and because they are the basic building blocks of the biosphere'.

'In a more lucid style and simple term an ecosystem may be defined as a fundamental functional unit occupying spatial dimension of 'earth space ship' characterised by total assemblage of biotic community and abiotic components and their mutual interactions within a given time unit'. (Savindra Singh, 1991)

4.1.A.II Properties of Ecosystems:

The ecosystems are characterized by the following basic properties:

- Ecosystem of any given space-time unit represents the sum of all living organisms and physical environment.
- It is composed of three basic components viz. energy, biotic (biome) and abiotic (habitat) components.
- It occupies certain well-defined area on the earth-spaceship (spatial dimension).
- It is viewed in terms of time-unit (temporal dimension).

- There are complex sets of interactions between biotic and abiotic components (including energy component) on the one hand and between and among the organisms on the other hand.
- It is an open system which is characterised by continuous input and output of matter and energy.
- It tends to be in relatively stable equilibrium unless there is disturbance in one or more controlling factors (limiting factors).
- It is powered by energy of various sorts but the solar energy is the most significant.
- It is a functional unit wherein the biotic components (plants, animals including man and micro-organisms) and abiotic (physical environment) components (including energy component) are intimately related to each other through a series of large-scale cyclic mechanisms viz. energy flow, water cycle, bio-geochemical cycle, mineral cycle, sediment cycle etc.
- Ecosystem has its own productivity which is the process of building organic matter based on the availability and amount of energy passing through the ecosystem. The productivity refers to the rate of growth of organic matter in an aerial unit per time-unit.
- Ecosystem has scale dimension i.e. it varies in spatial coverage. It may be as small as a cowshed, a tree or even a part of a tree having certain micro-organisms. The largest unit is the whole biosphere.
- There are different sequences of ecosystem development. The sequence of ecosystem development in term of a particular suite of physical and chemical conditions is called as 'sere'. A 'sere' represents the development of a series of sequential successions starting from primary succession and culminating into the last succession in a sere as 'climax' or 'climatic climax' which is the most stable situation of an ecosystem. Thus, the study of ecosystem development may help in environmental planning from ecological point of view.
- Ecosystems are natural resource systems.
- Ecosystem concept is monistic in that environment (abiotic component), man, animals, plants and micro-organisms (biotic components) are put together in a single framework so that it becomes easy to study the patterns of interactions among these components.
- It is structured and well-organized system.

4.1.A.III Types of Ecosystems:

Ecosystems may be identified and classified on various bases, with different purposes and objectives as outlined below:

(1) On the Basis of Habitats:

The habitats exhibit physical environmental conditions of a particular spatial unit of the biosphere. These physical conditions determine the nature and characteristics of biotic communities and therefore there are spatial variations in the biotic communities. Based on this premise the world ecosystems are divided into two major categories viz.

(A) Terrestrial ecosystems, and

(B) Aquatic ecosystems.

There are further variations in the terrestrial ecosystems in terms of physical conditions and their responses to biotic communities. Therefore, the terrestrial ecosystems are further divided

into sub categories of

(i) Upland or mountain ecosystems,

(ii) Lowland ecosystems,

(iii) Warm desert ecosystems, and

(iv) Cold desert ecosystems.

These sub ecosystems may be further divided into descending orders depending on specific purposes and objectives of studies.

(B) The aquatic ecosystems are subdivided into two broad categories

(i) Freshwater (on continents) ecosystems, and

(ii) Marine ecosystems.

Fresh water ecosystems (Bi) are further divided into (Bia) river ecosystems, (Bib) lake ecosystems, (Bic) pond and tank ecosystems, (Bid) marsh and hog ecosystems while (B11) marine ecosystems are divided into (Biia) open ocean ecosystems, (Biib) coastal estuarine ecosystem. (Biiic) coral reef ecosystem, or can be alternatively divided into (Biia) ocean surface ecosystems, and (Biib) ocean bottom ecosystems.

(2) On the Basis of Ecoclines:

Ecocline means a broad transition between two different ecosystems of mainly plant communities. In fact, an ecocline represents gradient along which biotic communities mainly plant community and abiotic conditions change. The study of ecocline representing the changing conditions, across an ecosystem boundary is known as 'gradient analysis' which implies the plotting of variations of plant community in particular direction and the analysis thereof and division of world ecosystem (M.J. Bradshaw, 1979). Based on above considerations R.C. Whittaker (1970) has drawn four profile diagrams of four ecoclines on a major world scale viz. (A) from Appalachians to southern Texas (USA) on the basis of increasing aridity, (B) from equatorial rainforest to desert area, on the basis of increasing aridity, (C) from ground surface to higher altitudes of the Andes on the basis of increasing altitude, and (D) from tropical rainforest to tundra on the basis of decreasing temperature. Thus, on the basis of above gradient profiles and associated ecoclines the following types of ecosystems in the aforesaid four situations may be identified:

(A) From mountains with relatively more moisture to the areas of increasing aridity

(a) Mesophotic forest ecosystem,

(b) Oak-hickory forest ecosystem,

(c) Oak woodland ecosystem

(d) Prairie ecosystem,

(e) Dry grassland ecosystem, and

(f) Desert ecosystem.

(B) From the areas of high moisture (equatorial areas) to the areas of lowest moisture (desert):

(a) Tropical rainforest ecosystem,

(b) Evergreen seasonal-deciduous forest ecosystem,

(c) Thorn forest ecosystem, and

(d) Desert scrub ecosystem.

(C) From lower to higher altitudes (in the Andean area of S. America):

(a) Tropical rainforest ecosystem,

(b) Lower montane rainforest ecosystem,

(c) Montane rainforest ecosystem,

(d) Montane thicket ecosystem,

(e) Elfin woodland ecosystem, and

(f) Paramos ecosystem.

(D) From equatorial hot and moist areas to cold tundra:

(a) Tropical forest ecosystem,

(b)Sub- tropical forest ecosystem,

(C) Temperate deciduous forest ecosystem,

(d) Temperate mixed forest ecosystem,

(e) Boreal forest ecosystem, and

(f) Tundra ecosystem.

(3) On the Basis of Spatial Scales:

Ecosystems are divided into different types of various orders on the basis of spatial dimensions required for specific purposes. The largest ecosystem is the whole biosphere which is subdivided into two major types:

(A) Continental ecosystem, and

(B) Oceanic or marine ecosystems.

The spatial scales may be brought down from a continent to a single biotic life (plant or animal).

(4) On the Basis of Uses:

E.P. Odum (1959) has divided the world ecosystems on the basis of use of harvest methods and net primary production into two broad categories viz.

(A) Cultivated ecosystems, and

(B) Non-cultivated or natural ecosystems.

Cultivated ecosystems may be further subdivided into several categories on the basis of cultivation of dominant crops, e.g. wheat field ecosystem, rice field ecosystem, sugarcane field ecosystem, fodder field ecosystem etc. Similarly, non-cultivated ecosystems can be subdivided into forest ecosystem, tall grass ecosystem, short grass ecosystem, desert ecosystem, seaweeds ecosystem etc.

(5) On the Basis of Source and Level of Energy:

Ecosystems can be classified on the basis of source, type and amount of energy available in the ecosystem on the basic premise that the main driving force of the ecosystems for their

functioning is energy. E.P. Odum (1975) has classified the ecosystems into four categories on this basis.

(A) Unsubsidized natural solar-powered ecosystems are those which are driven by solar energy only wherein incoming solar radiation is used to fix chemical energy. Open oceans, upland forest, wide and deep lakes may be cited typical examples of such ecosystems. The annual energy flow ranges between 1000- 10,000 Kcal/in^2/yr (kilocalories per square meter per year) whereas estimated average energy is about 2000 Kcal/m2/yr.

(B) Natural-subsidized solar-powered ecosystems represent tidal estuaries, lowland forests, coral reefs etc. Natural processes like tides, waves, surface runoff, wind etc. supplement solar energy input because these processes bring additional organic matter and bio- geochemical cycle shelving recycling of nutrients in the aforesaid ecosystems and thus solar energy is augmented to produce organic matter through primary producers (phototroph and chemotroph plants) so much so that these ecosystems become the most productive natural ecosystems. The annual energy flow in such ecosystems ranges between 10,000-50,000 Kcal/ m^2/year and average estimated energy flow is 20,00 Kcal/m^2/year.

(C) Man-subsidized solar powered ecosystems are those where additional energy is supplemented by human activities (e.g. farming). In other words, man applies additional energy in the form of fertilizers both natural and chemical, machines, irrigational water etc. to make the land more productive. Thus, he produces more food and fiber crops (food and fibre producing ecosystems) in a simple farming system. In a highly mechanised farming ecosystems, man increases the productivity through the use of chemical fertilizers, pesticides and herbicides (fossil energy to provide additional energy to crops, to kill insects and unwanted plants so that maximum energy is utilized by field crops), irrigational water (which augments the cycling and recycling of nutrients so that these are made available to desired plants), and by developing new hybrid high yielding varieties of seeds so-that the relatively low amount of solar energy and can make maximum use of solar energy to prepare food plants remain dwarf and require

through photosynthesis and thus can yield more production. The use of machines like tractors, hoes etc. also helps in augmenting the natural processes of bio-geochemical cycles (these agricultural implements make the soil horizons very friable after ploughing and thus organic matter is easily distributed in the soils for easy uptake by plants). The examples of such ecosystems are simple crop and fibre farming systems and highly advanced mechanised farming systems (agriculture) and some forms of aquaculture (fish farming, shellfish cultivation etc.). The annual energy flow is from 10,000 to 50,000 Kcal/m^2/year and estimated average annual quantity being 20,000 Kcal/m^2/year.

(D) Fuel-powered ecosystems are represented by urban and industrial areas where fuel energy fully replaces solar energy. The fuel energy is derived through fossil fuels like coal and petroleum which are obtained from underground quite away from the centres of utilization. Besides, energy is also supplied through hydroelectricity, nuclear power and wood coal. These ecosystems are basically wealth generating systems. These ecosystems also generate pollutants and thus are potential sources of environmental pollution in cities and towns, suburban areas, industrial areas as well as the rural atmospheric environment of even very distant places. These

fuel-powered urban- industrial ecosystems though generate material wealth of the economy of the society but these depend for life support (oxygen supply and food supply) fully on solar-powered natural ecosystems, nature-subsidized solar-powered ecosystem and man-subsidized solar-powered ecosystems. The annual flow of energy ranges between 100,000 to 3,000,000 Kcal/m^2/year, the estimated average being 2,00,0000 Kcal/m^2/year. Thus, these ecosystems are powered by largest amount of energy which comes from non-solar sources.

Previous Year Questions with proper Explanation

JULY-2018

Sub Unit: -1

1. Given below are the two statements, one labelled as Assertion (A) and the other labelled as Reason (R). Select your answer from the code given below:

Assertion (A): Energy flow shifts from production to respiration in the entropic stage, with oxygen demand exceeding oxygen availability.

Reason (R): Stratospheric ozone layer depletion causes skin diseases.

Code:

(1) Both (A) and (R) are true and (R) is the correct explanation of (A).

(2) Both (A) and (R) are true but (R) is not the correct explanation of (A).

(3) (A) is true but (R) is false.

(4) (A) is false but (R) is true.

Answer: 2

Explanation: -

Solar radiation is the basic input of energy which enters the ecosystem. This solar energy passes through the hierarchy of trophic levels in a food chain and food web and ultimately becomes output from the ecosystem as energy is lost through respiration from each trophic level. Biosynthesis is the process of the formation of organic tissue which represents the transformation of solar or light energy into chemical or food energy. Biodegradation is the process of breakdown and decomposition of organic matter and thus this process refers to the release of nutrients and food (chemical) energy in the form of heat. The energy flow (transfer of organic molecules) in the ecosystem is unidirectional and is non-cyclic (is not available again for reuse).

The radiant solar energy or light (of the sun) energy is trapped by green plants (primary producers or autotrophs) and is used to prepare food (chemical organic matter) through the process of photosynthesis. Thus autotrophic (or phototrophic) green plants transform a part of solar energy into food or chemical energy which is used by the green plants (primary producers at trophic level 1) to develop their tissues and thus it is stored in the primary producers or autotrophs at the bottom of trophic levels (i.e. trophic level 1).

2. Which one of the following groups of natural elements in living matters make up more than 99% of Earth's biomass?

(1)H, O, C

(2) N, Ca, K

(3) H, Ca, N

(4) S, H, Na

Answer: 1

Explanation: -

The six most common elements in living things are carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur. Atoms of these elements combine and form thousands of large molecules. These large molecules make up the structures of cells and carry out many processes essential to life.

3. Match the List - I with List - II and select the correct answer from the code given below :

List - I (Process)	**List - II (Process) (Outcome)**
Decomposition	(i) CO_2
Transpiration	(ii) O_2
Respiration	(iii) CH_4
Photosynthesis	(iv) Water vapour

Code :

	(a)	(b)	(c)	(d)
(1)	(i)	(iv)	(ii)	(iii)
(2)	(iv)	(iii)	(i)	(ii)
(3)	(iii)	(iv)	(i)	(ii)
(4)	(iii)	(iv)	(ii)	(i)

Answer: - 3

Explanation: -

Photosynthesis – the process of capturing light energy and converting it to sugar energy, in the presence of chlorophyll using CO_2 and H_2O,

Respiration – the process of metabolizing (burning) sugars to yield energy for growth, reproduction and other life processes, and

Transpiration – the loss of water vapor through the stomata of leaves.

NOVEMBER-2017,PAPER-II

1. Which one of the following terms is appropriate for the mixing zone of two biomes ?

(1) Environment

(2) Ecology

(3) Ecosound

(4) Ecotones

Answer: - 4

Explanation: -

Ecocline means a broad transition between two different ecosystems of mainly plant communities. In fact an ecocline represents gradient along which biotic communities mainly plant community and abiotic conditions change.

NOVEMBER-2017,PAPER-III

1. Which one of the following terms is appropriate for plants that endure seasonal climatic fluctuations from year to year ?

(1) Perennials

(2) Annuals

(3) Seasonal

(4) Bi-annuals

Answer: - 2

Explanation: -

Plant That endure seasonal climatic fluctuation from year to year called is annual.

Model Questions with Proper Explanation

1. Basalt rich and highly fluid lava are the characteristics of which of the following?

(a) Basic lava
(b) Acidic lava
(c) Both a and b
(d) None of these

Answer: A
Explanation:
Magma that reaches the earth's surface is called lava. It may be acidic or basic. Acidic lava is viscous, is lighter in colour and has higher silica content. Basic lava is non-viscous, is darker in colour and has lower silica content.

2. Most of the world's volcanoes and volcanism is associated with

(a) Convergence of plate margins
(b) Divergence of plate margins
(c) Faulting and subsidence of plates
(d) Young fold mountains

Answer: A
Explanation:
Volcanoes are most common in these geologically active boundaries. The two types of plate boundaries that are most likely to produce volcanic activity are divergent plate boundaries and convergent plate boundaries. At a divergent boundary, tectonic plates move apart from one another.

3. Which of the following volcanoes are not situated along the continental belt?

(a) Mt. Kilimanjaro
(b) Mt. Stromboli
(c) Mt. Fujiyama
(d) None of the above

Answer: C
Explanation:
The mountain is located in Yamanashi and Shizuoka *ken* (prefectures) of central Honshu, Japan, about 60 miles (100 km) west of the Tokyo-Yokohama metropolitan area. It is the major feature of Fuji-Hakone-Izu National Park, and it is at the centre of a UNESCO World Heritage site designated in 2013.

4. Circum-pacific ring of fire includes which of the following regions?

(a) Eastern coastal margins of Pacific Ocean
(b) Western coastal margins of Pacific Ocean
(c) Volcanic islands scattered over the Pacific Ocean

Answer: D

Explanation:

The southern portion is more complex, with a number of smaller tectonic plates in collision with the Pacific plate from the Mariana Islands, the Philippines, Bougainville, Tonga, and New Zealand. This portion excludes Australia, since it lies in the center of its tectonic plate.

5. Which of the following is not included in the pacific ring of convergent plate margins?

(a) Mt. fuji
(b) Mt. taal
(c) Andean volcanoes
(d) Mt. Kilimanjaro

Answer: B

Explanation:

Taal Volcano is a large caldera filled by Taal Lake in the Philippines. Located in the province of Batangas, the volcano is the second most active volcano in the Philippines, with 34 recorded historical eruptions, all of which were concentrated on Volcano Island, near the middle of Taal Lake.

Unit – 5: Population and Settlement Geography

Sub Unit – 1: Population Geography

5.1.1 Sources of Population Data
5.1.1.1 Census
5.1.1.2 Sample Surveys
5.1.1.3 Vital Statistics
5.1.1.4 Data Reliability
5.1.2 World Population Distribution
Factor Influencing Distribution of Population
Ecumene and Non Ecumene Area
5.1.2.1 Ackerman's Population Resource Region
5.1.3 World Population Growth
Positive Growth of Population and Negative Growth of Population
5.1.5 Demographic Transition
5.1.6 Theories of Population Growth
5.1.6.1 Malthus
5.1.6.2 Sadler
5.1.7 Fertility and Mortality Analysis
5.1.7.1 Indices
5.1.7.2 Determinants
5.1.8 Migration
Push Factors
Pull Factors
5.1.8.1 Types
5.1.8.2 Causes and Consequences
5.1.8.3 Models
A) Ravenstein
B) The Gravity Model
C) Principle of Least Efforts
D) Lee Migration Model
E) Zelinsky Migratoin Model
5.1.9 Population Composition and Characteristics
5.1.10 Population Problems in Developing Countries
5.1.11 Population Problems in Developed Countries

Sub Unit – 2: Rural Settlements

5.2.1 Settlement Geography
5.2.2 Rural Settlements
5.2.2.1 Types
5.2.2.2 Patterns
5.2.3 Contemporary Problems of Rural Settlements

Sub Unit – 3: Urban and Urbanization Related Issues

5.3.1 Theories of Origin of Towns
5.3.1.1 Gordon Childe
5.3.1.2 Henri Pirenne
5.3.1.3 Lewis Mumford:
5.3.2 Characteristics and Processes of Urbanization in Developed and Developing Countries:
5.3.2.1 Factors of Urban Growth
5.3.3 Urban Systems
5.3.3.1 Primate City
5.3.3.2 Rank Size Rule
Reilly's Law of Retail Gravitation
5.3.4 Central Place Theories
5.3.4.1 Christaller's Theory
5.3.4.2 Losch's Theory
5.3.5 Internal Structure of The City, Models of Urban Land Use
5.3.5.1 Burgess
5.3.5.2 Hoyt
5.3.5.3 Harris And Ullman
5.3.6 Concepts of Megacities
5.3.7 Global Cities and Edge Cities
5.3.8 Changing Urban Forms
5.3.8.1 Peri-Urban Areas
5.3.8.2 Rural-Urban Fringe
5.3.8.3 Suburban
5.3.8.4 Satellite Towns
5.3.9 Social Segregation in The City
5.3.10 Urban Social Area Analysis
5.3.11 Manifestation of Poverty in The City: (Slums, Informal Sector Growth, Crime and Social Exclusion)

Sub Unit – 1
Population Geography

Population Geography is the study of the ways in which spatial variations in the distribution, composition, migration, and growth of *populations* are related to the nature of places. Thomas Glean Trewartha is known as father of population geography.

Some Definitions:

a) **Population Density:**
Population density is the number of people per unit of area, usually quoted per square kilometre or square mile.

b) **Arithmetic Density:**
Arithmetic density, also known as real density, is very simply the total number of people divided by the total land area.

c) **Agricultural Density:**
Agricultural density is calculated by determining the area of arable (farmable land) divided by the number of agricultural populations in that region.

d) **Physiological Density:**
The ratio between total population and total cultivable land.

5.1.1 Sources of Population Data:

5.1.1.1 Census:

A census is the procedure of systematically acquiring and recording information about the members of a given population. This term is used mostly in connection with national population and housing censuses; other common censuses include traditional culture, business, supplies, agricultural, and traffic censuses.

5.1.1.2 Sample Surveys:

A **sample survey** is a method for collecting data from or about the members of a population so that inferences about the entire population can be obtained from a subset, or **sample**, of the population members.

5.1.1.3 Vital Statistics:

Vital statistics is accumulated data gathered on live births, deaths, fetal deaths, marriages and divorces.

5.1.1.4 Data Reliability:

Data reliability means the overall consistency of a measure.

5.1.2 World Population Distribution:

World's 90% population stay in 10% of the area.

Factor Influencing Distribution of Population:

1. **Geographical factors:**
   a) climate
   b) landforms
   c) water availability

d) soil
e) minerals

2. **Economic factors:**
   a) Urbanization
3. **Social and cultural factors:**
   a) industrialization

Ecumene and Non Ecumene Area:
Ecumene: area of highly concentrated of population. The areas are-
1) East Asia: Contain 1/5 of the world population. The leading country is China.
2) South Asia: Contain 1/5 of the world population. The leading country is India.
3) South East Asia: The leading country is Indonesian islands such as Philippines.
4) Western Europe: Contain 1/9 of the world population.
5) NE USA and SE Canada: Contain 2% of the world population.

Non Ecumene: area of sparsely concentrated of population.
1. Cold desert area
2. Desert area
3. Hot wet lands

5.1.2.1 Ackerman's Population Resource Region:

Sl no.	Type	Characteristics
1	Brazilian	Technology-Deficient Area of low Population-Potential/Resource Ratio
2	Egyptian	Technology-Deficient Area of high Population-Potential/Resource Ratio
3	European	Technology-Source Area of high Population-Potential/Resource Ratio
4	U.S.	Technology-Source Area of Low Population-Potential/Resource Ratio
5.	Arctic-Desert Type	Technology-Deficient Area with few Food Producing Resources

5.1.3 World Population Growth

The world's population reaches 800 million by 18th century. By middle of 20th century, it reaches 2.5 billion. By 1988 it was 5 billion. It requires more than one million years reaching one billion population in 1808. The next billion happened in 120 years (1928). The third billion requires only 32 years (i.e. 1960) and the fourth billion requires just 15 years (1975). Fifth billion requires only 13 years (1988).

Positive Growth of Population and Negative Growth of Population:
A **positive growth** rate indicates that the **population** is increasing, while a negative **growth** rate indicates that the **population** is decreasing.
Net Population change = (Mortality + Fertility)

5.1.5 Demographic Transition:

The "***Demographic Transition***" is a model that describes population change over time. It is based on an interpretation begun in 1929 by the American demographer Warren Thompson, of the observed changes, or ***transitions***, in birth and death rates in industrialized societies over the past two hundred years or so.

1. **Stage 1 –** both high birthrate and death rate is present
2. **Stage 2 –** high birth rate and death rate falls rapidly.
3. **Stage 3 –** falling birth rate and death rate falls slowly.
4. **Stage 4-** low birth rate and death rate.
5. **Stage 5 –** birth rate rising again and death rate remain low.

5.1.6 Theories of Population Growth:

5.1.6.1 Malthus:

Malthusianism is the idea that population growth is potentially exponential while the growth of the food supply is linear. It derives from the political and economic thought of the Reverend Thomas Robert Malthus, as laid out in his 1798 writings, An Essay on the Principle of Population.

5.1.6.2 Sadler:

Michael Thomas Sadler, an Economist and a British social reformer, was born in 1780. He was a contemporary of Malthus. He expressed his ideas about population in his book The Law of Population. According to Sadler, the law which regulates the growth of animals and plants is primarily the same as the law which regulates the growth of human population.

He was of the opinion that "The fecundity of human beings is in the inverse ratio of the condensation of their numbers."

Moreover, the fertility rate decreases with the increase in the density of population. In the agriculture based or pastoral countries where the density of population is low, the fertility rate of the population becomes high. In such countries, people have the capacity to work hard and hardworking people give birth to more children.

With the passing of time, when there is industrialization and the population becomes more civilized and literate, the density of population increases. Here people would limit the size of family and in such socio-economic conditions they will be happier and there will be prosperity.

5.1.7 Fertility and Mortality Analysis:

It includes, for **fertility**, the crude birthrate, the child-woman ratio (based on census data), and the total **fertility** rate; and, for **mortality**, life expectancy at birth and the infant **mortality** rate. There is some evidence of rising death rates during the decades.

5.1.7.1 Indices:

Bongaarts proposed a model where the total fertility rate of a population can be calculated from four proximate determinants and the total fecundity (TF). The index of marriage (Cm), the index of contraception (Cc), the index of induced abortion (Ca) and the index of postpartum infecundability (Ci). These indices range from 0 to 1. The higher the index, the higher it will make the TFR, for example a population where there are no induced abortions would have a Ca of 1, but a country where everybody used infallible contraception would have a Cc of 0.

$TFR = TF \times Cm \times Ci \times Ca \times Cc$

These four indices can also be used to calculate the total marital fertility (TMFR) and the total natural fertility (TN).

$TFR = TMFR \times Cm$

$TMFR = TN \times Cc \times Ca$

$TN = TF \times Ci$

Mortality rates can be seen as calculated using $(d/p)*10^n$, where *d* represents the deaths from whatever cause of interest is specified that occur within a given time period, *p* represents the size of the population in which the deaths occur (however this population is defined or limited), and n is the conversion factor from the resulting fraction to another unit (e.g., multiplying by 10^3 to get mortality rate per 1,000 individuals)

Crude birth rate: The crude birth rate (CBR) is equal to the number of live births (b) in a year divided by the total midyear population (p), with the ratio multiplied by 1,000 to arrive at the number of births per 1,000 people.

General fertility rate: The general fertility rate is an age/sex-specific birth rate while the total fertility rate is an age/sex-adjusted birth rate

Normal increase of population: natural increase is the difference between the numbers of births and deaths in a population; the rate of natural increase is the difference between the birthrate and the death rate.

Death rate: the ratio of deaths to the population of a particular area or during a particular period of time, usually calculated as the number of deaths per one thousand people per year.

5.1.7.2 Determinants:

The former includes cultural, psychological, economic, social, health, and environmental factors. The proximate **determinants** are those factors that have a direct effect on **fertility**. The background factors operate through the proximate **determinants** to influence **fertility**; they do not influence **fertility** directly.

As per capita income rises, life expectancy rises. Second, nutritional status affects **mortality**. The ability to fend off disease is directly linked to nutrition. Third, public health issues, things like access to a clean water supply and effective waste removal, are also **determinants of mortality**.

5.1.8 Migration:

The movement of an individual or a group from one place to another place for residence to settle (either permanently or semi permanently) with fertility and mortality. The migration causes due to push or pull factors.

Push Factors: Over population, unemployment, poverty, famine, flood etc.

Pull Factors: Employment opportunity, better economic and political condition.

5.1.8.1 Types:

A) International migration:

B) Internal Migration

1. Rural to Urban
2. Urban to Urban
3. Rural to Rural
4. Urban to Rural

The following types are present-

1. Step migration
2. Chain Migration
3. Counter Migration
4. Channelized migration

The migration in the past and present:

1. Past Migration:
   a) Voluntary migration
   b) Forced Migration
   c) Labour Migration
2. Present Migration:
   a) Migration given a legal status
   b) Illegal Migration
   c) Migrants accepted as refugees.

5.1.8.2 Causes and consequences:

1. Push and Pull factors
2. Colonial Development
3. Brain Drain
4. Globalization

Previous Year Questions Analysis with Proper Explanation

JULY-2018, PAPER-II

1. Which one of the following states in India recorded the lowest sex ratio as per 2011 census?
(1) Uttarakhand
(2) Tamil Nadu
(3) West Bengal
(4) Himachal Pradesh

Answer: - 3

Explanation: -

According to the 2011 Census of India, the total population of the state of Tamil Nadu stood at 72,147,039, with 36,137,975 males, 36,009,055 females, a sex ratio of 996 females per 1000 males, literacy rate of 80.09%, 10.51% of the population below seven years and a population density of 555.

Sex Ratio in West Bengal is 950 i.e. for each 1000 male, which is below national average of 940 as per census 2011.

Uttarakhand: Sex Ratio as per Census 2011. In Uttarakhand, the sex ratio as per census 2011 is 963 females per 1000 males. Sex ratio (rural) was 1000 females per 1000 males and Sex ratio (urban) was 884 females per 1000 males.

In Himachal Pradesh, the sex ratio as per census 2011 is 972 females per 1000 males

2. Which one of the following countries recorded highest population density as per U.N. Demographic Year Book, 2010?
(1) India
(2) Japan
(3) Bangladesh
(4) Pakistan

Answer: - 3

Explanation: -

Population density of Bangladesh 1007 which is the highest population density of the world in 2010.

3. Which one of the following groups of states in Indian recorded Sex Ratio higher than 950 according to year 2011 census?
(1) Andhra Pradesh, Odisha, Telengana
(2) Andhra Pradesh, Uttar Pradesh, Maharashtra
(3) Uttar Pradesh, Punjab, Andhra Pradesh
(4) Haryana, Bihar, Andhra Pradesh

Answer: - 1
Explanation: -
As per Census 2011, top five states/Union territories which have the highest sex ratio are Kerela (1,084) followed by Puducherry (1,038), Tamil Nadu (995), Andhra Pradesh (992) and Chhattisgarh (991).

4. Which one of the following statements indicates to the potential use of a service at a location according to Gravity Model?
(1) Direct relationship to both population size and distance
(2) Inverse relationship to both population size and distance
(3) Direct relationship to population size and inverse relationship to distance
(4) Direct relationship to distance and inverse relationship to population
Answer: - 3
Explanation: -
The Gravity Model holds that the interaction between two places can be determined by the product of the population of both places, divided by the square of their distance from one another. The primary implication of this model is that distance is not the only determining factor in the interaction between two cities.

5. Match the **List - I** with **List - II** and select the correct answer from the code given below:

List - I (Demographic terms)	**List - II (Explanation)**
(a) Cohart	(i) Birth rate minus death rate
(b) Natural increase	(ii) A population group unified by a specific common characteristic
(c) Total fertility rate	(iii) Average number of children that a women will bearthrough her child bearing years
(d) Dependency ratio	(iv) Measure in terms of number of dependants Against

Code:	**(a)**	**(b)**	**(c)**	**(d)**
(1)	(iii)	(iv)	(ii)	(i)
(2)	(ii)	(i)	(iii)	(iv)
(3)	(i)	(iv)	(iii)	(ii)
(4)	(iv)	(ii)	(i)	(iii)

Answer: - 2

Model Questions with Proper Explanation

1. The Mid-Atlantic belt of volcanoes is a

A. Intra plate fault
B. Convergent plate boundary
C. Conservative plate boundary
D. None of the above

Answer: D
Explanation:
The Mid-Atlantic Ridge is located at the juncture of crustal plates that form the floor of the Atlantic Ocean; it is considered a "slow-spreading" ridge by earth scientists.Apart from seafloor spreading, the Mid-Atlantic Ridge is also the site of volcanic activity and earthquakes along some portions of its length.

2. In volcanism, the majority of all volcanic gases is/are

A. NO_2
B. Water vapours
C. SO_2
D. NO_x

Answer: D
Explanation:
By far the most abundant volcanic gas is water vapor, which is harmless. However, significant amounts of carbon dioxide, sulfur dioxide, hydrogen sulfide and hydrogen halides can also be emitted from volcanoes.

3. Which of the following is the most active region of the Mid-Atlantic belt of ridges?

A. Greenland
B. Andes
C. Iceland
D. Japan

Answer: C
Explanation:
Iceland sits spanning the Mid-Atlantic Ridge tectonic plate boundary which separates the Eurasian and the North American plates. The ridge, an underwater mountain chain, extends about 16,000 km along the north-south axis of the Atlantic Ocean.

4. Volcanic eruptions cause the heat balance of Earth to change. Why?

A. Amount of isolation received is reduced due to volcanic dust and ashes
B. Ecosystem services get disrupted due to volcanic eruptions and temperature is raised
C. Basic lavas cause the insolation to reflect back because they are highly glossy
D. Huge heat is emitted from volcanoes which raises the temperature of Earth

Answer: A
Explanation:
Major eruptions alter the Earth's radiative balance because volcanic aerosol clouds absorb terrestrial radiation, and scatter a significant amount of the incoming solar radiation, an effect known as "radiative forcing" that can last from two to three years following a volcanic eruption.

5. Which of the following is not a feature of basic lava?

A. Highly fluid
B. Rich in Fe and Mg
C. Poor silica content
D. Loud explosions

Answer: D
Explanation:
Magma that reaches the earth's surface is called lava. It may be acidic or basic. Acidic lava is viscous, is lighter in colour and has higher silica content. Basic lava is non-viscous, is darker in colour and has lower silica content.

Unit - 6: Geography of Economic Activities and Regional Development

Sub Unit-1: Economic Geography

6.1.1 Scope of Economic Geography
6.1.2 Concept of Economic Activity
6.1.3 Definitions of Resources
6.1.4 Classification of Resources
6.1.5 Major Resource Region of the World
6.1.6 Types of Minerals
6.1.7 Energy Resources

Sub Unit-2: Agricultural Geography

6.2.1 Agricultural Regionalization
6.2.2 Delimitation of Agricultural Regions
6.2.3 Cropping Pattern
6.2.4 Crop Concentration
6.2.5 Crop Combination Region
6.2.6 Maximum Positive Deviation Method
6.2.7 Crop Diversification
6.2.8 Agricultural Productivity
6.2.9 Ranking Coefficient Method
6.2.10 Patterns of Agricultural Productivity
6.2.11 Measurement of Agricultural Productivity in Term of Money
6.2.12 Land Classification and Land Use Survey
6.2.13 Land Capability
6.2.14 Von Thunen's Model
6.2.15 Agriculture Systems of The World

Sub Unit-3: Industrial Geography

6.3.1 Types of Industries
6.3.2 Types of Manufacturing Industries
6.3.3 Factors of Location of Industries
6.3.4 Theories of Industrial Location
6.3.5 Industrial Region
6.3.6 Meaning of Globalization
6.3.7 Economic Development

Sub Unit-4: Transport and Trade

6.4.0 Theories and Models of special Interaction
6.4.1 Transportation
6.4.2 World Trading Blocs and Associations

Sub Unit-5: Regional Development

6.5.0 Concept of Region
6.5.1 Typology of Regions
6.5.2 Formal v/s Functional Region
6.5.3 Region Based on Economic Development
6.5.4 World Region Disparities
6.5.6 Dependency Theory of Under Development
6.5.7 Global Economic Blocs
6.5.8 Social Movement in India

Unit - 6: Geography of Economic Activities and Regional Development: Sub Unit 1

Economic Geography

6.1.1 Scope of Economic Geography

Economic geography is most dynamic branch of human geography. It has been undergoing a fast and dynamic growth in its content and scope through time. "Over the decades". Its 'core' content, scope, methodology, organization, conceptual structure and approaches have enriched by borrowing, digesting, renovating and fruitfully interacting with a long list of disciplines, in historical, social, cultural, bio and environmental technical as well as Physical Sciences. Thus, however, the scope or subject matter of economic geography may be expressed as follows:

1) Evaluation and utilization of Resources:

a) Natural Resources

(i) Spatial location
(ii) Topography or landforms
(iii) Climatic conditions
(iv) Soils and minerals
(v) Water bodies
(vi) Natural vegetation
(vii) Animal life

b) Human Resources

(i) Distribution and density of population
(ii) Demographic character
(iii) Social structure
(iv) Health and efficiency
(v) Education, training and research
(vi) Technology etc.

2) Analysis of Areal Differentiation of Economic Activities

a) Primary Activities

(i) Hunting
(ii) Livestock rising
(iii) Fishing
(iv) Agriculture
(v) Mining and quarrying etc.

b) Secondary Activities

(i) Manufacturing industry, and
(ii) Construction

c) Tertiary Activities

(i) Trabe and commerce
(ii) Transport and communication
(iii) Various services as health, education, administration etc.

3) Planning for Economic Development

(i) To reduce spatial inequality in economic development
(ii) Best utilization of resources
(iii) Resource management and conservation.

in short, economic geography includes the spatial study of: (1) natural resources such as soil, water, mineral, energy resources, natural vegetation, animals etc., (2) human occupations or economic activities such as hunting, livestock raising, forestry, agriculture, manufacturing industry, construction, transport, communication, trade and commerce, varies services etc. and (3) economic organization, institution, government policies and planning etc.

6.1.2 Concept of Economic Activity

The term economic activity is Synonymous with occupation. The economic activity or occupation may be defined as the specific activity with a market value which an individual pursues for the purpose of obtaining a steady flow of income which in turn determines the social position of the individual. Thus, an economic activity refers to a specific activity by which one earns one's livelihood. Although an individual may be engaged in several economic activities as he pursues subsidiary activates to supplement his income yet only one of them is recognized as his chief economic activity or occupation which yields the major part of the income. Actually, the concept of economic activity on occupation is not very definite and static but it has undergone a continuous change through historical periods.

In modern period major economic activities include gathering, hunting, herding and livestock raising, fishing, lumbering, agriculture (farming), mining and quarrying, manufacturing, construction, trade and commerce, transport, communication, diversified services etc. All the economic activities are grouped in the following four categories:

(i) Primary activity: It includes those economic activities which are associated with land or the nature e.g. gathering, hunting, herding, livestock raising, fishing. Lumbering, forming (agriculture), mining and quarrying etc.

(ii) Secondary activity: Those economic activities are included under secondary activities which are concerned with transforming material provided by primary activity into something more useful to people, e.g. manufacturing industry, construction work electric power production, etc.

(iii) Tertiary activity: The tertiary activity is concerned with service to the primary and secondary activities either to the community or to the individual, e.g. financial, commercial and educational institutions, professions, trades, transport and communities, repairs, maintenance, defence, various personal services etc.

(iv) Quaternary activity: It includes the activities in the tertiary sector which are concerned with research, with the assembly, processing and transmission of information and with administration and the control of other industrial sectors.

6.1.3 Definitions of Resource

Resource is variously defined by social scientists, mainly economists and geographers. Some significant definitions of resource are given below:

(1) Eric Zimmermann: According to Zimmerman, an eminent economic thinker, anything or material will be called a resource when it can be used for the satisfaction of any human need. To him, "Resource does not refer to a thing or a substance, but to a function that a thing or substance may perform to an operation in which it may take part namely the function or operation of attending given end, such as satisfying a want". (Zimmermann, 1951).

(2) W. Zelinsky: Wilber Zelinsky an American geographer has defined resource in this way. Resources are substance or properties which satisfy human needs. And obviously they increase with the aim's talents and efforts of people on their economic and cultural atainments and on their ability to exploit resources. [zelinsky. w-1966]

6.1.4 Classification of Resources

On the basis of origin and nature, all the resources are basically classified in to two broad categories: (A) Natural resources and (B) Human resources. Their characteristics and types are discussed below.

(A) Natural Resources

All the elements, materials and forces of nature which are used or usable by man to his own ends are called natural resources. They are originated through natural processed and are integral part of physical or natural environment which is the same total of all conditions, agencies and influence which affect the development, growth, life and death of an organism, species or race. Physical or natural environment is the sum of all conditions which surround human race of a fixed place and time. Natural resources are related with and constituents of following natural elements.

1) Land Forms - Land forms are designated as relief features on the earth's Surface. Mountain plates all and plain are main relief features.

2) Water Bodies – Oceans, Seas, Lake, River etc. are main water bodies.

3) Climate – Temperature, Wind, Atmospheric pressure, Humidity, Precipitation (Rainfall, Snowfall, Fog, Dow etc.) are major clime elements.

4) Rocks and Minerals – Rocks are igneous, Sedimentary or Metamorphic. Minerals are metallic and non-metallic. iron is Manganese, Bauxite, Copper, Gold, Silver, Diamond etc. are important minerals Coal, Petroleum, Natural Gas, Uranium, radium, Thorium etc. are energy resources.

5) Soils – Major Soils include alluvial laterite, chernozem, desert, chestnut, block lava, red and yellow etc.

6) Natural Vegetation – Forests, Grasslands, Bush, Shrub, Scrub etc.

7) Animal Life – This includes Animals, Birds, Insects, Replies, Fish, and Microorganism etc.

Types of Natural Resources

Natural resources may be classified in various ways. These resources are classified on the basis of (1) Distribution and Occurrence of resources, (2) Use of resources, and (3) Renewability of resources.

1) Classification Based on Distribution and Occurrence: – Zimmerman has classified the resources into four categories on the basis of their spatial distribution amount and frequency of occurrence which are as under.

(a) Ubiquities – Ubiquities resources which are found everywhere such as oxygen in air, such resources have abundant supply.

(b) Commonalities – Resources that occur in many places such as fertile soils, forests, grassland, water etc.

(c) Rarities – Rare resources which are rarely found only in few places. Examples include tin, gold bauxite, coal etc.

(d) Unquails – Such resources that occur only in one place, commercial cordite is its example which occurs only in Greenland.

2) Classification Based on use of Resources: - Resources are classified on the basis of their use into 4 categories: (a) Unused resources, (b) Unusable resources, (c) Potential resources, and (d) Latent resources.

(a) Unused Resources: Unused resources include the resources of an area which are yet unused. For instance, most forest and mineral resources of South America were not used for a long time until the continent was colonized by the Europeans.

(b) Unusable Resources: Such resources which cannot be used again in near future. Example includes very deep mines which can be workout at further depth become unusable.

(c) Potential Resources: Such resources can be developed and used in near future with advanced technology. At present less than 5 percent of the potential hydroelectric power in tropical Africa has been developed which can be developed with growing technology and local needs in near future.

(d) Latent Resource: Such resources yet have bead unknown to man. For example, petroleum was latent resource lying unknown and unused before the eighteenth century when distillation process was developed and combustion engine was invented likewise there are several latent resources in the environment which are yet unknown to man.

(3) Classification Based on Renewability of Resources: - Owen (1971) has classified resources on the basis of renewability into two broad categories: (a) Inexhaustible resources, and (b) Exhaustible resources.

(a) Inexhaustible Resources: Such resources do not completely exhausted but after use remain in the changed from. Example includes solar energy air. Water etc.

(b) Exhaustible Resources: Such resources are either lost for ever after use on may be renewable in some way. Renewable resources are forests (plants), wild life, (animals), fertile soils etc. Non-renewable resources include fossil fuels like coal. Petroleum, natural gas etc.

(a) Non-Renewable Resources: Such resources once used are lost for ever. Example includes fossil fuels like coal, petroleum, natural gas wild life etc.

(b) Renewable Resources: All the biological living elements that can be reproduced in future are called renewable resources. Plants and animal are renewable resources. But all the living communities are not necessarily renewing able mainly due to destructive human activities.

(c) Recyclable Resources: Such resources can be reproduced and used again and again. Metals are recyclable resources.

(d) Inexhaustible Resources: Those resources which will continue and available to the earth as long as the earth and humanity. Whether they are in use or unused, sunlight, water and wind or air are the examples of inexhaustible resources.

(B) Human Resources

Man being the producer and consumer of all the resources, is himself an important resource. The use for man is the basic quality of resources which depend on the human knowledge and capacity in any space and time. Actually, human knowledge is greatest resources which make any element, useful for man. As stated above any element or material in itself is not a resource, but it becomes a resource with the development of human knowledge to use it. Thy quantity, value, limit of utilization, methods of progress etc. are determined by social, economic, cultural and political organization, technology, scientific knowledge etc. So that it is said that there is more resources in man than in land.

In each space and time, total population, population density, living standard life style, human needs, efficiency, scientific and technical knowledge availability of capital, resources ownership, government policy and stability, international relation etc. are such factors which decide and affect the quantity, value, method of extraction etc. of resources. Natural environment is the resources base but resources are created by human knowledge utility, the coal is now a most significant source of energy and which is called black gold, in the absence of knowledge of its utilization, it was non usable black thing for thousands of years.

The resources which are the result of human efforts and activities are known as human resources. Human resources make cultural landscape which is a concrete and characteristic product of the complicated interplay between a given human community having certain cultural preferences and potentials and a particular set of natural environments. It is a heritage of several eras of natural evolution and of many generations of human effort this, the landscape of an area created by or modified by human activities is known as cultural landscape, Human resources are primarily the products of cultural landscapes. Thus, however human resources include human population and its activities, agricultural fields, crops, gardens, means of irrigation (well, tanks, tube wells, river canals etc.), houses, rural and urban settlements, factories and their products offices, means of transportation and communication etc.

Human resources belong to a particular set of cultural phenomena on the surface of the earth, major constituents of human resources are as follows.

1) Human Population: Population refers the total number of inhabitants of an area, village, town, city, country or other areal unit. It is the treasure of all knowledge, technology, activity, production, consumption etc.

Previous Year Questions Analysis with Explanation

1. Match the **List - I** with **List - II** and select the correct answer from the code given below:

List – I (Countries)	**List – II (Mineral Reserves)**
(a) Liberia	(i) Iron
(b) Guinea	(ii) Uranium
(c) Togo	(iii) Phosphate
(d) Niger	(iv) Bauxite

Code :	**(a)**	**(b)**	**(c)**	**(d)**
(1)	(iv)	(iii)	(ii)	(i)
(2)	(i)	(iv)	(iii)	(ii)
(3)	(ii)	(i)	(iv)	(iii)
(4)	(iii)	(ii)	(i)	(iv)

Answer: - 2

2. Match the **List - I** with **List - II** and select the correct answer from the code given below:

List - I (Sectors of the Economy)	**List - II (Activities)**
(a) Primary	(i) Research endavours
(b) Secondary	(ii) Train services
(c) Tertiary	(iii) Pearl culture
(d) Quaternary	(iv) Spinning cotton year

Code :	**(a)**	**(b)**	**(c)**	**(d)**
(1)	(i)	(ii)	(iii)	(iv)
(2)	(iii)	(iv)	(ii)	(i)
(3)	(ii)	(i)	(iv)	(iii)
(4)	(iv)	(iii)	(i)	(ii)

Answer: - 2

Explanation: -

The Primary sector of the economy includes any industry involved in the extraction and production of raw materials, such as farming, forestry, fishing and mining.
The primary sector tends to make up a larger portion of the economy in developing countries than it does in developed countries. For example, in 2018, agriculture, forestry, and fishing comprised more than 15% of GDP in Sub-Saharan Africa. but less than 1% of GDP in North America.

The occupations which produce finished goods by using the products of primary *activities* as raw materials are included in *secondary activity*. Manufacturing of cloth from cotton, sugar from sugarcane and steel from iron ore are important examples of *secondary activities*.

Tertiary activity consists of all service occupations. Transport, communication, trade, health, education and administration are important examples of tertiary activities. These tertiary activities help in the development of the primary and secondary sectors. So, these are also known as support services.

> The quaternary sector is the label used to describe a knowledge-based part of the economy, which typically includes knowledge-oriented economic sectors such as information technology; media; research and development; information-based services such as information-generation and information-sharing; and knowledge-based

3. Guntur district of Andhra Pradesh is known for which one of the following ore deposits?
(1) Bauxite
(2) Anthracite
(3) Magnetite
(4) Muscovite

Answer: - 3

Explanation: - In India, over 90% of magnetite is found in the southern states of Karnataka (73%), Andhra Pradesh (14%) and Tamil Nadu (5%). Rajasthan in the west accounts for another 5%. The balance is scattered over Goa, Kerela, Maharashtra, Odisha, Jharkhand, Assam, Nagaland & Meghalaya

4. Jharkhand ranks third after which one of the following group of states in the availability of coal reserves in India?
(1) West Bengal and Chhatisgarh
(2) Odisha and Chhatisgarh
(3) Odisha and West Bengal
(4) Chhatisgarh and Karnataka

Answer: - 2

Explanation: -

Top five states in India with the largest coal reserves

1. **Jharkhan**d: Coal reserves 83.15 billion tonnes. ...
2. **Odisha**: Coal reserves 79.30 billion tonnes. ...
3. **Chhattisgarh:** Coal reserves 57 billion tonnes. ...
4. **West Bengal**: Coal reserves 31.67 billion tonnes. ...
5. **Madhya Pradesh**: Coal reserves 27.99 billion tonnes.

January – 17

1. World's largest Uranium reserves are found in
(1) Canada
(2) Chile
(3) Zaire
(4) Nigeria
Answer: - 3

Explanation: - Over two-thirds of the world's production of uranium from mines is from Kazakhstan, Canada and Australia.

An increasing amount of uranium, now over 50%, is produced by in situ leaching.
Kazakhstan produces the largest share of uranium from mines (43% of world supply from mines in 2019), followed by Canada (13%) and Australia (12%).

Unit :7 Cultural, Social and Political Geography

Sub Unit – 1: Cultural Geography

7.1.2 Concept of culture – Areas and cultural Regions
7.1.3 Theory of Tribal Groups
7.1.4 Dwelling places as cultural Expressions

Sub Unit – 2: Social Geography

7.2.1 Social Structure and Social Process
7.2.2 Concept of Social Well-Being
7.2.3 Distributions of Racial Groups or Eathnic Groups

Sub Unit – 3: Political Geography

7.3.1 definihtion and Scope of Geography
7.3.2 Global Strategic Views
7.3.3 Boundaries and Frontiers
7.3.4 Geograplhy and Federalism
7.3.5 Electoral Reforms to Tackle Booth Capturing
7.3.6 Geopolitics

Unit :7 Cultural, Social and Political Geography: Sub Unit - 1
Cultural Geography

Nature and Scope of Cultural Geography:

Cultural Geography is a systematic branch of geography which deals with the charaacteristics and identity of communities and societies like language, religion, observing similar manner and customs at local, regional and national level with a central emphasis on people-environment relationships. In other words, the same as similar cultural traits within a particular geographical field or region may be said to form cultural geography.

The Cultural Geography is isynonymous with much narrower geographical traditions concerned wwith cultural differences. In U.K., it is associated with descripted regional geography. While in North America it is equated with the human geography.

Cultural geography depends entirely on the direct field observations on the people environment relationship and has its origins in the work of Carl Sauer, who emphasized upon the ways in which the differential impact and succession of culture groups was imprinted in the exploitation, form and personality of the landscape.

The cultural geography also emphasised on a variety of themes, including the domestication of plants and animals, agricultural practices, people's impact on ecology, the origin and spread of cculture settlement feature like-house types, building materials, language, religion, observing customs and manner etc.

7.1.2. Concept of Culture-Areas and Cultural Regions:

A cultural area is a geographical region. Cultural traaits maintain homogeneity. These cultural traits are supposed to be the product of regional geographical circumstances like speaking same kind of languages, practising the same religion, observing similar types of work and living in similar types of community groups. In other words, the same or similar cultural traits may be said to form a cultural group. This group forms a cultural region or cultural realm.

The characteristics of cultural realms fall into two categories:

a) A unique combination of cultural features should generally pervade the area to be organized as a cultural entity.
b) The cultural features must be different from the neighbouring area for recognition and demarcation of the boundary.

Various cultural realms have been identified on the basis of cultural types which includes variations in economic activities, social customs, traditional values, dietary habits, dress patterns, language and physical characteristics.

The major cultural realms are:

1. The Occidental Realm: It is mainly the culture of European society, influenced mainly by Christianity. It has great regional variation according to the levels of industrialization, political and economic thought, colonisation, commercialisation, urbanisation, and development of transport system, social, political and economic institutions. The occidental realm is further sub-divided into six sub-regions:

i) **West European:** It is the most urbanised, industrialised and developed cultural realm.

ii) **Continental European:** it is influenced by different political and economic thoughts. It is influenced mainly by Christianity.

iii) **Mediterranean European Culture:** This region is also Christian dominated and includes countries lying South of the Alps. The limited economic development in these countries is due to deep rooted traditional social system.

iv) **The Anglo-American Realm:** The region is endowed with natural resources; hence industrialisation and urbanisation are very high. British influence is quite significant in this region.

v) **Australian Cultural Realm:** It is an off-shoot of European cultural realm. The region has struck a balance between agriculture and industry. The people of this region are well educated, energenetic and progressive with a high living standard.

vi) **Latin American Cultural Realm:** Only culture which lies in occidental realm but still backward. The colonial language of Spanish and Portuguese have become state language. Hence, Spanish and Portuguese influence is quite prevalent in this realm.

2. The Islamic Cultural Realm: The prominent religious faith in this realm is Islam.This realm lies between the traditional Indian cultural in the east and the modernised European culture in the west. This culture is very orthodox and based on traditional beliefs. The level of modernisation is very low here.

3. The Indian Cultural Realm: It is also known as sub-continental realm or paddy culture. It is spread between Himalayas in the north to Indian Ocean in the South, Hindukush Mountain in the east to Bay of Bengal in the east. This realm has some typical features like joint-family, caste-system, semi-feudal land relations, subsistence agriculture, paddy farming etc.

4. The East Asian Cultural Realm: It is basically a Buddhist Culture with regional modification. The level of industrialisation, modernisation and urbanisation in this realm is high, Japan, South Korea and other countries are part of this realm.

5. The South East Asian Realm: It is generally a traditional culture lying in a region where different culture gets intermingled.

For Example: Dominance of Buddhism can be seen in Myanmar, Thiland and Vietnam, dominance of Christianity in Philippines, impact of Indian culture in Indonesian islands while impact of Islamic culture in Malaysia and Indonesian islands can be seen.

1. The Negro African Realm: It is a widely scattered cultural realm characterized by marginalised and relatively isolated communities. It mainly includes tropical African region.

7.1.3. Theories of Tribal Groups:

Human Races: Race can be defined as “a bilogocal grouping within the human species distinguished or classified according to genetically transmitted differences”.

Thus, race is a large group of people who share a common ancestry and have certain physical characteristics (e.g. skin colour, hair colour etc.). Races can be scientifically classified on the basis of certain fixed, inherited and identifiable traits auch as head shape, facial features, nose shape, eye shape, colour, skin colour, stature etc. these traits represent morphological, biological and genetical aspects. With the inclusion of more traits, the number of combinations increases and the analysis becomes more complex.

There is difference among the scholar about the origin of different races. Some arhue that the racial differences existed from the very beginning while others argue that different races developed from one single ancestral species. Similarly, there are a lot of differences among scholars on the number of racial groups but seven chief groups have been accepted in the world. These are:

1. Negroids: are the people with dark black skin, black wooly hair, dark eyes, broad and flat nose, thick and averted lips, long head, prognathous jaw and stocky body build. Theey are inhabitants of Africa and Oceania and thus consists of two branches:

a) The African Branch: It includes the subgroups:
- i) Forest or True Negro in West Africa.
- ii) Sudanese in Central Africa.
- iii) Nilotic in East Africa.
- iv) The Bantu in South Africa.
- v) The Bushmen-Hottentot in the Kalahari Desert of South Africa.
- vi) The African Pygmies.

b) The oceanic Negroids are commonly called Melanesian of Papuan and are found chiefly in Borneo, New Guinea, the Island the Hebrides and Fiji Islands.

2. Magoloids: They are people with light yellow to brown skil colour, brown eyes, straight and coarse black hair, flat face and nose, broad head, epicanthic eye-fold, high cheek-bones and short but stocky build ir stature. The Mongoloids are usually divided into following subgroups:

- **i)** The Tungus groups
- **ii)** The palaeo-Asiatic
- **iii)** The sinic group
- **iv)** The South Mongoloid group
- **v)** The Oceanic Mongols

1. Caucasoids: They are people with fair skin and eyes, light and wavy hair, prominent and narrow nose, thin lips and abundant body hair, medium to tall stature, long to broad-short and medium or high head form. They are further sub-divided into following subgroups.

- **i)** The Nordic or North-West European Group.
- **ii)** The Alpine or Central European Group.
- **iii)** The Mediterranean of S.W. European Group.
- **iv)** The Baltic or N.E. European Group.
- **v)** The Dinaric or S.E. European.
- **vi)** Armenoid in Western Asia Minor and North Central Asia.
- **vii)** The Turanian or Turki Group.
- **viii)** Indo-Afghans, Dravidians and Pre-Dravidians.

ix) Nesiot and Polynesian Groups.

x) The Arabic, Hamitic and Berber groups in North Africa.

These three were the major earliest racial groups. But later, other racial groups were also identified. These are:

1. Negritoids: They have yellow to brown skin, black spiral hair, short stature and varying blood groups. Such people are known as Negrillo in Congo Basin and upper Nile region and as Negrito in Andaman Islands, parts of Malaysia and New Guinea. The two display different blood groups.

2. Bushmanoids: They have skin and hair like Negritoids but have flat face, epicanthic eye folds etc. Such groups are found in Southern Africa.

3. Australoids: They have dark skin and eyes, dark wavy hair, broad nose, full lips, long head and A and O blood types. B type is not found among them. Such people include Australian aborigines, Ainu of Hokkaido (Japan), Vedda of Srilanka and Bhil, Kurumba, Gonda of Deccan Plateau (India).

4. Papuan-Melanesians: They are much like Australoids but have more frizzly hair. Such racial group is found in New Guinea (Papuans) and Melanesia (Salomons).

7.1.4. Dwelling Places as Cultural Expressions:

The tribal people constitute about 4% of the world's population. These tribal people differ in their stature, shape of head, blood type, sskin colour, hair, eye fold etc. Some of the chief tribes of the world with their food, dress and living ways are as follows:

The Pygmies: They live in tropical Africa. They are further classified into three groups:

i) Eastern Pygmies of Africa are called Mbuti living in forests of Zaire.

ii) The Central Pygmies live in the Congo Republic.

iii) The Western POygmies live in Gibon and called Bongo.

They vary from 1.33 m to 1.50 m in height. The colour of sskin varies from yellowish or reddish brown to dark brown. They hav broad flat nose, large eyes and dark woolly hair. They are gatherer and hunter who hunt with bow and poisoned arrow. Their main food items are obtained from trees, plants, nuts, birds and insects. The warm humid and damp climate of the Congo-basin pygmies to live in a state of complete nakedness.

The Bedouins: They are most numerous tribes of S.W. Asia and North Africa. Usally they are more than 5 feet in height and have a long, narrow face with prominent nose, dark eyes and hair and a pale complexion. They are seasonal migrants. Their main food item is camel milk along with barley, dates and mutton.

The Eskimos: They are found in the Arctic and Antarctic Tundra regions. They are still in the primitive stage of development leading a semi-nomadic life. Hunting, fishing and gathering are their main occupations. They are short in stature, have flat and narrow face, small snub noses, yellow brown skin colour and coarse straight black hair. Their clothes are made up of reindeer and furs. They wear a sack like coat of reindeer which hide them up to knees with long sleeves and tail is attached with it.

The Eskimos construct igloos or snow houses for living. It is made up of snow blocks. They belong to Mongoloid race. They are mainly confined in the regions which include Aleution Islands, Alaska, Northern Canada, Victoria, and Baffin, Northern parts of Norway, Sweden, and Finland etc.

The Khirgiz: They are located in central Asia, Southern Tien Shan and Pamirs. They are well known for courage, vigilance, wariness, sense of locality and keen powers of observation etc. During winter, they migrate to the valleys with their herds. Barley, Millet, Wheat, and fodder are their agricultural products. Hunting is their occupation also. They wear long, woolpadded clothes to protect themselves from winter.

The Bushmen: They are also called sun. They live in the Kalahari Desert (Naminia) of Africa. They are short in stature and look like Negritos. They eat small animals like Ants, Lizards, Frogs, Beer and locusts. They are basicallyhunters. The women collect the roots, berries, grubs, insects, Tortoises, Lizards. They wear scanty clothes. Men wear a triangular loin cloth, while women wear cloak.

The Aborigines: The original inhabitants of Australia are known as Aborigines or Aborginals. The term aborigines literally apply to earliest known inhabitants of a land or those found in possession of the land by early colonists. The term may be aaplies to human inhabitants, animals and plants. They belong to the indigenous Australoid race. Their physical features is like Negroid with the difference that their hair are wavy and necer wooly. Their stature varies from short to medium ranging between 1.6 m to 1.75 m. they have broad and narrow face and colour of eyes varying from brown to brown black. They indulge in worst evils like cannibalism, human sacrifice, slavery and witchcraft. In some cases, the relatives of a deceased person eat portions of his body or the oldmen of tribal are killed often at their own request and eaten by their children, relations and friends, who think that it is better to keep their parents in the warmth of their bellies than in the lovely hor or cold of the earth.

Previous Year Questions Analysis with Proper Explanation

1. Which one of the followings is the largest entity in areal location?
(1) Cultural Region
(2) Cultural Landscape
(3) Cultural Realm
(4) Cultural Point

Answer: 3

Expalnation:

Cultural realm is the traditions and beliefs relating to a particular group or area. ... The attributes of a group of individuals or region assist to delineate its cultural realm. Some of the key elements used to describe a culture comprise religions, economic development and languages

2. Match **List – I** with **List – II** and select the correct answer from the codes given below:

List – I (Scholar)	**List – II (Definition)**
I. O.H.K. Spate	A. Role of relief features in the horizontal expansion and segregation of cultures.
II. Terre and Peterson	B. Late stone age must be associated with people much like the modern tribal groups in more remote regions.
III. Richards and Subbarao	C. Values of the mountain wall are determined by as much as what lies beyond as by its own topography.
IV. Allchin	D. Direct relationship between the climatic changes and the rise of early human cultures.

Codes: (I) (II) (III) (IV)
(1) C D A B
(2) C B A D
(3) B D C A
(4) D A C B

Answer: 1

December- 15

1. The concept of 'Cultural Hearth' was given by:
(1) C.C. Colby
(2) C.O Sauer
(3) R.J. Pryor
(4) F.W. Notestien

Answer: 2

June- 15

1. Which one of the following authors has defined the phrase "Culture is that complex whole which includes knowledge, elief, art, morals, law, customs acquired by a man as member of Society"?
(1) E.B. Taylor
(2) R.H. Lowie
(3) Kroeber
(4) Goldenweiser

Answer: 1

June- 14

1.Which one of the following culture realms is characterised by East European

(i) heritage of ancient civilization and traditions of classical culture
(ii) rise of ancient citystates; and
(iii) importance of agriculture and horticulture including viticulture?

(1) culture realms is characterised by East European
(2) Indian
(3) Mediterranean
(4) Chines

Answer: 1

Model Questions with Proper Explanation

1. Which of the following is not a critical effect of volcanic eruptions?

(e) Diversion of natural drainage systems
(f) Tsunamis waves along the coastal regions
(g) Damage to natural ecosystems
(h) Cyclonic rainfalls

Answer: D
Explanation:
Cyclonic or Frontal rain: This type of rainfall occurs when warm and cold air meets each other. Since warm air is lighter, it rises above the cold air. The rising air is then cooled beyond the saturation point resulting in heavy rainfall. Such rainfall lasts only for few hours.

- Volcanoes can change the weather. They can cause rain, thunder and lightning.
- Fast-moving lava can kill people and falling ash can make it hard for them to breathe. They can also die from famine, fires and earthquakes which can be related to volcanoes.
- Lava can kill plants and animals too.

2. Which of the following gases are usually emitted from fumarole?

(i) Oxygen
(j) Carbon dioxide
(k) Nitrogen
(l) Hydrogen

Answer: B
Explanation:
Fumaroles are openings in the earth's surface that emit steam and volcanic gases, such as sulfur dioxide and carbon dioxide. They can occur as holes, cracks, or fissures near active volcanoes or in areas where magma has risen into the earth's crust without erupting.

3. Which of the following is not a cause of occurrence of earthquake?

(m) Volcanic activity
(n) Hydrostatic pressure
(o) Movement of lithospheric plates
(p) Weathering and erosion

Answer: D
Explanation:
Erosion happens when rocks and sediments are picked up and moved to another place by ice, water, wind or gravity. Mechanical weathering physically breaks up rock. One example is called frost action or frost shattering. Water gets into cracks and joints in bedrock.

4. The point of origin of an earthquake deep inside the earth is

(q) Epicenter
(r) Hypocenter
(s) Tremor
(t) None of these

Answer: B

Explanation:

The location below the earth's surface where the earthquake starts is called the hypocenter, and the location directly above it on the surface of the earth is called the epicenter. These are smaller earthquakes that occur afterwards in the same place as the mainshock.

5. The earthquakes that occur at 700-800 km below the surface are known as

(u) Deep focii earthquake
(v) Medium focii earthquake
(w) Shallow focii earthquake
(x) None of the above

Answer: A

Explanation:

No earthquakes are known to have occurred below about 700 km. At greater depths the rocks are very hot and under high pressure so they deform by flowing rather than breaking and faulting.

Unit-8: Geographical Thought

Sub Unit -1: Contributions of Scholar and Geographer

Contributions of the Ancient Greeks and Romans
Geography in the Arab Lands
The Age of Exploration
The New Geography of the 18th Century
Geography of the 19th Century
Geography After Humboldt And Ritter

Developments in Great Britain
Developments in Russia
Developments in the United States

Concept of Chorology

Sub unit -2: Geographical Thought

The Darwinian Theory of Evolution
Impact of Darwin on Geographical Thought

Sub unit -3: Contemporary Trends in Indian Geography

Evolution of Modern Geographical Thinking and Disciplinary Trends in India
The Roots of Indian Geography
Contemporary Trends & Fields of Study
Cartography and Thematic Mapping
Paradigm Shifts

Sub Unit-4: Major Geographic Traditions

The Study of Man-Land Relationships
Areal Differentiation and its Critique
The Schaefer-Hartshorne Debate
The Regional Concept and Regional Geography

Sub Unit-5: Dualism

The Problem of Dualities and How it Was Resolved
Rise of Dualism Between Physical and Human Geography
Geography as Chorology
The Quantitative Revolution

Sub Unit-6: Paradigm and Perspectives in Geography

Behavioural Geography
Humanistic Geography
The Radical Geography
Feminist Geography
Modernity, Modernization and Modernism
The Nature of Positivist Explanation

Unit-8: Geographical Thought: Sub Unit-1

Contributions of Scholar and Geographer

8.1 Introduction

In its wider connotation as a branch of knowledge concerned with the satisfaction of human curiosity about the lands and peoples away from one's home base, speculation regarding mysteries of the physical environment, and the role it plays in shaping the destiny of man upon the earth, geography is as old as human civilization. As such, each major cultural realm has had its own historiography of geography. Modern geography as practiced all the world over today, represents, however, an outgrowth of the Europeans geographic tradition so that the historiography of modern geography is essentially an account of the conceptual developments among Europeans regarding the nature of the earth and its environment and the way it influences man and his pursuit for livelihood. Thus, the roots of modern geography areb traced back to the thought of the ancient Greeks.

Contributions of the Ancient Greeks and Romans:

References to descriptive writings about lands and peoples in different parts of the earth's surface are found in the oral traditions of classical Greece and are reflected in the writings of Homer, whom the Greek geographers had themselves referred to as the father of geography. *Odyssey*, Homer's epic poem written sometime in the ninth century B.C., presents geographical accounts of the lands and peoples located on the margins of the world then known to the Greeks. The poem records the wanderings of Odysseus on his return journey to Ithaca after the fall of Troy, when he was own off-course by a storm so that it had taken him twenty years to reach home. The poem contains geographical account of the distant places visited by the hero of the epic in course of his long journey. In it there are references to a land of continuous sunshine, and later of Odysseus's visit to an area of continuous darkness. Apparently, a Greek poet could not have imagined these scenes. Somehow accounts about nature of the earth in the far north of Europe during the long summer days and the continuous winter darkness had filtered back to Greece, and were woven with other geographical threads into an enchanting adventure story. As in the case of *Meghdoot* of Kalidas, many have tried to identify the many places referred to in the epic poem.

However, Thales of Miletus- a town located near the mouth of the Menderes river on the eastern side of the Aegean Sea (which was both a prominent centre of learning and flourishing centre of commerce)- who lived in the seventh and sixth century B.C., is regarded as the first Greek to have devoted focused attention to the measurement and location of places on the surface of the earth. Thales himself was a very successful businessman. In the course of a business trip to Egypt, he had been greatly impressed by the geometrical tradition of the Egyptians in the measurement and computation of areas. He introduced some of these ideas among the Greeks. Anaximander, a contemporary of Thales and a few years his junior, is created with having first introduced the idea of the sundial consisting of a pole set vertically over a flat surface to measure the varying position of the sun by measuring the length and direction of the shadow cast by the –pole. The shadow was shortest at noon and provided an exact north- south line for determining the correct longitude of the relevant place. Anaximander is also said to have produced a map of the known world with Greece as its centre. Thales and Anaximander have jointly been regarded as the originators of the mathematical tradition in Geography in ancient Greece. The literary tradition in the writing of geography had also developed around the same time. Hecataeus, a resident of the town of Miletus, and born around 475 B.C.-about the time

that Thales and Anaximander had passed away- originated the literary tradition, and his book *Periods Ges*(Description of the earth) is regarded as the first known attempt to synthesize available knowledge about the world in a usable form. Hecataeus is also one of the earliest writers of prose in classical Greece literature.

The next great name in this context is that of **Heredotus (circa 485-425 B.C.)** who is widely known as the father of history, but is also generally regarded as one of the founders of geography. His history of Greek struggle with the "barberians" included (as digressions) descriptions of various places visited by the author/. Herodotus firmly believed that all history must be treated geographically and also that all geography must be studied historically. For him geography provided the stage, or the setting that gives meaning to historical events. Herodotus had travelled a great deal. Throughout his travel he had retained a keen interest in the nature of landscape so that he not only described geographical phenomena but also tried to explain them. Examples include his attempt to explain the annual fluctuations in the flow of the Nile, and the processes involved in the origins of Delta's occurring at the mouth of the Meander (Menderes) river at Miletus. Herodotus had no interest in the mathematical tradition and showed no interest in problems like measurement of the earth's circumference. He accepted the Homeric view of the earth as a flat disc over which the sun was believed to travel in an arc from east to west.

Plato (428-348B.C.) also made an important contribution to the development of geographical ideas. Plato was a great proponent of deductive reasoning. He insisted that the observable phenomena on the earth's surface represent poor copies of ideas from which these observable phenomena had degenerated. By way of illustration he referred to the case of Attica (the ancient territory of which Athens was the capital). According to Plato, the area was originally very fertile and capable of supporting a large population of men and animals. He wrote that compared to its original state, the Attica of his time was "like the Skelton of a sick man, all the flesh and soft earth having been wasted away, and onek bare framework of the land being left" (cited in Blacken,1967, p.121). Contemporary philosophers in Greece generally accepted the idea that symmetry of form is one of the essential attributes of perfection, and that the most completely symmetrical form was a sphere. It was argued that since the earth had been created to serve as the home of man, it must have a perfect form, and therefore it muat be a sphere. Plato is regarded as the first scholar who put forward the concept of a spherical earth located in the centre of the universe, and the sun and all the other celestial bodies moving round it. Plato offered no other argument or evidence as proof that the earth is round. Providing the proof for the spherical shape of the earth was left to **Aristotle (384-32 B.C.)**, who was a student and a member of Plato's academy for twenty years.

Aristotle is regarded as the pioneer of inductive reasoning and the inductive approach to acquiring knowledge. He was convinced that the best method of building a reliable theory was to start with the observation of facts. This required reasoning from the particular to the general, in contrast to Plato's deductive approach which required the student to proceed from the general to the particular. Aristotle laid the foundation of what has been regarded as the world's first paradigm to guide research procedures. He laid down four fundamental principles of scientific explanation: First, it is necessary to establish the essential characteristics (i.e, the nature) of the phenomenon being investigated; Second, it is necessary to identify the substance of which it is composed; Third, it is necessary to identify the process through which the phenomenon has attained it's present form; and lastly, it is necessary to identify the purpose that the phenomenon concerned fulfills in the overall "scheme of nature". This last principle makes Aristotle stand

out as teleologist in that he believed that everything was changing in accordance with a preexisting plan.

Aristotle argued his propositions so convincingly that his research methodology appeared irrefutable at the time it was presented. His intellectual status in the contemporary world of scholarship was so high that for a long time his ideas were accepted without question. (Some of his ideas were patently false, however. One such was the idea that habitability on the earth surface is a function of distance from the equator, and that areas around the equator are too hot for human survival.)

Although Plato and Aristotle gave intellectual leads that contributed to the development of knowledge about the earth as the human habitat, to this, **Eratosthenes (276-194 B.C.)** is often referred to as the father of geography as a branch of knowledge. He is said to have coined the word geography. The term is derived from ge, meaning the earth, and grapje, meaning description. Thus, was born geography as a field of study which specialized in presenting reasoned description of the Greek ecumne (the world known to the ancient Geeks) and speculated about the nature of peoples and places beyond the range of knowledge in contemporary Greece. He wrote the first formal text on geography entitled *Geographica.* His estimate of the earth's circumference was remarkably accurate, and, therefore had proved a major step forward in the development of knowledge about the earth. Eratosthenes was the chief librarian at the famous museum at Alexandria-a post that he occupied for about forty years until his death in 194 B.C. Under his leadership, the museum had developed into a major centre of astronomical research, a field of knowledge that was at that time viewed as closely associated with geography. Eratosthenes identified five climates zonee one torrid zone, two temperate zones, and two frigid zones. He also improved upon the Aristotelian idea on this subject by giving latitudinal boundaries to the five climatic zones. The *torrid zone* extended 24 north and south of the equator, and the *frigid zones* extended equlorward 2r from either pole. The areas in between were the two *temperate zones.*

After the death of Eratosthenes, the post of chief librarian of the museum at Alexandria went to Hipparchus who was the first to divide the circle into 360 degrees. He also defined a grid of latitudes and longitudes for the earth, and identified the equator as a great circle that divides our spherical planet into two equal parts. Hipparchus pointed out that since the earth makes one complete revolution in 24 hours, it covers a journey of 360 degrees in a day and so covers fifteen degrees of longitude in one hour. He also made a significant contribution to the development of map projections by suggesting ways for overcoming the difficulty of representing the spherical earth on a flat sheet of paper.

The cartographical cosmographical traditions set by Erastothenes and Hipparchus were further advanced by the succeeding generation of students at the museum. The cumulative knowledge gained through these exertions culminated in **Ptolemy's (90-168 A.D.)** eight volume work entitled *Guide to Geography*. Ptolemy was a great astronomer of his time and was the author of the famous text on classical astronomy entitled *Almagest* which had for long remained the most standard reference on the movement of celestial bodies. His *Guide to Geography* was also of related interest. By adopting the system of latitudes and longitudes based on the division of the circle into 360 degrees, he attempted to give precise location for all the known places in precise mathematical terms. Six out of the eight volumes of his *Guide to Geography consisted* of tables of latitudes and longitudes. The first volume was devoted to a discussion on map projections, and the eight volume contained maps of different parts of the world showing all the places that had been included in volumes two to seven. It is true that from the perspective

of present, Ptolemy's book would appear as a monumental collection of errors. It was, however, a piece of great scholarship at the time when it was originally presented. Ptolemy's calculations of latitudes and longitudes are found to be wrong since these calculations had been based on estimated lengths of journeys between places; and these could never be accurate. Another major source of error was that Ptolemy had rejected Eratosthenes's almost correct estimate of the earth's circumference in favour of Posidonius's (which gave a figure that fell short of the actual by a little over one-fourth). (Erastothenes had estimated the earth's circumference at 252,00p stadion, and Poisonous at 180,000 stadii- one stadiums being equal to 157.5 meters.)

Strabo (64 B.C. to 20 A.D.), born a century-and-a-half before Ptolemy, he carried forward the tradition of topographical work of Greek geography as started in the works of Herodotus. His seventeen-volume work named *Geography* was largely an encyclopadic description of the world known to the Greeks. Unlike the works of most other Greek scholars, Strabo's book was found almost intact. The first two volumes of his book contain a review of the work of other geographers since the time Homer. They give a fair idea of the nature of geographical writing in ancient Greece. The next eight volumes were devoted to Europe, six to Asia, and one to Africa.

Strabo's book was written to cater to the needs of a specific group of readers, namely the officers of the administration, statesmen, and commanders of the Roman empire. The purpose was to provide a handbook of information about places and people to help the imperial officers in better appreciation and accomplishment of their tasks. Strabo's book had laid down a clear foundation for choto logical writing in geography. Explaining the method of writing geography, Strabo wrote:just as the man Who measures the earth gets his principles from the astronomer and the astronomer his from the physicist, SO too, the geographer must in the same way take his own point Of departure from the man Who has measured the earth as a whole, having confidence in him and in those in whom he, in his turn, had confidence, and then explain in thefirst instance. our inhabited world, its size, shape and character, and its relation to earth as a whole; for this is the particular task of the geographer. Then, secondly, he must discuss in a fitting manner the several parts of the inhabited world, both land and sea, noting in passing where the subject has been treated inadequately by those of our predecessors whom we have believed to be the best authorities on the matters (Strabo, trans., Jones, 1917, pp. 429-431;cited in James, 1972, p. 47).

Both Strabo and Ptolemy had lived at a time when the Roman empire was at its zenith. It was the largest centralized empire in history till that time. The state needed to have exact description of its territories as well as the other territories it interacted with. This knowledge was necessary both for effective administration and trade as also for the training of the younger generation from among whom the future crop of administrators was to be recruited. The work of the hive Greek scholars, besides extending the frontiers of knowledge, was designed to meet a definite need of society. Geography was flourishing because it served a useful purpose.

Geography in the Middle Ages:

During the fifth century AD, the Roman empire suffered demise. The central administration had greatly weakened and consequently the constituent territories gradually became independent. As trade and commerce declined, the geographic horizons of the people rapidly narrowed down so that, with passage of time, the geographical horizon of most people in Christiandom became confined to their immediate surroundings. Given the extremely narrow world-view of contemporary European societies, it was natural that the hold of religious orthodoxy should increase. Before long, scriptures had begun to be regarded as the ultimate repository of knowledge of every kind so that an impression was created that there was no need

to learn anything outside the Holy books. Anything that did not conform with the" truth" of the scriptures was regarded as the product of a perverse mind and had, accordingly, to be rejected. Under these conditions, science (and, therefore, geography) could not develop so that the Middle Ages represented the Dark Age in the history of scientific knowledge in Europe. During this period, scientific concepts developed by the ancient Greeks were reshaped with a view to make them conform with the" truth" preached by the Church. For example, the idea of a spherical earth was abandoned in favour of the old concept of the earth as a flat disc, with Jerusalem as its centre. This dismal state of affairs had continued almost until the end of the twelfth century A.D.

By the end of the eleventh century A.D., overland travel of Christian pilgrims to Jerusalem across Turkey and Syria had been made very difficult on account of Muslim domination over these territories. This aroused the religious sentiments of Christian Europe. A series of military campaigns were organized with a view to rescue the Holy Land of Jerusalem from the control of Muslims. Between 1096 and 1270 A.D., eight different crusades were organized for this purpose. These crusades (religious wars) played a major role in broadening the geographical horizon of Christian Europe. Men from different parts of Europe had come together to participate in them. These participants went back to their homes with new knowledge and information about the landscapes and customs of many areas beyond the range of the familiar. This stimulated interest in, and the urge to gain knowledge about unfamiliar places. The religious wars, therefore, had led to a new beginning-a revival of interest in geography as a branch of knowledge. Expeditions began to be organized to distant places. The most famous of such expeditions was Marco Polo's voyage to China, the Far East, and the Indian Ocean undertaken between 1271 and 1295. The Crusades proved a stimulant to the revival of interest in the study of peoples and places in far-off lands in another way also. Owing to the" religious" wars the Muslims had closed the overland routes to India and beyond to European merchants who had until then participated in the highly profitable spice trade between India and Europe. Attempts were, therefore, directed to finding an alternative route to the Indies. Two such attempts led to the glorious discoveries of Columbus and Vasco de Gama.

Geography in the Arab Lands:

The fall of the Roman empire, and the decline of scientific learning in Europe was followed by a period of great ascendancy in the Muslim world which, under the influence of Prophet Mohammed, had been transformed from a multitude of tribes divided by intertribal feuds into integral components of a larger all-inclusive identity based on adherence to a common set of religious beliefs and practices. The followers of Islam soon embarked upon a course of conquest of the world outside Arabia with a view to spreading the new religious ideology to the farthest corners of the world. Persia and Egypt were conquered in 641-642 A.D., and by AD. 732 the whole of the West Asian desert region was under their control. They soon overran the Iberian Peninsula so that Spain and Portugal had remained under Muslim rule for almost nine hundred years. Muslim influence also extended eastward into India and parts of south-east Asia. The act of holding on to such a huge politico-cultural empire had, in itself, become a major stimulant to the rise of interest in geographical learning. The Arabs now held a monopoly over the spice trade between India and Europe. This trade required a great deal of travel over land and sea. Travels between places spread over such a large expanse of territory became the source of considerable extension of knowledge about geographical environment in tropical regions.

Previous Year Questions Analysis with Explanation

June- 14

1. Which one of the following pairs does not match correctly?

Author	Book
(A) Ibn Khaldun	– Muqaddimah
(B) Al-Balakhi	– Kitabul Ashkal
(C) Al-Masudi	– Routes and Realms
(D) Al-Biruni	– Kitab-al-Hind

Answer: 2

2. Match List – I with List – II andselect the correct answer from the codes given below :

List – I (Geographers)	List – II (Concepts Developed)
i. F. Ratzel	a. Landscape Science
ii. C. Ritter	b. Areal differentiation
iii. R. Hartshorne	c. Teleological view
iv. O. Schluter	d. Social Darwinism

Codes:

	a	b	c	d
(A)	iv	iii	ii	i
(B)	iii	iv	i	ii
(C)	ii	iv	iii	i
(D)	iv	i	ii	iii

Answer: 1

3. Which one of the following is in correct sequence in the development of German geographical thought.

(A) Troll, Peschel, Hettner, Ratzel (B) Peschel, Ratzel, Hettner, Troll

(C) Peschel, Troll, Hettner, Ratzel (D) Ratzel, Peschel, Troll, Hettner

Answer: 1

Explanation:

Carl Troll: 24 December 1899- 21 July 1975

Oscar Ferdinand Peschel: 17 March 1826 - 13 August 1875

Alfred Hettner: August 6, 1859 in – August 31, 1941

Friedrich Ratzel: August. 30, 1844 - August. 9, 1904,

4. Who coined the term 'Cosmography'and divided it into uranography and Geography?

(A) O. Peschel (B) C. Ritter

(C) B. Vareneous (D) A. Humboldt

Answer: 4

5. The book entitled "Perspective on Nature of Geography (1959)" was authored by

(A) Ellen Churchill Semple (B) Rudolf Kjellen

(C) Richard Hartshorne (D) Isaih Bowman

Answer: 3

Model Questions with Proper Explanation

1. Which of the following is true about modified mercalli scale?
   (a) This scale is a quantitative scale
   (b) It measures the magnitude and energy of earthquake
   (c) It is a log scale
   (d) It has an upper limit

Answer: D
Explanation:
The lesser degrees of the Modified Mercalli Intensity scale generally describe the manner in which the earthquake is felt by people. The greater numbers of the scale are based on observed structural damage. Many people do not recognize it as an earthquake.

2. The instrument used to record seismic waves is known as
   (a) Seismogram
   (b) Richter scale
   (c) Seismograph
   (d) Barometer

Answer: C
Explanation:
A seismograph, or seismometer, is an instrument used to detect and record earthquakes.

3. The most devastating earthquake recorded on richter scale was about what magnitude?
   (a) 7.5
   (b) 8.6
   (c) 10.2
   (d) 6.2

Answer: B
Explanation:
The most powerful quake was the 9.5-magnitude Valdivia Earthquake that struck in Chile in 1960, according to the U.S. Geological Survey (USGS). That quake created a tsunami, which together killed an estimated 5,700 people

4. The greatest amount of destruction, caused by an earthquake, is caused near the
   (a) Focus
   (b) Epicenter
   (c) Zone of subduction
   (d) All of these

Answer: B
Explanation:
Ground shaking may affect areas 65 miles or more from the epicenter (the point on the ground surface above the focus). As such, it is the greatest primary earthquake hazard. Ground shaking may cause seiche, the rhythmic sloshing of water in lakes or bays.

5. Approximately how much percent of total land area of globe is situated to the North of Equator?
   (a) 63%
   (b) 76%
   (c) 91%
   (d) 12%

Answer: B

Explanation:

The total area of land on the surface of the Earth is 149,900,000 square kilometres, of which 106,429,000 square kilometres is in the Northern Hemisphere and 43,471,000 square kilometres is in the Southern Hemisphere. So about 71% of the Earth's land is north of the Equator.

Unit – 9: Geographical Techniques

Sub Unit – 1: Maps and Cartography

9.1.1 Sources of Geographic Information and Data:
9.1.1.1 Spatial Data:
9.1.1.2 Non-Spatial Data:
9.1.2 Types of Maps:
9.1.2.1 Essential Characters of a Map:
9.1.2.1.1 Scale its Essentialities:
9.1.2.2 Classification of Maps:
(A)According to Purpose:
B) According to Scale:
C)According to Function:
9.1.3 Techniques of Map Making:
9.1.3.1 Choropleth:
9.1.3.2 Isopleth:
9.1.3.3 Isarithmic:
9.1.3.4 Dasymetric:
9.1.3.5 Chorochromatic:
9.1.3.6 Choroschematic Maps:
9.1.3.7 Dot Maps:
9.1.3.7 Flow Maps:
9.1.4 Data Representation on Maps:
9.1.4.1 Pie Diagrams:
9.1.4.2 Bar Diagrams:
9.1.4.3 Line Graph:

Sub Unit – 2: GIS and Remote Sensing

9.2.1 GIS Database:
Attribute Data:
Vector Data:
Raster Data:
9.2.2 Functions of GIS:
9.2.3 Digital Elevation Model (DEM):
9.2.4 Georeferencing:
9.2.4.1 Co-ordinate System:
9.2.4.2 Map Projections:
9.2.4.3 Datum:
9.2.5 GIS Applications:
9.2.5.1 Thematic Cartography:
9.2.5.2 Spatial Decision Support System:
9.2.6 Basics of Remote Sensing:
9.2.6.1 Electromagnetic Radiation:
9.2.6.2 Electromagnetic Spectrum:
9.2.6.3 Sensors:
9.2.6.4 Platforms:
9.2.6.5 Resolution:
9.2.6.6 Types:
A. Spatial Resolution
B. Spectral Resolution

C. Temporal resolution
D. Radiometric Resolution
9.2.7 Elements of Air Photo and Satellite Image Interpretation:
9.2.7.1 Photogrammetry:
9.2.7.2 Types of Aerial Photographs:
9.2.8 Digital Image Processing:
9.2.9 GPS Components:
9.2.9.1 GPS Applications:

Sub Unit – 3: Measures of central Tendency

9.3.0 Cetral Tendency
9.3.1 Mathematical Average
9.3.2 Positional Average
9.3.3 Dispersion
9.3.4 Correlation
9.3.5 Regression Analysis
9.3.6 Hypothesis of Testing
9.3.6.1 Types of Hypothesis
9.3.6.2 Two Tailed and One Tailed Test of Hypothesis
9.3.7 Small Sample Test
9.3.8 Time Series Analysis
9.3.9 Sampling

Sub Unit – 4: Morphometric Analysis

9.4.0 Introduction
9.4.1 Morphometry of Drainage Basins

Unit – 9: Geographical techniques: Sub Unit – 1
Maps and Cartogharphy

Cartography is the study and practice of making maps. Combining science, aesthetics, and technique, cartography builds on the premise that reality can be modeled in ways that communicate spatial information effectively.

9.1.1 Sources of Geographic Information and Data:

Data are simply facts or figures — bits of information, but not information itself. When data are processed, interpreted, organized, structured or presented so as to make them meaningful or useful, they are called information. Information provides context for data. The most common general sources for geographical data are: hard copy maps, aerial photographs, remotely-sensed imagery, point data, samples from surveys, existing digital data files, existing hard copy maps etc.

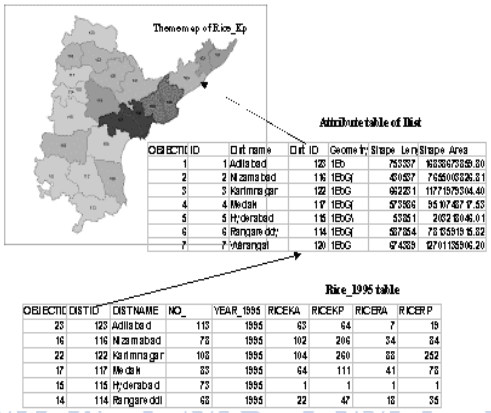
9.1.1.1 Spatial data:

Spatial data refers space related data. It refers to shape, size and location of the earth or a part of the earth, such as any administrative boundaries, road and railways, cities of towns of a country, state or district etc.

9.1.1.2 Non-spatial data:

Non- spatial data refers to other attributes associated with the feature (spatial data) such as name, length, area, volume, population, soil type, etc.

LINKING SPATIAL AND ATTRIBUTE DATA



9.1.2 Types of Maps:

A map is a symbolic depiction emphasizing relationships between elements of some space, such as objects, regions, or themes.

9.1.2.1 Essential characters of a map:

Making Date	When the map was made
Orientation	Directions (north arrow)
Grid	Locates places on the map
Scale	what the map distance is
Title	What, where, and when
Author/agency	Who is/are made the map
Legend/Index	what the symbols mean

9.1.2.1.1 Scale its essentialities:

Scale is a ratio between map distance and ground distance.

How can we express scales:

a) By R.F. (e.g. 1:50,000)
b) By statement (e.g. 1 cm =100 Kilometers)
c) By graphical drawings (e.g. linear scale, comparative linear scale, diagonal scale etc.)

How can we calculate areas:

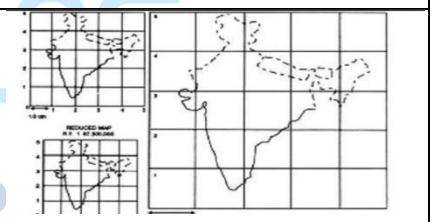
1. measuring area with graph paper
2. mid ordinate rule method
3. Bar Method
4. Dot planimeter method

An example of area calculation from map lengths to ground area -

R.F.	map lengths	map area	Derived ground lengths	Derived ground area
1: 50,000	2 cm×10 cm	20 sq cm	1 km×5 km	5 sq kms

How can we reduce and enlarge the maps:

Original R. F	Reduction		Enlargement	
	Times	New R.F.	Times	New R.F.
1:50,000	1/4	$(\times \frac{1}{\sqrt{4}})$ 1:100,000	4	$(\times \sqrt{4})$ 1: 25,000



Magnitude of reduction and enlargement of reproduced map:

$$\text{Linear reduction} - \text{enlargement magnitude} = \frac{\text{distane between two points on reproduced map}}{\text{distane between two points on original map}}$$

$$\text{Area reduction} - \text{enlargement magnitude} = \left(\frac{\text{distane between two points on reproduced map}}{\text{distane between two points on original map}}\right)^2$$

9.1.2.2 Classification of maps:

B) According to purpose:

3. the 'general-purpose' (or 'reference') map:

Those are - Political maps, Physical maps, Statistical /Distribution maps, Topographic maps, Geological maps, Geomorphological maps, Town plan maps, Cadastral maps, Weather maps, Bathymetric maps /Navigational maps, Aeronautical maps etc.

About Topographical Map:

Toposheet type	R.F.	Index i.e.
Four-degree Sheet	1:1,000,000	53

Degree Sheet	1:250, 000	53A
Half Degree Sheet	1:100,000	53A NE
Quarter Degree Sheet	1:50,000	53 /5

3. the 'special-purpose' (or 'thematic') map

it may be divided into two types

c) Qualitative maps:

Region Map, Path Map, Facility Map, Resource Map etc.

d) Quantitative maps:

Data attributes are displayed on the map.

B) According to scale:

1. **Small scale map:** small-scale maps are drawn to show large areas. For example, atlas maps, wall maps, etc. (as per NATMO it starts from 1:1,000,000).
2. **Medium scale map:** It is from 1: 50,000 to 1:1,000,000
3. **Large scale map:** Large scale maps are drawn to show small areas at a relatively large-scale. For example, topographical maps, cadastral map etc. it is up to 1:50,000.

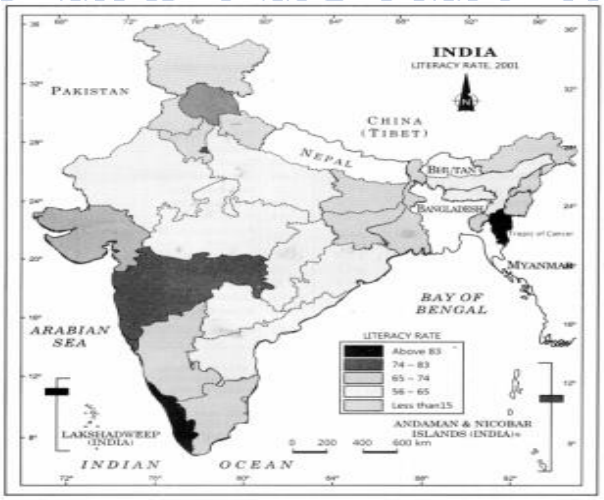
C) According to function:

1. **Physical maps:** relief, geological, climatic maps etc.
2. **Cultural maps:** political population maps etc

9.1.3 Techniques of Map Making:

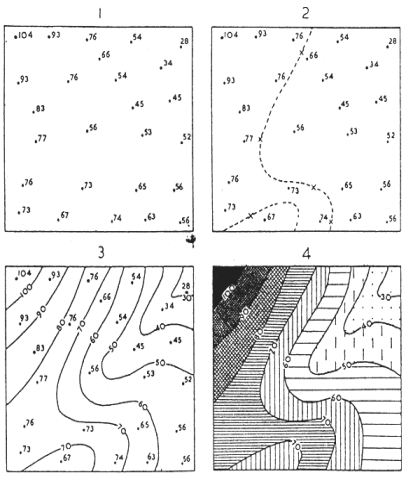
9.1.3.1 Choropleth:

A choropleth map is a type of thematic map in which areas are shaded or patterned in proportion to a statistical variable that represents an aggregate summary of a geographic characteristic within each area, such as population density or per-capita income.



9.1.3.2 Isopleth:

The word Isopleth is derived from Iso meaning equal and pleth means lines. Thus, an imaginary line, which joins the places of equal values, is referred as Isopleth. The more frequently drawn isopleths include Isotherm (equal temperature), Isobar (equal pressure), Isohyets (equal rainfall), Isonephs (equal cloudiness), Isohels (equal sunshine), contours (equal heights), Isobaths (equal depths), Isohaline (equal salinity), Contour (equal height) etc.

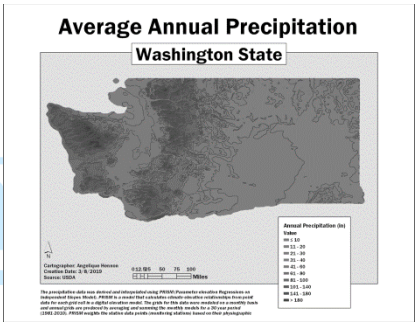


Gradient and Slope Calculation:

Gradient is as like 5-meter height reduces in 1 kilometer. So, we write it as like 5meter/Kilometer. Slope is always calculated as in degree (e.g. 5°).

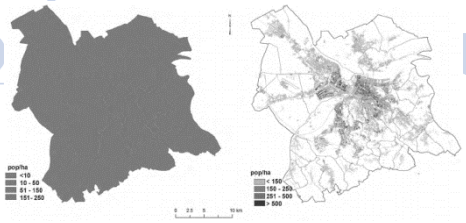
9.1.3.3 Isarithmic:

Isarithmic maps, also known as contour maps or isoline maps depict smooth continuous phenomena such as precipitation or elevation. Each line-bounded area on this type of map represents a region with the same value. For example, on an elevation map, each elevation line indicates an area at the listed elevation. An isarithmic map is a planimetric graphic representation of a 3-D surface. Isarithmic mapping requires 3-D thinking for surfaces that vary spatially.



9.1.3.4 Dasymetric:

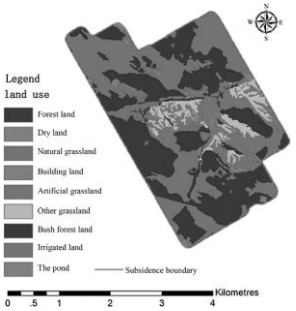
The dasymetric map is a type of thematic map that uses areal symbols to visualize a geographic field by refining a choropleth map with ancilliary information about the distribution of the variable.



Choropleth map vs Dasymetric map

9.1.3.5 Chorochromatic:

A Chorochromatic map, also known as an area-class or qualitative area maps, is a type of thematic map that portray regions of categorical or nominal data using variations in color symbols.



9.1.3.6 Choroschematic Maps:

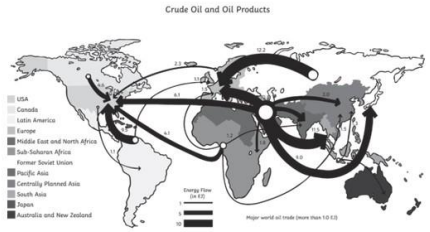
Various cartographic symbols like dots, circles, triangles, initial letters of the elements to represent on the map. This method mostly stresses on the location rather than the characteristics of the phenomenon. Neither the shape nor the color of the symbol used represents the dimension of the object. The main advantage of this method is that many elements may be shown together on a single map.

9.1.3.7 Dot Maps:

The dot maps are drawn to show the distribution of phenomena such as population, cattle, types of crops, etc. The dots of same size as per the chosen scale are marked over the given administrative units to highlight the patterns of distributions.

9.1.3.7 Flow Maps:

In cartography, **flow maps** are a mix of maps and flow charts, that "show the movement of objects from one location to another, such as the number of people in a migration, the amount of goods being traded, or the number of packets in a network.



9.1.4 Data Representation on Maps:

9.1.4.1 Pie diagrams:

A pie chart is a circular statistical graphic, which is divided into slices to illustrate numerical proportion. In a pie chart, the arc length of each slice is proportional to the quantity it represents.

9.1.4.2 Bar diagrams:

A bar chart or bar graph is a chart or graph that presents categorical data with rectangular bars with heights or lengths proportional to the values that they represent.

Types of bar:

1. Simple bar diagram
2. Multiple bar diagram
3. Compound bar diagram

9.1.4.3 Line Graph:

A line chart or line plot or line graph or curve chart is a type of chart which displays information as a series of data points called 'markers' connected by straight line segments. It is a basic type of chart common in many fields.

Several other diagrams are: Square Diagram, Circle Diagram, Sphere Diagram, Scatter Diagram, Ergograph (An ergograph is a graph that shows a relation between human activities, or agricultural/climate factors, and a seasonal year.), Wind rose etc.

Previous Year Questions Analysis with Proper Explanation

Paper-II, July – 18

1. Match the **List - I** with **List - II** and select the correct answer from the code given below:

List - I (Map Type)	**List - II (Information Content)**
(a) Chorochromatic	(i) showing regional variation in distribution by shades
(b) Choroschematic	(ii) areal distribution by Tints
(c) Choropleth	(iii) showing imaginary lines joining places of equal value
(d) Isopleth	(iv) areal distribution by symbols

Code:	**(a)**	**(b)**	**(c)**	**(d)**
(1)	(i)	(iv)	(ii)	(iii)
(2)	(iv)	(i)	(iii)	(ii)
(3)	(ii)	(iv)	(i)	(iii)
(4)	(iv)	(ii)	(iii)	(i)

Answer: 2

Explanation: -

A Chorochromatic map, also known as an area-class or qualitative area maps, is a type of thematic map that portray regions of categorical or nominal data using variations in color symbols. Chorochromatic maps are typically used to represent discrete fields, also known as categorical coverages.

In the Choroschematic technique, the geographical phenomenon like soil, land use, vegetation etc. are depicted by various cartographic symbols like dots, circles, triangles, initial letters of the elements to represent on the map.

A choropleth map is a type of thematic map in which areas are shaded or patterned in proportion to a statistical variable that represents an aggregate summary of a geographic characteristic within each area, such as population density or per-capita.

Isopleth maps simplify information about a region by showing areas with continuous distribution. Isopleth maps may use lines to show areas where elevation, temperature, rainfall, or some other quality is the same; values between lines can be interpolated.

2. On a topographical map of 1: 50,000 scale the contour Interval is given as 10 meters. Place 'A' is situated on a contour of 200 m MSL and another place 'B' is located on a countour of 240 m MSL. The distance between 'A' and 'B' on the map is 4.0 cms. The correct gradiant between 'A' and 'B' therefore would be:

(1) 1/30
(2) 1/40
(3) 1/50
(4) 1/60

Answer: 3

Explanation: -

$1\ c.m.$ map distance $=\ 50{,}000\ c.m.$ ground distance

Place 'A' is situated on a contour of $200\ m.$ MSL and another place 'B' is located on a countour of $240\ m.$ MSL.

So, variation of hight between place 'A' and 'B' $40\ m.$

We know that $1\ c.m.$ map distance $=\ 50{,}000\ c.m.$ ground distance. So, $4\ c.m.$ map distance $=\ 200000\ c.m.$ ground distance.

Gradiant calculation: $\frac{Horizontal\ Distance}{Vertical\ Distance}$

$\therefore \frac{2000}{40}$

$\therefore 50$

So, $\frac{1}{50}$

Paper-II, January – 17

1. Given below are two statements, one labelled as Assertion (A) and other labelled as Reason (R). Select your answer from the codes given below:

Assertion (A): Maps that are usually referring various attributes' information are called complex Thematic maps.

Reason (R): Complex Thematic Maps are used to show locations of earth's different features and activities.

Codes:

(1) Both (A) and (R) are true and (R) is the correct explanation of (A).
(2) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
(3) (A) is true, but (R) is false.
(4) (A) is false, but (R) is true.

Answer: 2

Explanation: -

A thematic map is also called a special-purpose, single-topic, or statistical map. A thematic map focuses on the spatial variability of a specific distribution or theme (such as population density or average annual income), whereas a reference map focuses on the location and names of features.

Paper-III, January – 17

1. Which one of the following linear length measures could be derived from the fractional measure of 10–6 metres?
(1) Nanometre
(2) Micrometre
(3) Millimetre
(4) Femtometre

Answer: 2

Explanation: -

Micrometre, also called micron, metric unit of measure for length equal to 0.001 mm, or about 0.000039 inch. Its symbol is μm. The micrometre is commonly employed to measure the thickness or diameter of microscopic objects, such as microorganisms and colloidal particles.

2. Which of the following is a non-quantitative areal distribution map?
(1) Choropleth
(2) Isopleth
(3) Multiple dots
(4) Choroschematic

Answer: 4

Explanation: -In the CHOROSCHEMATIC technique, the geographical phenomenon like soil, land use, vegetation etc. are depicted by various cartographic symbols like dots, circles, triangles, initial letters of the elements to represent on the map.

Model Question

1. The great Pacific Ocean occupies almost
   (a) 1/6th area of earth
   (b) 1/3rd area of earth
   (c) 1/5th area of earth
   (d) 1/9th area of earth

Answer: B

2. In which year, the "concept of horizontal displacement of continents" by FB Taylor published?
   (a) 1901
   (b) 1910
   (c) 1905
   (d) 1981

Answer: B

3. According to F B Taylor, the main driving force behind the drift of continents was?
   (a) Gravitational pull
   (b) Tidal force
   (c) Electromagnetism
   (d) Geomagnetism

Answer: B

4. From which period did F B Taylor start his theory of drift of continents?
   (a) Cretaceous
   (b) Carboniferous
   (c) Cambrian
   (d) Tertiary

Answer: A

5. F B Taylor postulated two landmasses in his theory of continental Drift. Which were these two landmasses?
   (a) Lauratia and Angara
   (b) Angara and Gondwana
   (c) Lauratia and Gondwana
   (d) Pangea and Panthalassa

Answer: C

Unit-10: Geography of India

Sub Unit -1: Physiography & Physiographic Division of India

10.1.1 Physiographic Division of India
10.1.2. Origin of the Himalaya
10.1.3 Physiographic Divisions of the Himalaya
10.1.4 Longitudinal Divisions of the Himalaya
10.1.5 Main Mountain Passes of Himalayas
10.1.6 Glaciers and Snowline
10.1.7 Ice Ages in India
10.1.8 The Great Plains of India
10.1.10 Meso-Regions of the Northern Plains of India
10.1.11 Physiography and Relief Features of Peninsular India
10.1.12 The Coastal Plains
10.1.13 The Indian Islands
10.1.14 Vulcanicity

Sub unit -2: Drainage System of India

10.2.1 The Drainage System of India
10.2.2 Drainage patterns
10.2.4 The Himalayan Drainage
10.2.6 Major Rivers of Peninsular India
10.2.7 Main Lakes of India
10.2.8 Some Important waterfalls of India
10.2.9 Irrigation

Sub unit -3: Climate of India

10.3.1 Indian Monsoon
10.3.2 Jet Stream and Indian Monsoon
10.3.3 Season in India
10.3.3.1 Rainfall Distribution
10.3.4 Climatic Regions of India
10.3.5 Kopen's Classification of Indian Climate
10.3.6 Climatic Division by Stamp and Kendrew

Sub Unit-4: Natural Resource of India

10.4.1 The Region Wise Distribution of Forests
10.4.2 India classification of forests
10.4.4 Percentage Share of Different Types of Forests
10.4.6 Types of Soil of India
10.4.7 Mineral Resources

Sub Unit-5: Population of India

10.5.1 Types of Rural Settlements
10.5.2 Trend of Urbanisation
10.5.3 Urban Population
10.5.3.1 Number of Towns and Households and Slum Population

Sub Unit-6: Agriculture resources of India

10.6.2 Determinants of Agriculture
10.6.5 Agricultural Productivity
10.6.6 Cropping Patterns
10.6.7 Crop Concentration
10.6.8 Agricultural Intensity
10.6.9 Crop Combinations
10.6.10 Agricultural Regionalisation
10.6.11 Agroclimatic Region

Sub Unit-7: Industries

10.7.1 Industrial Development during the Five-Year Plans
10.7.2 Industrial Policy
10.7.3 Industrial Regions of India

Sub Unit-8: Development of transport Network, Internal and External Trade

10.8.1 Transport Communications and Trade
10.8.2 important National Highway
10.8.3 International Trade

Sub Unit-9: Regional Planning

10.9.1 Regional Planning
10.9.2 Integrated Area Development
10.9.3 Development of Backward Areas
10.9.4 Command Area Development
10.9.5 Desertification and Desert Development Programme
10.9.6 Human Derclopment Index

Sub Unit-10: Natural Hazard and Disaster in India

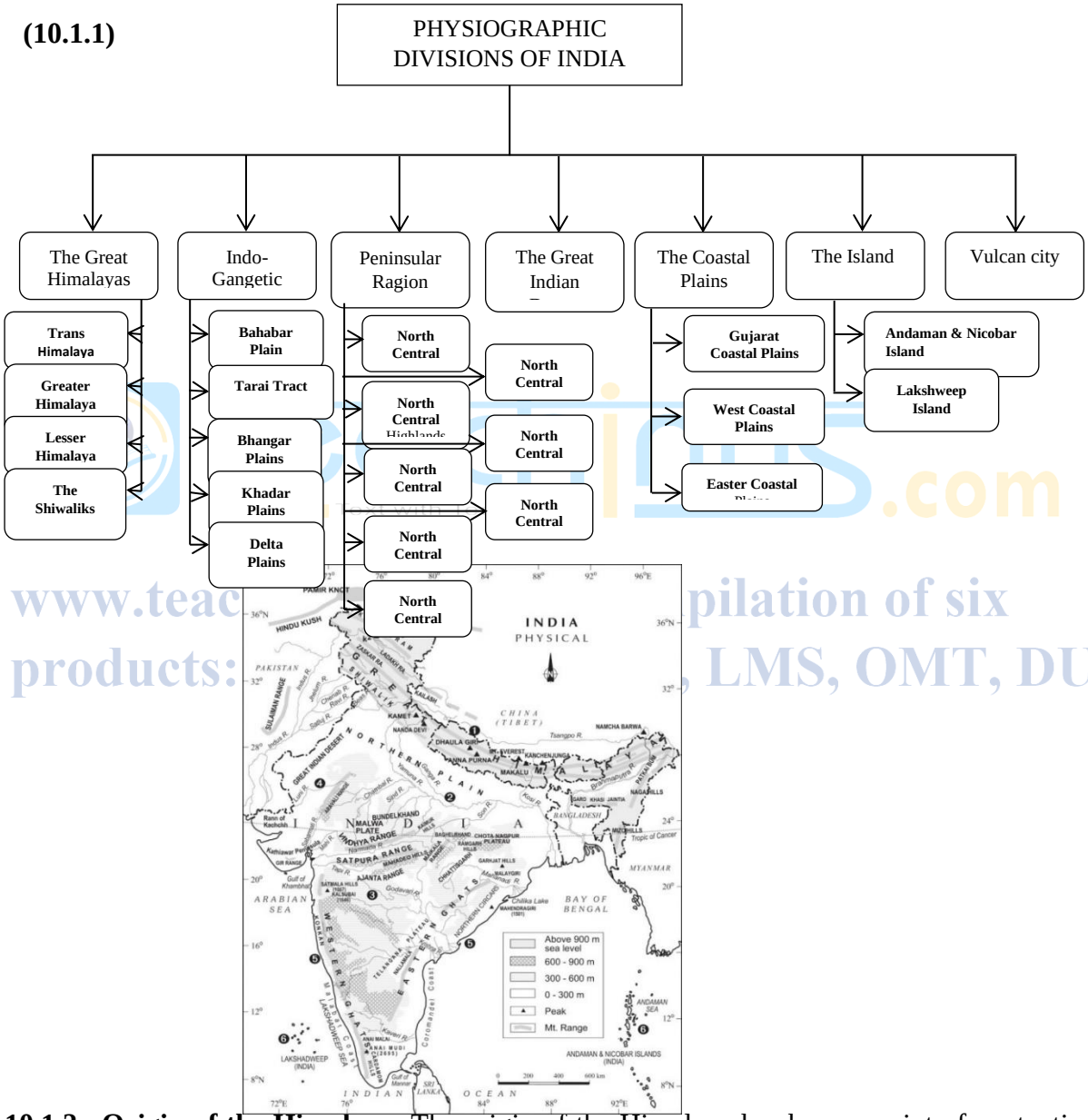
10.10.1 Environmental Hazards
10.10.3 Globalisation and Indian Economy

Sub Unit – 1
Geography of India

Physiography & Physiographic Division of India:

Introduction: physiography deals with the study of the surface features and landforms of the Earth. On the basis of tectonic history, stratigraphy, and physiography, India may be divided into the following physiographic divisions as shown on the map.

(10.1.1)



10.1.2. Origin of the Himalaya: The origin of the Himalaya has been a point of contention among the geologists and geomorphologists. It is a complex mountain system having rocks from the Precambrian and Eocene periods. Mostly formed of sedimentary and metamorphic rocks, it has been subjected to intense folding and faulting. The main theories about the origin of the Himalayas are as under:

(i) The Geosynclinal Origin

The main supporters of the ge4osynclinal origin of the Himalaya are Argand, Kober, and Suess. According to these geologists, the disintegration of Pangaea, about 200 million years back, led to the formation of a long Tethys Sea between the Lauratian Shield (Angaraland) of the north and the Gondwanaland of the south. This sea was occupying the region of Himalaya during the Mesozoic Era (180 million years ago). At the end of the Palaeozoic and beginning of the Mesozoic Eras, the Tethys almost girdled the whole Earth running from Europe in the west to china in the east. Eroded material forms the two land masses (Eurasian Shield – Angaraland and Gondwanaland) was deposited in the Tethys Sea and assumed considerable thickness due to the sinking nature of the sea bed. During the Cretaceous Period, the bed of the sea started rising which led to the folding of three successive ranges of the Himalaya. The first upheaval led to the formation of the Greater Himalaya during the Eocene Period (about 65 million years back). Similarly, the second upheaval took place during the Miocene Period (about 45 million years back) resulting in the formation of the Lesser Himalaya, and the third upheaval started in the Pliocene period) about 1.4 million years back) resulting in the formation of the Shiwalik or the Outer Himalaya.

(ii) The Plate Tectonic Origin of the Himalaya

The theory of Plate Tectonics was put forward by W. J. Morgan of Princeton University in 1967. This theory is based on the concept of "Sea-Floor Spreading" advocated by H.H. Hess. According to this theory, about 70 or 65 million years ago there was an extensive geosyncline, called the Tethys, in place of the Himalaya. About 65-30 million years ago the Indian plate came very close to the Asian plate and started subducting under the Asian plate. This caused lateral compression due to which the sediments of the Tethys were squeezed and folded into three parallel ranges of the Himalaya. It has been estimated that this convergence has caused a crustal shortening of about 500km in the Himalayan region and is compensated by sea floor spreading along the oceanic ridge in the Indian ocean region. Since the northward movement of the Indian plate is still continuing the height of the Himalayan peaks is increasing.

10.1.3 Physiographic Divisions of the Himalaya

For a systematic study of the physiographic and relief, the Himalaya may be devided into the following four divisions from north to south:

a) The Trans-Himalaya
b) The Greater Himalaya
c) The Lesser Himalaya and
d) The Shiwaliks or the Outer Himalaya.

a) The Trans-Himalaya

The Trans-Himalaya are about 40 km wide. They contain the Tethys sediments. The rocks of this region contain fossils bearing marine sediments which are underlain by "Tertiary granite". It has partly metamorphosed sediments and constitutes the core of the Himalayan axis. It has a great accumulation of debris in the valleys of defeated streams which could not maintain their southerly course across the rising barrier of the Himalaya.

b) The Greater Himalaya

The Greater Himalaya rise abruptly like a wall north of the Lesser Himalaya. The MCT separates the Greater Himalaya from the Lesser Himalaya. The Greater Himalaya are about 25 km wide with an average height above 6100 m (wadia, D.N.). Almost all the lofty peaks of the Himalaya, Mt. Everest, kanchanjunga, Nanga-Parbat, Gasherbrum, Manaslu, Dhaulagiri, Annapurna, Gosainthan, Cho-Cyu, Nanda-Devi, kamet, Badrinath, Nanda Devi, etc., lie in this

zone. The Greater Himalaya are composed of crystalline, igneous or metamorphic rocks (granite, schists, and geneiss). The basal complex of the Himalaya is Archaean. At places, due to heavy thrust, older rocks are found overlying the newer rocks. The Greater Himalaya are almost a contiguous range. The range has very few gaps mainly provided by the antecedent rivers. The Greate Himalaya receive less rainfall as compared to the Lesser Himalaya and the Shiwaliks. Physical weathering is pronounced. Erosion is, however, less effective over the Greater Himalaya as compared to the Lesser Himalaya. Being lofty, they have very little forest area.

c) The Lesser Himalaya

The width of the Lesser Himalaya is about 80 km with an averge height of 1300-4600 m. It consists, generally, of unfossiliferous sediments or metamorphosed crystalline. The main rocks are slate, limestone and quartzites. Along the southern margin of the Lesser Himalaya lies the autochthonous belt of highly compressed Upper Palaeozoic to Eocene rocks, often containing volcanic material. Examples of autochthonous belts are found between Murree and Panjal thrust in Kashmir, Giri thrusts in the Shimla region and krol and MBT in Garhwal region. This region is subjected to extensive erosion due to heavy rainfall, deforestation, and urbanisation.

d) The Shiwaliks or Outer Himalaya/Sub-Himalaya

The Shiwaliks extand from Jammu Division of Jammu and Kasmir State to Assam. In width Shiwaliks very from 8 km in the east to 45 km in the west with an average elevation of about 900-1500m above sea level. It is not continuous range. It is boader in the west and narrows down in the east. Between the Shiwaliks and the Lesser Himalaya are longitudinal valleys called Doons/Duns. Some of the important Duns are Dehra Dum, Potli, Kothri, Kathmandu, Chumbi, and Kyarda. The Shiwaliks are mainly composed of sanndstones, sand-rocks, clay, conglomerates and limestones, mostly belonging to the upper Tertiary period.

10.1.4 Longitudinal Divissions of the Himalaya

The Himalaya have also been divided by Sir.S. Burrard into four divissions, namely (i) The Western Himalaya, (ii) The Kumanu Himalaya, (iii) the Nepal Himalaya, (iv) The Assam Himalaya. Prof. S.P. Chatterjee (1973), divided the Himalaya into the following six transverse divisions from west to east.

a) The Kashmir Himalaya
b) The Himachal Himalaya
c) The Kumaun Himalaya
d) The Central Himalaya
e) The Eastern Himalaya

a) The Kashmir Himalaya

Sprawling over an area of about 350,000 sq km in the state of Jammu and Kashmir, the range stretches about 700 km in length and 500km in width. With an average height of 3000 m, it has the largest number of glaciers in India. The Ladakh region of the Kashmir Himalaya is characterised by cold desert conditions. Ladakh is one of the loftiest inhabited regions of the world (3600-4600m). the gorge of Gilgit is 5200 m in height above the sea level of the water at its bed. Surrounded by the Greater Himalaya and the Lesser Himalaya is the Kashmir Valley. Having a height of 1585 m above the sea-level, the total area of the Kashmir Valley is about 4920 sq km. It is a structural longitudinal “Dum” (D.N. Wadia). A special feature of the Vale of Kashmir is the karawa (lacustrine) deposits consisting of silt, sand and clay. These Karewas are mainly devoted to the cultivation of saffron and have orchards of apple, peach, almond, walnut and apricot. Kashmir Himalaya are characterised by high snow-covered peaks, deep valleys, interlocked spurs and high mountain passes. Pir-panjal, Banihal (Jawahar tunnel), Zoji-La, Burzil, Khardungal, pensi-La, Saser-La, Lanak-la, Jara-La, Taska-La, Chang-La, Umasi-

La, and Qara-Tagh-La (Karakoram) are the important mountain passes of the Kashmir Himalaya.

The Himadri: Known as the abode of gods, this section of the Himalaya has many snow-capped peaks, such known as Nanga-Parbat (8119 m), Nanda Devi (7817 m), Trisul (7140 m), Nunkun (7135 m), Kamath (7756 m), etc.

b) The Himachal Himalaya

Stretching over Himachal Pradesh, it occupies an area of about 45,000 sq km. All the three ranges (the Greater, the Lesser, and Outter Himalaya) are well represented in this region. The northern slopes of the Himachal Himalaya are clothed with thick forests and show plains and lakes, while the southern slopes are rugged and forest clad. Rohtang, Bara-Lacha, and Shipki-La, are the important passes which join Himachal Pradesh with Tibet (China). The beautiful and highly productive valleys of Kangra, Kullu, Manali, Lahul, and Spiti lie in Himachal Pradesh. These valleys are well known for orchards and scenic beauty. Shimla, Dalhousie, Chamba, Dharamshala, Kullu-Manali are the important hill stations of this region.

c) The Kumaun Himalaya

The kumaun Himalaya lie between the satluj and the Kali rivers, stretching to a length of 320 km and occupying an area of about 38,000 sq km. Its highest peak is Nanda Devi (7817 m). Among the other peaks Kamet (7756 m), Trisul (7140 m), Badrinath (7138 m), Kedarnath (6940 m), Dunagiri (7066 m), Jaonli or Shivling (6638 m), Gangotri (6615 m), and Bandarpunch (6320 m) are important. Gangotri, Milam, and Pindar are main glaciers of Uttarakhand. The important hill stations include Mussorrie, Nainital, Ranikhet, Almora, and Bageshwar. The Kumaun Himalaya are connected to Tibet by a number of passes namely, Thaga-La Muling-La (5669 m), Mana pass, Niti Pass, (5068 m), Tun-Jun-La, Shalsal Pass, Balcha Dhura, Kungrinbingri Pass, Lampiya Dhura, Mangsha Dhura and Lipu Lekh.

d) The Central Himalaya

This range stretches from river Kali to river Tista for about 800 km occupying an area of about 116,800 sq km. A major part of it lies in Nepal except the extreme eastern pert called Sikkim Himalaya and in the Darjeeling District of West Bengal. All the three ranges of the Himalaya are represented here. The Highest peaks of the world like Mt. Everest (8850 m), Kanchenjunga (8598 m), Makalu (8481 m), Dhaulagiri (8172 m), Annapurna (8078 m), Manaslu (8154 m), and Gosainath (8014 m) are situated in this part of the Himalaya. It has very few passes. The passes of Nathu-La and Jelep-La (4538 m in Sikkim) connect Gangtok (Sikkim) with Lhasa (Tibet, China).

Kanchanjunga: Situated on the border of Sikkim and Tibet, it is the third highest mountain peak in the world. It is 8,598 m above sea level and remains snow covered throughout the year. Some of the important rivers of India like Kosi and Tista have their origin in this mountain.

e) The Eastern Himalaya

These lie between the Tista and the Brahmaputra rivers, covering a distance of about 720 km with an area of 67,500 sq km. The Eastern Himalaya occupy the state of Arunachal Pradesh (India) and Bhutan, in this part, the Himalaya rise very rapidly from the plains of Assam, and foothills of Shiwaliks are very narrow. The Eastern Himalaya include the Aka Hills, the Defla Hills, Miri Hills, Abor Hills, Mishmi Hills, and Namcha Barwa (7756 m). it has a number of mountains passes among which Bomdi-la, Bom La, Tunga, Yonggyap, Diphu, pangsau, tse-La, Debang (Arunachal Pradesh) are the most important. In the Eastern Himalaya, due to heavy rainfall, fluvial erosion is quite pronounced.

On the southern border of Arunachal Pradesh, the Himalaya take a southerly turn and the ranges are arranged in a north-south direction. Passing through the states of Arunachal Pradesh (Tirap Division) Nagaland, Manipur, Tripura, and Mizoram, the Himalaya are locally known as Purvanchal. The main hills of the Eastern Himalaya are Patkai-Bum (Arunachal Pradesh), Naga-Hills (Nagaland), Manipur Hills, Blue Mountains (Mizoram), Tripura Range, and Brail range. On the border of Nagaland and Myanmar lies the Arakanyoma. These hills are heavily forested. Northern Myanmar is connected through Diphu, Hpungan, Chaukan, Pangsau, and Likhapani (Arunachal Pradesh). Southwards, a pass joins lmphal (Manipur) with Mandalay (Myanmar). The Purvanchal is joined by the Meghalaya Plateau in the west. The extension of the Myanmar mountain chain continues southward up to Andaman and Nicobar Islands and even up to the Archipelago of Indonesia.

10.1.5 Main Mountain Passes of Himalayas

A mountain pass is a route through a mountain range or over a ridge. A pass plays a significant role in trade, war or migration.

Main Mountain passes

Name of the pass	Altitude above the sea level	Location
Aghil Pass	5000 m	Situated to the north of K2 in karakoram
Banihal Pass	2835 m	It is located in the Pir panjal ranga on NH1A that has been numbered as NH44
Bara Lacha	4843 m	Himachal Pradesh
Bomdi La	4331 m	Arunachal Pradesh. It is situated to the east of Bhutan in Greater Himalaya
Burzail Pass	Greate then 5000 m	Srinagar with Kishan-Ganga Valley
Chang-La	>5270 m	In Greater Himalayas Ladakh with Tibet
Debsa-La	5270 m	High Mountain Pass in Greater Himalayas between the Kullu and Spiti districts of Himachal Pradesh
Dihang Pass	4000 m	Situated in Himachal Pradesh
Diphu Pass		Situated in the eastern part of Arunachal Pradesh
Lmis La	>4500 m	Ladakh region of India and Tibet in China
Khardung La	>6000 m	Near Leh in China region
Khunjerab La	>5000 m	Karakoram Mountains in Ladakh
Likhapani	>4000 m	Arunachal Pradesh
Lipu Lekh		Pithoragarh district, Uttarakhand
Mana Pass	5611 m	Greate Himalayas
Mangsha Dhura Pass	5000 m	Pithoragarh district of Uttarakhand
Muling la		Situated North to Gangotri, Uttarakhand
Nathu La	4310 m	Situated at Indo-China border, Sikkim
Niti Pass	5068 m	Uttarakhand
Pangsau Pass	>4000 m	Arunachal Pradesh
Pensi La	>5000 m	Greater Himalayas
Pir Panjal Pass	3494 m	Mughal Road
Qara Tagh Pass	5540 m	Located in Karakoram Mountain

Rohtang Pass	3979 m	Eastern side of Pir Panjal Range, 51 km from Manali
Shencottah-Gap	>4300 m	Located through the Satluj Gorga
Shipki La	3930 m	Himachal Pradesh
Thang La	5359 m	Ladakh
Traill's pass	5212 m	Uttarakhand. Situated at the end of the Pindari Glacier in the Pithoragarh and Bageshwar district of Uttarakhand
Zoji La	3528 m	Kasmir (100 km from Srinagar)

Previous Year Questions Analysis with Proper Explanation

December - 14

1. The Pir Panjal range lies in
(A) Outer Himalayas
(B) Trans Himalayas
(C) Greater Himalayas
(D) Middle Himalayas
Answer: C
Explanation: -
The Pir Panjal Range, also Panchaladeva in Hindu scriptures, is a group of mountains in the Lesser Himalayan region, running from east-southeast (ESE) to west-northwest (WNW) across the Indian state of Himachal Pradesh, the Indian administrated Union Territory of Jammu and Kashmir and the Pakistani administered territory of Azad Kashmir, where the average elevation varies from 1,400 m (4,600 ft) to 4,100 m (13,500 ft).[1] The Himalayas show a gradual elevation towards the Dhauladhar and Pir Panjal ranges. Pir Panjal is the largest range of the Lesser Himalayas. Near the bank of the Sutlej River, it dissociates itself from the Himalayas and forms a divide between the Beas and Ravi rivers on one side and the Chenab on the other. The renowned Galyat mountains are also located in this range.

2. Match the following List – I with List – II and select the correct answer from the codes given:

List – I (Mountain Range)	**List – II (Highest Peak)**
a. The Western Ghats	i. Doddabetta
b. The Eastern Ghats	ii. Gurusikhar
c. The Nilgiris	iii. Annamudai
d. The Aravalis	iv. Deomali

Codes:

	(a)	**(b)**	**(c)**	**(d)**
(A)	i	ii	iii	iv
(B)	iv	ii	i	iii
(C)	ii	iii	iv	i
(D)	iii	iv	i	ii

Answer: D
Explanation: -
Doddabetta is the highest mountain in the Nilgiri Mountains at 2,637 metres. There is a reserved forest area around the peak. It is 9 km from Ooty, on the Ooty-Kotagiri Road in the Nilgiris District of Tamil Nadu, India. It is a popular tourist attraction with road access to the summit.

Guru Shikhar, a peak in the Arbuda Mountains of Rajasthan, is the highest point of the Aravalli Range. It rises to an elevation of 1,722 metres. It is 15 km from Mount Abu and a road from there leads almost to the top of the mountain.

Anamudi is a mountain located in the Indian state of Kerala. It is the highest peak in the Western Ghats and South India, at an elevation of 2,695 metres and a topographic prominence of 2,479 metres. It lies on the border of Devikulam Taluk, Idukki district and Kothamangalam Taluk, Ernakulam district.

Deomali, is a mountain peak in the Chandragiri-Pottangi subrange of the Eastern Ghats. It is located near Koraput town in the Koraput district of southern Odisha, India.

3. Given below are two statements, one labelled as **Assertion (A)** and the other labelled as **Reason (R)**. Select the correct answer from the codes given below:
Assertion (A):Indus and Ganges are the antecedent rivers.
Reason (R): These rivers pass through the very narrow and deep gorges in the Himalayan mountain region.
Codes:
(A) Both (A) and (R) are correct and (R) is the correct explanation of (A).
(B) Both (A) and (R) are correct, but (R) is not the correct explanation of (A).
(C) (A) is correct, but (R) is false.
(D) (A) is false but (R) is correct.
Answer: B
Explanation: -
The Indus, the Sutlej, the Ganga, the Ghaghra, the Kosi, the Brahmaputra etc., are antecedent to all of the three ranges of the Himalayas as they cut across the Greater, the Lesser and the Outer Himalayan ranges. All of these rivers have formed deep and narrow gorges while cutting across the Himalayan ranges.

4. Match the following **List – I** with **List – II** and select the correct answer from the codes given:

List – I (Rivers)	**List – II (Origin)**
a. Chenab	i. Great Himalaya
b. Beas	ii. Kullu Hills
c. Ganga	iii. Gangotri
d. Brahmaputra	iv. Kailas Range

Codes:

	(a)	**(b)**	**(c)**	**(d)**
(A)	i	ii	iii	iv
(B)	i	iii	ii	iv
(C)	ii	iii	i	ii
(D)	iv	iii	i	ii

Answer: A

5. Match the following **List – I** with **List – II** and select the correct answer from the codes given:

List – I (Plateau)	**List – II (States)**
a. Bhander	i. Chhatisgarh
b. Ranchi	ii. Madhya Pradesh
c. Bastar	iii. Jharkhand
d. Shillong	iv. Meghalaya

Codes:

	(a)	**(b)**	**(c)**	**(d)**
(A)	i	ii	iii	iv
(B)	i	iii	iv	ii
(C)	ii	iii	i	iv
(D)	ii	i	iii	iv

Answer: C

Explanation: -

The Chhota Nagpur Plateau is a plateau in eastern India, which covers much of Jharkhand state as well as adjacent parts of Odisha, West Bengal and Chhattisgarh. The Indo-Gangetic plain lies to the north and east of the plateau, and the basin of the Mahanadi River lies to the south.

Model Questions

1. Which of the following plate was a part of Laurasia?
   (a) Anatolian plate
   (b) Chinese plate
   (c) Iranian plate
   (d) Agean plate

Answer: A

2. Which of the following is primitive form of pan thalassa, according to the continental Drift theory of Alfred Wegener?
   (a) Atlantic
   (b) Southern Ocean
   (c) Indian ocean
   (d) Pacific Ocean

Answer: D

3. The intervening space between two broken landmasses is known as
   (a) Tethys
   (b) Madagascar
   (c) Angara
   (d) Lauratia

Answer: A

4. According to the continental Drift theory of Alfred Wegener, the S shape of Atlantic Ocean is due to
   (a) Formation of Rockies and Andes on West coast of American continent
   (b) The differential movement of North and South American continent
   (c) Closing down of Tethys sea
   (d) None of the above

Answer: B

5. Which of the following can be certainly said about the continental Drift theory of Wegener?
   (a) Mountains were formed due to continental blocks fracturing apart.
   (b) Wegener successfully described the situation in pre-carboniferous period.
   (c) Jigsaw fit of continents is an evidence of his postulations
   (d) Wegener described the correct sequence of displacement of continents

Answer: C

Last Minute Suggestion

1. **Homer**:- In the Greeks he also recognized four major winds of different properties and direction . These winds were called –Bores (north wind), Eures (east wind), Notus(south wind), Zephyrus (west wind). His works were published Illiod and Odyssey(1280-1180BC).

2. **Anaximander**:- He introduced into the Greek word of a Babilonian instrument known as 'Gnomon'. This instrument was used for measuring the varying position of the sun. He first prepare world map in scale(2700BC).

3. **Herodotus(485-425BC):-** Herodotus is widely known as the father of history "All history must be treated geographically and all geography must be treated historically". He was the first to have noted about the large river of Nile – "Egypt is the gift of Nile".

4. **Eratosthenes (276-194 BC):-** He first used the word 'Geography'. He was famous for the correct **measurement** of the length of equator . He also calculated the latitude and longitude of many places, on map using a grid system.

5. **Hipparchus(150BC):-** He was the first to divide the great circle into 360° .He discovered the precession of the equinox. For determination of latitude and longitude, he invented instrument called 'Astrolabe' orthographic and stereographic projection designed by Hipparchus. He was the 'founder of Trigonometry'.

6. **Strabo(64BC-AD20): -** The geographical book 'Geographica'(17th volume) and 'Periplus of the erithrian sea' to his most important work .He was the first declare geography as a chorological science. He is also considered as the Father of Regional Geography.Strabo considered earth as an 'Oblong'.

7. **Ptolemy(AD90-168):-** HE was a great astronomer . His best-known works are- "the Almagast', (Syntaxis), 'The guide to geography', 'the outline of geography'.

   *The basic objective of Ptolemy books was to reform the map of the world.

   *Ptolemy first plot Bay of Bengal and he believed "star was fixed point in a rotating sphere".

8. **Book and author**:

Books	Author
Human geography	Vidal de la Blache
American History conditions	E.C.Semple
Civilization and climate	E. Huntington
Geography: A modern synthesis	Peter Hagget
Explanation in Geography	David Hervey
A geographic introduction to history	Griffith Taylor
The outline of geography	Ptolemy

9. **Varenius(1622-1650):-** He published book 'Geographia generalis'(1650). He was the first geographer to suggest the essential difference between physical and human geography. He believe Heliocentric universe.

10. **Immanul Kant(1724-1804):-** He was not only a great philosopher he was an geologist ,astronomies and theologist . He used the term 'chorographic' meaning descriptive to describe geography. His book 'Critique of pure reason' and his famous work 'Ankundinggung'(1757).

11. **Humboldt (1790-1859) and carl ritter (1779-1859):-** Humboldt and ritter both are a modern and classical german geographer. Humboldt also believe inductive views and his book 'cosmos' published (1845).

* Karl ritter also believe Teleological views, ritter's monumental work is entitled as 'Erdkunde'(1817 to 1859).

*Both two geographer death in 1859 and in this year 'origion of specis' published by Darwin.

12. **Ratzel** :- was an determinist ,and influenced by Darwins theory. His book Political geography compared 'State' to an 'Organism'('Lebensraum' means living space). He also coined the term 'anthropogeography'. His books are * 'travels of a naturalist', 'Social Darwinism', 'Volkerkune'.

His important words "I travelled, I sketched, I described".

13. **Alfred Hetner (1859-1941):-** His books are *'Travels in the Columbian andis'(1888), *European Russia'(1907), *'Surface features of the land ', *'The climates of the earth' *'Landschafts kunde'(landscape science).

14. **Determinism**(Nature is an active agent):- First deterministic geographer was Hipocratus. Suporters – Aristotle, Strabo, Al Masudi, Al Biruni, Ibn Khaldun, Ritter, Fridrich Loplay , Homboldt, E. Demolan, Ellen C. Sample, Hungtinton, Albert P. Bringhum,J. Makinder.
*Stop and go determinism – Grifith Taylor
* Neo determinism- anuchin ,Taylor
*climatic Determinism- E. Huntinton
*social/cultural determinism- Preston James, E.Ulman

15. **(Ellen Churchill sample (1863-1932):-** She was an environmental determinist. Her books are- 'Influence of geographic environment'(1911), 'American history conditions'(1903), 'The geography of Mediterranean region'(1931), .
*she said – 1) "Man is a product of the earth's surface ". 2) "The earth is an inseparable whole".

16. **Arab geographers**: - *Ibn Haqul(943-973AD)- 'A book of routs and realms'
*Al masudi (985AD)-16 climatic regions. 'Conception of the sphericity of the earth'.
* Al Idrishe(1099-1180AD)- "Amusement for him who desire to travel around the world'.
*Ibn Batuta(1304-1368AD)-'Rihlah'
* Ibn khaldun(1342-1405AD)-Founder and father of modern historiography. His books 'Muquaddimah'.
*Al Balakhi(921AD)-'Kitab ul ashkal'
*Al biruni (1030AD)- 'Kitab ul hind'
*Ibn sina, *Al maqdisi- 14climatic regions.

17. **Time geography**: - The founder of time geography was T. Haggerstrand(1970). He said, "Time has to be taken into account along with space".
*supporters – Allan Pred (1936-2007).
His concept 'place, practice and structure'(1986).

18. **Greek Geographers chronology**:

Homer>Thales>Anaximander>Hecateous >Herodotus>Plato>Aristotle>Alexander>

Hipocratus>Pythius>Polibious>Hiperchus>Posidnious.

Roman geographers: - Strabo>Ptolemy

19. **Following techniques of agricultural productivity** are –

- To asses agricultural production as grain equivalents (Buck,1967)
- Input-Output ratio (Khusro,1964)
- Ranking co-efficient method (Kendall,1939; Stamp,1960; Shafi,1990)
- Carrying capacity of land in term of population (Stamp,1958)
- Determining an index of productivity (Enyendi,1964; Shafi,1972)
- Computing the crop yield and concentration indices ranking co-efficient (J. Singh,1976)
- Giving weight to the ranking order of the output per unit area with the % share under each crop (Sapre and Deshpande,1964; Bhsatia,1967)

20. **World agricultural regions:-** classification of world agriculture was that proposed by D. Whittlessy in 1936.

1) Nomadic herding(Mongolia) , 2) Livestock ranching , 3) Shifting cultivation, 4) Rudimental sedentary tillage , 5) Intensive Subsistence tillage, rice dominant, 6) Intensive subsistence tillage , without paddy rice , 7) Commercial plantation crop tillage (Sri Lanka), 8) Mediterranean agriculture , 9) Commercial grain farming (Argentina), 10) Commercial livestock and crop farming, 11) Subsistence crop and livestock farming, 12) Commercial dairy farming(New Zealand), 13) Specialized horticulture.

Abbreviation:

1. **Text: Unit wise separate pdf**
2. **PYQs: Previous Years Questions**
3. **MQs: Model Questions**
4. **LMS: Last Minute Suggestion**
5. **OMT: Online MOCK Test**
6. **DU: Daily Updates**