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UPDATED

ANSWER WRITING WORKBOOK

Geography

GS PAPER 1

Complete Geography Revision
through **200+ Question**

- Preparation Approach
- 22 Practice Sets & Model Hints
- Micro Detailling of UPSC Syllabus
- Previous Year Questions & Solutions

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PREFACE

While current affairs changes every year there are some parts in syllabus which do not change and a candidate requires conceptual understanding and a good grip over these topics. The purpose of this workbook is to serve as one stop destination for students. It will help in building a base of knowledge and conceptual clarity

GS answer writing workbook aims to function as a standalone product that will promote self-learning habits in students and help in maximum syllabus coverage of the static portion.

• Features of Workbook

The workbook has following features that aim to resolve various issues faced by students in an efficient and holistic manner.

Feature	Issue resolved
Static Topics from syllabus	Conceptual clarity
Topic wise sets	Syllabus coverage
Question & Answer format	Answer writing practice & Time management
Approach before each answer	Structuring of answers
Previous Year questions	Analysis
Blank Page at the end of each set	Self-note making

• How to optimally make use of workbook

In order to gain maximum out of it, a student must first attempt each of the set by himself and then compare his answers with model hint given. This exercise will help them to gain confidence in answer writing, in enrichment of their answers and in better management of time.

The approach given at the beginning of each answer is also aimed to give him an idea about how to approach an answer. Before going into the answer, he must first build his own answer around the approach and then compare with the given answer.

Any extra point to be remembered, revised or any other extra additions can be made at the Blank Page given at the end of each set.

• About GS score Geography workbook

It consists of total 22 sets that are broadly divided as per UPSC syllabus. It is intended to guide you and serve as a reliable source of information, ideas, concepts and facts. This will help you to approach the subject with much more clarity and confidence. It is essential that you must aim to utilize the workbook optimally as per steps given above, to gain maximum out of it

APPROACH TO PREPARE GEOGRAPHY FOR UPSC

Geography is often considered a tough subject under UPSC civil services examination. Its vastness sometimes poses a challenge for students but number of questions asked every year both in prelims and mains makes it inevitable.

It is essential that a student must make a comprehensive strategy that focuses on concept clarity as well as on answer writing practice. Geography involves understanding of multiple phenomena and their applications. Along with this a candidate must keep in mind the kind of questions been asked in UPSC every year.

Preparation of Geography is based on following 3 pillars

- Study of past year papers
- Books and resources
- Strategizing

• Study of past year papers

Past year papers are the guiding light for preparation. They help in giving a direction to the course of your study and also enable you to gain maximum output. Every year 6-7 questions are asked in UPSC mains GS paper 1. Thus in order to get a good score a candidate must analyze the trends in questions and topics that are being asked.

Areas from where questions have been asked include-

- Desertification
- Interlinking of rivers
- Importance of mangroves
- Location of steel industries
- Industrial corridors
- Mantle plume etc.

Thus as we can see above that what is required is point to point coverage of syllabus. Areas that have been asked require a broad overview, thus a candidate must keep in mind the syllabus also at all times.

• Books and Resources

Before going to any advanced books, it is advisable to go through NCERTs that will help in concept clarity and you will be able to gain confidence on almost all areas of UPSC syllabus. It will help you write lucid answers. The following NCERT books must be referred to strengthen the basics:

- NCERT Class 7 – Our Environment
- NCERT Class 8 – Resources & Development.
- NCERT Class 9 – Contemporary India 1
- NCERT Class 10 - Contemporary India II
- NCERT Class 11 - Fundamentals of Physical Geography
- NCERT Class 11 - India – Physical Environment
- NCERT Class 12- Fundamentals of Human Geography
- NCERT Class 12th – India – People & Economy

Advance Books and Resources

- Selected study of Certificate Physical and Human Geography by GC Leong
- Oxford School atlas
- Orient Black swan school atlas
- GS score Geography material

Strategizing

The best strategy is the one that works for you. It is best to devise a plan and stick to it. Thus discipline is the most important part in your strategy. After going through basics, cover the areas that you feel require more clarity from other sources. As soon as you come across any new place look into the map and study it in detail, mountain, seas, plateaus, ocean surrounding it etc. Frequent revisions are the key, if you require best outcomes. Instead of reading multiple sources stick to few. Answer writing practice is the most important part of the strategy. Make sure to give enough mocks and solve previous year papers to gain confidence in answer writing and practice time management.

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SYLLABUS

MICRO DETAILING

SUB TOPIC LISTING
(Geography)

UPSC Syllabus

- Disaster and Disaster Management.
- Salient features of world's physical geography
- Geophysical phenomena such as earthquakes, Tsunami, Volcanic activity, cyclone etc.
- Geographical features and their location-changes in critical geographical features (including water-bodies and ice-caps) and in flora and fauna and the effects of such changes.

Physical geography: India and the World

1. Geomorphology

- Earth's Interior
- Sources of Information about the Interior (Direct Sources, Indirect Sources - Earth Quake Wave, Volcanoes)
- Structure of the Earth's Interior
- Mechanical and Chemical categorization of internal structure
- Geology and Rock System
  - Minerals
  - Major Elements of the Earth's Crust
    - Physical Characteristics
    - Classification -
  - Rocks (Aggregate of Minerals)
    - Classification
    - Igneous
    - Sedimentary
    - Metamorphic
  - Rocks & landforms
    - Rocks & Soils
- Geomorphic Processes
  - Endogenic Forces
    - Diastrophism
    - Orogenic
    - Epierogenic
    - Earthquakes
    - Plate movements
    - Volcanism
  - Exogenic Forces
    - Denudation Processes
    - Weathering & its Significance
    - Mass movements& their impact
    - Erosion Transportation & Deposition
- Distribution of Continents & Oceans
  - Theories
    - Continental Drift Theory
    - Convectional Current Theory
    - Mapping of the Ocean Floor
    - Sea Floor Spreading
    - Plate Tectonics
  - Isostasy
- Landforms and their evolution
  - Causesof landform development
    - Geomorphic Processes
    - Geomorphic Agents
  - Geomorphic Agents and Landforms
    - Running Water
    - Development of a river System
    - Erosional Landforms

        - Depositional Landforms
    - Ground Water (Karst Topography)
        - Erosional Landforms
        - Depositional landforms
    - Glaciers
        - Erosional Landforms
        - Depositional Landforms
    - Waves and Currents
    - Winds
        - Erosional Landforms
        - Depositional Landforms
- Landforms across the world
    - Rivers and lakes
    - Mountain and Peaks
    - Plateaus

2. Oceanography

- Hydrosphere
    - Water on the Surface of the Earth
    - Hydrological Cycle
- Submarine Relief Features
    - Relief of the Ocean floor
    - Divisions of the ocean floor
    - Minor relief features
- Temperature and Salinity
    - Temperature of the Ocean Water
        - Factors affecting Temperature distribution
        - Horizontal and Vertical Distribution
    - Salinity of the Ocean Water
        - Factors affecting salinity
        - Horizontals distribution of salinity
        - Vertical Distribution of salinity
    - Density of Ocean Waters
- Movements of Ocean Water
    - Factors influencing Movement
    - Waves
        - Motion of waves
        - Characteristics of wave
    - Tides
        - Types of Tides
        - Importance of Tides
        - Ocean Currents
    - Characteristics of Ocean Currents
    - Types of ocean currents:
    - Major Ocean currents of the World
    - Effects of Ocean Currents
- Marine Resources
    - Surface water resources
    - Ground water resources
    - Inland water resources
    - Oceanic Water Resources (Marine Resource)
    - Utilization of oceans by man
    - Water consumption patterns
    - Water Conservation and Management (Techniques)
- Ocean Deposits and Corals
    - Terrigenous Deposits
    - Volcanic Deposits
    - Biotic deposits
    - Abiotic Deposits
    - Coral Reefs
        - Probable origin of Coral Reef
        - Types and significance of Coral Reef
        - Issue of Coral Bleaching

3. Climatology

- Atmosphere
    - Composition of the Atmosphere
    - Structure of the Atmosphere
- Solar Radiation, Heat Balance and Temperature
    - Solar Radiation and Isolation
    - Heating and cooling of atmosphere
    - Terrestrial Radiation
    - Heat Budget of the Planet Earth

- Temperature
- Factors Controlling Temperature Distribution
- Distribution of Temperature

- Atmospheric Circulation and Weather Systems
  - Atmospheric Pressure
  - Vertical variation of pressure
  - Horizontal distribution of pressure
  - World Distribution of Sea Level Pressure
  - Factors affecting the velocity and direction of the Wind
  - General Circulation of the Atmosphere – Pattern of Planetary Winds
  - Latitudinal Variation of Atmospheric Heating
  - Emergence of Pressure Belts
  - Hadley Cell , Ferrel Cell, Polar Cell
  - Seasonal Wind
  - Local Wind
  - Land and Sea Breezes
  - Mountain and Valley Winds
  - Air Mass, Fronts, Cyclones and Jet Stream
    - Air mass & fronts
    - Cyclones
    - Thunderstorms
    - Tornadoes
- Water in the Atmosphere
  - Water Vapour
  - Humidity – Absolute and Relative
  - Saturation – Dew Point
  - Evaporation and Condensation
    - Dew
    - Frost
    - Fog & Mist
    - Clouds
  - Precipitation
    - Rainfall
    - Snowfall
    - Sleet Hail
    - Hailstones
    - Types of Rainfall
    - World Distribution of Rainfall
- Climatic Zones of the World
  - World Climate
    - The Hot, Wet Equatorial Climate
    - The Tropical Monsoon and Tropical Marine Climates
    - The Savanna or Sudan Climate
    - The Hot Desert and Mid-Latitude Desert Climates
    - The Warm Temperate Western
    - Margin (Mediterranean) Climate
    - The Temperate Continental (Steppe) Climate
    - The Warm Temperate Eastern Margin (China Type) Climate
    - The Cool Temperate Western Margin (British Type) Climate
    - The Cool Temperate Continental (Siberian) Climate
    - The Cool Temperate Eastern Margin (Lauren-tian) Climate
    - The Arctic or Polar Climate
  - Koeppen's Scheme of Classification of Climate
  - Climatic Zones of World

4. Bio-Geography

- Soil& Its Characteristics
  - Soil Characteristics
  - Factors Responsible for Soil Formation
  - Process of Soil Formation
  - Soil Profiles and Horizons
  - Classification of Soil
  - Soil Degradation, Erosion and Conservation

- Vegetation resources
  - Types of natural vegetation
  - Forests
    - Significance of forests
    - Factors of forest development
    - Classification of forests
    - forest cover
  - Grasslands
  - Desert vegetation
  - Tundra Vegetation
  - Deforestation
  - Conservation of forests
  - Reforestation
  - Afforestation
  - Forestry
    - Social forestry
    - Agro-forestry
    - Farm Forestry
    - Community Forestry

5. Important Geophysical Phenomenon

- Occurrence of Earthquakes
- Earthquake Waves
- Shadow Zone
- Types of Earthquake
- Measuring Earthquake
- Effects of Earthquake
- What Causes Tsunami
- Effect of Tsunami
- Mitigating the Impact of Tsunami
- Volcanoes
- Types of Volcanoes
- What Causes Volcanoes?
- Volcanic Landforms
- Cyclone
- Tropical Cyclones
- Anti-Cyclone
- Extra Tropical Cyclones

6. Critical geographical features & effect of Climate change

- Factors Causing Changes in Critical Geographical Features
- Changing Geographical Features
- Impact of Changing Geographical Features

7. Physical Geography of India

- Physiography of India
  - Location
  - Geopolitical Significance of India
  - Geological Divisions
    - The Peninsular Block
    - The Himalayas and other Peninsular Mountains
    - Indo-Ganga-Brahmaputra Plain
  - Physiographic Divisions
- Drainage System
  - Drainage Patterns
  - Drainage System of India
  - Himalayan Drainage System
    - River Systems of Himalayan Drainage
    - Indus river system
    - Ganga River System
    - Brahmaputra river system
  - Peninsular Drainage System
    - River Systems of Peninsular Drainage
    - Small Rivers Flowing Towards East and West
- Climate
  - Factors influencing the climate of India
  - Monsoon
  - Mechanism of the Monsoon
    - Classical Theory
    - Modern theory
    - Air mass theory
    - Jet stream theory

- ELNINO and LANINA & their impact
- The rhythm of Seasons
  - The cold weather season
  - The hot weather season
  - The southwest monsoon season
  - The retreating monsoon season
- Climatic Regions of India

- Soils in India
  - Classification of Soils
  - Soil textures
  - Issue of Soil degradation & Soil Erosion
  - Soil Conservation
- Natural Vegetation
  - Types of Forests in India
  - Forest Cover in India
  - Forest Conservation
  - Forest Problems in India
  - Factors of forest development
  - Causes and factors of deforestation:
  - Immediate causes of deforestation
    - Indirect deforestation
    - Conservation of forests
    - Forest conservation strategies
  - Reforestation
  - Monoculture plantation

Economic Geography

1. Natural resources

- Land Utilisation
- Land Use Pattern
- Land Degradation & Conservation
- Forest Resources
- Mangroves
- Grasslands, Forests
- Himalayan resources
- Causes of Depletion
- Conservation of Forests
- Land-use Pattern and changes
- **Problems of Land Resources:**
  - Land Degradation: Causes and Impact
  - Concept of Land Degradation Neutrality
  - Land Use Planning and Policy

2. Water Resources

- Extent of Water Resources
- Water Resource Potential of India
- Utilization and related problems (Pollution)
- Inter- state water disputes in India
- Water management, conservation and Development
- National Water Policy
- Marine & Freshwater
- Water Scarcity
- Water Conservation
- Integrated Water Resources Management
- Interlinking of Rivers
- River pollution
- Drainage basins

3. Agriculture

- Agriculture Basic Terminologies
  - Cropping pattern
  - Agriculture Productivity
  - Agriculture Intensity
  - Land capability
- Location of agriculture
- World Agriculture Typologies
- Salient features of Indian Agriculture
- Problems of Indian Agriculture
- Factor Affecting Agriculture
  - Geographical factors

- Institutional factors
- Technological factors

- Major Crops and conditions for growth
- Regionalization of Agriculture
- Various Revolutions in Agriculture Sector
- Green Revolution
  - Impact of Green Revolution
  - Evergreen Revolution
- White Revolution
- Operation Flood
- Blue Revolution
- **Food Security**
  - Nature of Food Insecurity: Duration, Severity and types
  - Trend and Pattern in Food Insecurity
  - Causes and Geography of famine
  - Key Dimension of food security
  - Efforts and Remedies to ensure food security

4. Mineral & Energy Resources

- Types of Mineral Resources
- Distribution Pattern of Minerals in World
- Major Mineral Belts of India
- Problems related to mining
- Conservation of Mineral Resources
- National Mineral Policy, 2019
- Classification of Energy Resources
- Distribution and production trend of major energy Resources
  - Coal
  - Petroleum
  - Natural gas
- Strategic Oil Reserves
- Exploration of Coal Bed Methane
- Non-Conventional Energy Resources
  - Solar Energy
  - Wind Energy
  - Geothermal
- Nuclear Energy Resources: Challenges and prospects in India
- Recent Debates on Resources
  - Geopolitics of Natural Resources
  - Globalisation and unsustainable exploitation of natural resources
  - Depletion of natural resources versus Economic Growth
  - Changing Pattern of Land Use and Causes
  - Water Crisis: Causes, Conflicts and Resolution
  - Energy Crisis
  - Challenges and constraints faced by coal sector
  - Challenges in Hydropower sector
  - Renewable Energy: way toward sustainability
  - Energy Security: Energy Policy and strategy in India

5. Location of Industries & Transport

- Classification of Industries
- Factors affecting location of Industries
  - Weber's Model of Industrial Location
  - Losch theory of Profit Maximization
- Various Industries: Location, Prospects and Challenges
  - Iron and Steel Industry
  - Textile Industry
  - Jute Industry
  - Auto Mobile Industry
  - Fertilizer Industry
  - Agro-based Industries
  - Other Industries
- Industrial Regions and its Characteristics
- Major Industrial Regions of the World

- Industrial Regions of India
- Industrial Policies and Development
  - A Scheme for Promotion of Innovation, Rural Industry and Entrepreneurship (ASPIRE)
  - Scheme of Fund for Regeneration of Traditional Industries (SFURTI)
  - Stand Up India
  - Fourth Industrial Revolution
  - Role of Industrial development in minimizing regional inequalities
  - Problems of Industrial regions
  - Factors behind the growth and present location pattern of automobile industry in India
  - Pharmaceutical industry: Locational pattern and reasons
  - Sugar industry: Problems and challenges of current pattern
  - Food Processing Industry: Untapped Potential
  - Agro based Industries: Problems and Prospects
  - Impact of agro-based industries on cropping pattern
  - Tourism: Prospects and Impact on Environment
- Definition, Development and scope of Economic Geography
- Type of Economic Activities
  - Primary Activities
  - Secondary Activities
  - Tertiary, Quaternary and Quinary Activities
- Land Transport
  - Roads
    - Classification of roads
    - National Highway Grid
    - Problems and Prospects
    - BharatmalaPariyojana
  - Railways
    - Significance and Problems of Indian Railways
    - Dedicated Freight Corridors
    - Privatisation of Railways
  - Pipelines
    - Significance, Distribution and Challenges
- WaterTransport
  - Inland: National Waterways
    - Factors affecting Inland waterways
    - Significance and Challenges
    - Jal Marg Vikas Project
  - Seaways and Oceanic Route
    - Shipping
    - Major Ports of World and India
    - Challenges in Port Development
    - Sagarmala Project
- Air Transport
  - National Airways
    - National Civil Aviation Policy
    - Regional Connectivity Scheme (UDAN)
    - International Airways
  - Communications
    - Communication Infrastructure
    - National telecom Policy
  - Major Issues in Transport and Communication
    - Role of Transport in Regional Development
    - Need for holistic transport planning to improve the city's mobility
    - Carbon footprint of the transport sector
    - Road Transport: Investment Challenges
    - Inland Waterways: Development challenges and propects
    - Ports: Inclusive centres of economic development
    - Problem of Pot Development
    - Analysis of Sagarmala Project

- Environmental issues of maritime shipping
- Role of Transport in Regional Development
- Eco Tourism: Way toward Responsible Tourism

Human Geography

1. Population & Migration

- Concept of human resources
- Factors affecting the distribution of Population
- Population growth
  - Theories of Population Growth
    - Malthusian Theory
    - Marxian Theory
    - Demographic transition theory
    - Optimum Population Theory
  - Size, growth rate and distribution of population
  - Components of Population growth
- Demographic Dividend
  - Demographic Window of Opportunity
- Components of Population change
  - Birth Rate
  - Death Rate(Mortality Rate)
  - Migration
    - Factors responsible for migration
    - Type of Migration
    - Issues related to migration
    - Migration pattern in world and India
    - World Migration Report, 2018
- Population Composition
  - Age Sex Pyramids & their significance
  - Trends and Pattern in Sex Ratio
  - Initiatives to improve Sex ratio
  - Trends and Patterns in Literacy
  - Government's Efforts
- Fertility Rate
- Impact of Population Change
- Population Policies
  - Need for revision of National Population Policy
- Population problems
  - Global Nutrition Report, 2018
  - Global Hunger Index
- Rural Settlements
  - Classification of Rural Settlements
  - Function of Rural Settlements
  - Patterns of Rural Settlements
  - Changing Pattern of Rural Settlements
- Urban Settlements
  - Origin of Urban Settlements-Functional Classification of Towns
  - Urbanization
    - Indian Mega Cities
    - Central Place Theory
    - Primate City
    - Morphology of Indian Cities
    - Conurbations
    - Urban Slums
    - Rural Urban Fringe
    - Rural Urban Continuum
  - Issues related to Urbanization in India
    - Habitat – III Conference
- Concept of Region
- Types of Regions
- Issues of Regional Imbalances
- Strategies for Regional Development
- Growth v/s Development
- Approaches to Human Development
- Human Development Index

PRACTICE QUESTIONS

SET: 1 - 22

PHYSICAL GEOGRAPHY OF INDIA AND WORLD

SET-1: QUESTIONS

GEOMORPHOLOGY

Q1. **Describe the sources which provide the information about the Earth's interior. Why seismology is the only method which gives complete authenticated information about the earth's interior.**

Q2. **Evaluate the theory of Continental Drift as given by Wagner. How does the Plate Tectonic Theory seek to remove the shortcomings of the Continental Drift Theory?**

Q3. **Though oceanic floors are considered to be the most fundamental rocks in origin, no one of them are beyond the age of Mesozoic times. Explain it in the light of sea floor spreading theory. How is it different from continental drift theory?**

Q4. **Discuss briefly the theory of Isostasy? What is its role in the geo-morphological context?**

Q5. **The interior of the earth can be understood only by indirect evidences as neither anyone has nor anyone can reach the interior of the earth. Elaborate.**

Q6. **Discuss the economic and strategic significance of Indian islands.**

Q7. **Discuss the various reasons behind the formation of "Fire Girdle of Pacific" and major landforms along it.**

Q8. **Discuss the Orogenesis of Himalayan Mountain ranges on the basis of plate tectonics. Elaborate with geographical evidences supporting collision of different types and nature of tectonic plates during process of orogeny.**

Q9. **Different physiographic divisions of India are complementary to each other and lead to socio-economic development of the nation. Explain.**

Q10. **Discuss the formation of intermontane plateaus and tectonic plateaus citing examples.**

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SET-1: ANSWERS

1. Describe the sources which provide the information about the Earth's interior. Why seismology is the only method which gives complete authenticated information about the earth's interior.

(250 words)

Approach

1. **Briefly describe the sources which provide the information about the Earth's interior** ***(100 words)***
2. **Define the theories of the interior of the Earth.** ***(100 words)***
3. **Conclusion** ***(50 words)***

Hints

Understanding of the earth's interior is essential to understand the nature of changes that take place over and below the earth's surface.

The sources which provide knowledge about the interior of the earth may be classified into 3 groups,

- Artificial Sources
- Theories of the interior of the Earth
- Natural Sources
- Artificial Sources:

Density:

- The average density of the crust is around 2.9 to 3.3 g/cm3
- While the average density of the Earth is 5.5
- Thus, the core of the earth will be, without doubt, more than 5.5.
- Later, the density of the earth core was found out to be 11

Pressure:

- Now the question is what is the reason for very high density of the core?

- Previously it was believed that, as pressure increases, density also increases due to super incumbent force.
- But there is critical limit beyond which pressure increase does not increase density.
- Thus, core must be composed of intrinsically heavy metallic materials of high density (i.e. iron and nickel)

Temperature:

- Temperature of the upper part of the magma slab representing upper portion of oceanic crust has been estimated to be 0°C, while temperature at around 70km was found out to be 1200°C.
- With this rate of increase of temperature, core should be approx. 25000°C. But it would have melted the whole earth.
- Thus, it is evident that most part of the radioactive materials which releases heat in large amount and thus causes rock melting, are concentrated in the crust.
- While rate of increase of temperature downwards decreases with increasing depth.

Theories of the interior of the Earth:

- **Edward Suess theory:** According to him the earth is made up of three zones of different matter below the outer thin sedimentary cover viz. SIAL, SIMA and NIFE.

Natural Sources:

- **Volcanism:** The lava coming from inside the earth shows that the same material has to be there inside the earth.
- However, all these methods were just speculations or partially proved concepts. The real concrete proof about the interior of the earth was provided by the Seismic studies.
- The behaviour of seismic waves in different layers of the earth provides the most authentic evidence about the composition & structure of the earth. The different types of waves generated during the occurrence of earthquake, are generally divided into 3 broad categories; (a) Primary waves, (b) Secondary waves, (c) surface waves.
- **Seismic Waves**- both P-waves & S-waves travel faster through rigid material than through soft or plastic material. The velocities of these waves travelling through specific part of earth give an indication of type of rocks there. Abrupt changes in seismic wave velocities indicate significant changes in earth's interior.
- Seismic waves passing through the earth are refracted in ways that show distinct discontinuities within earth's interior & provide basis for the belief that earth has
- A solid inner core, (2) a liquid outer core, (3) a soft asthenosphere, (4) a rigid lithosphere.

2. Evaluate the theory of Continental Drift as given by Wagner. How does the Plate Tectonic Theory seek to remove the shortcomings of the Continental Drift Theory?

(200 words)

Approach

1. **Give a detailed description of Continental Drift Theory** ***(50 words)***
2. **What provided base for the development of Plate tectonic theory** ***(60 words)***
3. **Differentiate the Plate Tectonic Theory with the Continental Drift Theory** ***(60 words)***
4. **Conclusion** ***(30 words)***

Hints

- Continental drift is the movement of the Earth's continents relative to each other, thus appearing to "drift" across the ocean bed. The speculation that continents might have 'drifted' was first put forward by Abraham Ortelius in 1596. The concept was independently and more fully developed by Alfred Wegener in 1912, but his theory was rejected by some for lack of a mechanism (though this was supplied later by Arthur Holmes) and others because of prior theoretical commitments. The idea of continental drift has been subsumed by the theory of plate tectonics, which explains how the continents move.
- Alfred Wegener a German meteorologist who put forth a comprehensive argument in the form of "the continental drift" in 1912.
- According to Wegener, all the continents formed a single continental mass and Mega Ocean surrounded the same. The super continent was named Pangaea, which meant all earth and Mega Ocean surrounded it named Panthalassa, meaning all water. He argued that, around 200 million years ago, the super continent, Pangaea first broke into two large continental masses as Laurasia and Gondwanaland forming the northern and southern component respectively. Subsequently, Laurasia and Gondwanaland continued to break into various smaller continents that exist today.
- When Wegener proposed continental drift, many geologists were contractionists. They thought Earth's incredible mountains were created because our planet was cooling and shrinking since its formation. But Wegener's continental drift theory was great step ahead of contractionist theory. It provided base for development of Plate tectonic theory.

However, the theory has many flaws:-

- He failed to explain the forces that lead to the drift of huge continental masses. As per the theory force of buoyancy, differential gravitational force along with tidal force of sun and moon are the real cause, which are not sufficient enough to drift huge land masses.
- nitially the theory considers that there is no resistance offered by the denser SIMA layer but later Wegener adopts the force full resistance offered by SIMA to explain the origin of mountains.
- The theory did not talk about the direction of the drift and chronological sequence of this displacement.
- At that time people hardly have any understanding about ocean bed topography.
- Also Wegener provided those evidences which supports theory and neglected those which did not support.
- Wegener did not explain about how Pangaea got formed .He don't talk about pre Pangaea condition of earth.

Plate tectonics is the widely accepted theory that Earth's crust is fractured into rigid, moving plates. In the 1950s and 1960s, scientists discovered the plate edges through magnetic surveys of the ocean floor and through the seismic listening networks built to monitor nuclear testing. Alternating patterns of magnetic anomalies on the ocean floor indicated seafloor spreading, where new plate material is born. Magnetic minerals aligned in ancient rocks on continents also showed that the continents have shifted relative to one another.

Though Wegner was a pioneer in bringing the concept of continental drift to limelight but the limitations in his theory ignited minds to improve the concept and explain the process**. This gives rise to Plate Tectonic Theory.**

- Plate tectonics revolve around the concept of continental drift and sea floor spreading. The theory describes constructive plate margins or divergent plates leading to upwelling of lava from mantle that are responsible for forming new oceanic ridges.
- It explains the destructive plate margins when two plates collide along a margin, leading to one plate overriding the other. The overridden plate is sub ducted into the mantle thereby losing a part of the crust.
- Strahler & Stahler who are behind this new theory considered the constant thermal convection currents from the inner part of earth as the forces responsible for this movement along with geo magnetic field of the earth.
- To overcome the limitations of continental drift and to explain the cause of the drift incorporating seafloor spreading moulded into plate tectonic theory in 1968. According to which, it was assumed that the Earth was divided into lithosphere and asthenosphere at about 7000km. As asthenosphere is said to be made of viscous flowing material which can bear non hydrostatic force only for 1000-10000years or longer and convection currents can occur here. While lithosphere comprising of Earth's crust and upper mantle having variable thickness of 200km, can bear non hydrostatic force for a 100 million years or so. The lithosphere is further divided into a number of large and small plates, which are in constant relative motion due to convection currents in the asthenosphere. It is this movement of tectonic plates which leads to the continental drift. This caused Pangaea to break up which is still continuing, that proves the Wegener's hypothesis. Due to this tectonic framework, the continents have been coming together and then fragmenting and drifting apart for billions of years.
- The plate tectonic was based on the evidence of seafloor spreading and palaeomagnetism. Both concepts were backed by strong scientific evidence. The theory assumed that continents are part of "plates", mass of lithosphere, which floats over asthenosphere, evidence for the same has been found. The theory suggests plate movement based thermal convective current movement in mantle.
- Plate tectonic based on strong scientific evidence conclusively explained the breaking up Pangaea and drifting of continent as on present day. It also explains the expansion of oceans floor and orogeny. Thus the theory explains all events along with strong scientific evidence. And hence PT is a large improvement over CDT.

3. Though oceanic floors are considered to be the most fundamental rocks in origin, no one of them are beyond the age of Mesozoic times. Explain it in the light of sea floor spreading theory. How is it different from continental drift theory?

(250 words)

Approach

1. **Discuss the theory of sea floor spreading.** ***(50 words)***
2. **"Though oceanic floors are considered to be the most fundamental rocks in origin, no one of them are beyond the age of Mesozoic times" Give reasons behind this anomaly** ***(100 words)***
3. **Discuss the difference between sea floor spreading and continental drift theory are as follows** ***(100 words)***

Hints

Seafloor spreading is a geologic process in which tectonic plates—large slabs of Earth's lithosphere—split apart from each other.

The theory of sea floor spreading was propounded by Harry Hess. During Glomar expedition of the Atlantic Ocean he observed that oceanic rocks are the first to form over the earth surface but still no one of them are beyond Mesozoic times. There were several reasons behind this anomaly as follows

- There is a continuous release of magma along the mid oceanic ridge due to divergence and thus the oceanic floor is continuously getting formed.
- Also, there if there would have been only divergent boundaries then earth size by now would have increased enormously which is not true.
- Thus, he said that there must be some convergent boundary which exists between continental margins which sub ducts the oceanic slab and recycle them.
- It may be concluded that due to subduction of the plates along the plate boundaries, the old plates are continuously consumed.

The difference between sea floor spreading and continental drift theory are as follows:

- CDT explains movement of continental plates only while SFS theory explains movement of oceanic plates only.
- Forces responsible for the movement of the continents according to CDT are buoyancy force, gravity, tidal currents while according to SFS the oceanic plates move due to convection currents.
- CDT theory is too general with vague conclusions while SFS theory is partial in its explanation.

4. Discuss briefly the theory of Isostasy? What is its role in the geo-morphological context?

(200 words)

Approach

1. **Discuss briefly the theory of Isostacy** ***(100 words)***
2. **Discuss is its role in the geo-morphological context** ***(100 words)***

Hints

Isostasy is the state of gravitational equilibrium between Earth's crust and mantle such that the crust "floats" at an elevation that depends on its thickness and density. The term 'isostasy' was coined in the year 1889 by the American geologist Clarence Dutton.

This concept is invoked to explain how different topographic heights can exist at Earth's surface. When a certain area of Earth's crust reaches the state of isostasy, it is said to be in isostatic equilibrium. Isostasy does not upset equilibrium but instead restores it (a negative feedback). It is generally accepted that Earth is a dynamic system that responds to loads in many different ways. However, isostasy provides an important 'view' of the processes that are happening in areas that are experiencing vertical movement.

For instance, certain areas (such as the Himalayas which are in its young stage) are not in isostatic equilibrium, which has forced researchers to identify other reasons to explain their topographic heights.

Isostasy controls the regional elevations of continents and sea floors in accordance with the densities of their underlying rocks. This means that an excess of mass seen as material above sea level, as in a mountain system, is due to a deficit of mass, or low-density roots, below sea level. Consequently, high mountains have low-density roots that extend deep into the underlying mantle.

The concept of isostasy played an important role in the development of the hypothesis of plate tectonics.

In the simplest example, isostasy is the principle of buoyancy wherein an object immersed in a fluid is buoyed with a force equal to the weight of the displaced fluid. On a geological scale, isostasy can be observed where Earth's strong crust or lithosphere exerts stress on the weaker mantle or asthenosphere, which, over geological time, flows laterally such that the load is accommodated by height adjustments.

Isostatic effects of deposition and erosion:

- When large amounts of sediment are deposited on a particular region, the immense weight of the new sediment may cause the crust below to sink. A likely, when large amounts of material are eroded away from a region, the land may rise to compensate.
- An analogy may be made with an iceberg - it always floats with a certain proportion of its mass below the surface of the water. If more ice is added to the top of the iceberg, the iceberg will sink lower in the water.
- If a layer of ice is somehow sliced off the top of the iceberg, the remaining iceberg will rise. A likely, the Earth's lithosphere "floats" in the asthenosphere.

Isostatic effects of plate tectonics:

- When continents collide, the continental crust may thicken at their edges in the collision. If this happens, much of the thickened crust may move downwards rather than up as with the iceberg analogy. The idea of continental collisions building mountains "up" is consequently rather a simplification. Instead, the crust thickens and the upper part of the thickened crust may become a mountain range. However, some continental collisions are far more complex than this, and the region may not be in isostatic equilibrium, so this subject has to be treated with caution.

Post-glacial rebound effect:

- Post-glacial rebound (sometimes called continental rebound, glacial isostasy, and glacial isostatic adjustment) is the rise of land masses that were depressed by the huge weight of ice sheets during the last glacial phase, through a process known as isostasy. It affects northern Europe (especially Scotland, Estonia, and northern Denmark), Siberia, Canada, the Great Lakes of Canada and the United States, the coastal region of the US state of Maine, parts of Patagonia, and Antarctica.
- Post-glacial rebound produces measurable effects on vertical crustal motion, global sea levels, horizontal crustal motion, gravity field, Earth's rotational motion and a state of stress and earthquakes.

5. The interior of the earth can be understood only by indirect evidences as neither anyone has nor anyone can reach the interior of the earth. Elaborate.

(150 words)

Approach

1. **Explain why approaching earth's interior is not possible yet** ***(30 words)***
2. **Elaborate on direct and indirect sources** ***(100 words)***
3. **Conclusion** ***(20 words)***

Hints

The radius of the earth is 6,370 km, which makes it impossible to reach the center of the earth. Its changing interior composition and rapid increase in temperature towards its core, further limit direct observation of the earth's interior. Thus, most of the knowledge about the interior of the earth is largely based on estimates and inferences.

Three centuries ago, Newton calculated average density of earth surface. Our knowledge of what's inside the Earth has improved immensely since Newton's time. Our current information comes from many direct and indirect sources.

Direct sources:

- **Solid earth material:**
  - Obtained through mining and volcanic eruptions.
  - Besides above, scientists have taken up a number of projects to penetrate deeper depths to explore the conditions in the crustal portions. Examples- Deep Ocean Drilling Project and Integrated Ocean Drilling Project.

Indirect Sources:

- **Laboratory analysis:** Laboratory experiments on surface minerals and rocks at high pressure and temperature provide many insights into earth's interior.

- Data on the Earth's interior also come from geological observation of surface rocks and studies of the Earth's motions in the Solar System, and the flow of heat from inside the Earth.
- Through mining activities, it is known that temperature and pressure increase from the surface towards the interior of the earth.

- **Meteors:** The material and structure observed in the meteors are similar to that of the earth. They are solid bodies developed out of materials similar to our planet. Hence, when some of meteors reach earth, they become yet another source of information about the interior of the earth.
- **Gravitation force:** It is not the same at different latitudes on the surface. It is greater near the poles and less at the equator. Gravity anomalies give us information about the distribution of mass of the material in the crust of the earth.
- **Magnetic surveys:** They provide information about the distribution of magnetic materials in the crustal portion, and thus, provide information about the distribution of materials in this part.
- **Seismic activity:** It is one of the most important sources of information about the interior of the earth. For it, paths and characteristics of earthquake waves travelling through the Earth are studied.

6. Discuss the economic and strategic significance of Indian islands.

(200 words)

Approach

1. **Briefly introduce Indian islands** ***(40 words)***
2. **Discuss the economic significance of these islands** ***(60 words)***
3. **Discuss the strategic significance of these islands** ***(60 words)***
4. **Conclusion** ***(40 words)***

Hints

There are two small groups of islands. One of these situated in the Bay of Bengal, off the coast of Myanmar is known as the Andaman and Nicobar Islands. The other is known as Lakshadweep and situated in Arabian Sea, off the coast of Kerala.

- **The economic significance of these islands is:**
  - The Exclusive Economic Zone (EEZ) around the islands encompasses around 0.6 million sq. km which is 30 percent of the EEZ of India. This provides a great opportunity for fisheries are exploitation of other marine resources.
  - Aquaculture is promoted in case of mud crab and lobster fattening, freshwater shrimp farming, and freshwater fish farming.
  - Tourism is one of the major developmental activities in these islands. The Andaman tropical evergreen rainforests, the beautiful silver sandy beaches, the serpentine mangrove-lines creeks, marine life abounding in rare species of plants, animals, corals, etc., provide a memorable experience to the tourists.

- Fishing and pisiculture is a big earning method for the Indian Territory of Andaman and Nicobar Islands and Lakshadweep.

- **The strategic significance of these islands is:**
  - The Andaman and Nicobar Islands straddle the busiest trade routes in the world and the onus of keeping them safe and sanitised, is one of the chief responsibilities of the Indian Navy.
  - Their southernmost point is just 150 km from Indonesia's Sumatra and their northernmost fewer than 50 km from the Coco islands controlled by Burma. In effect, they give India a foothold in south-east Asia.
  - The location suits India's grand ambition of becoming a regional naval power capable of extended operations beyond the range of shore-based support.
  - The Andaman's' natural harbours and coral reefs offer perfect locations for ships and submarines.
  - Further in case of Lakshadweep, proximity to the Indian western coast as well as to other island nations such as Sri Lanka and Maldives, nearness to busy shipping lanes, wide geographical spread, and a predominantly Muslim population all make the archipelago attractive to non-state actors. The fact that these islands could be used as safe havens or platforms for launching attacks by non-state actors cannot be denied. Hence security of islands is very important.

7. Discuss the various reasons behind the formation of "Fire Girdle of Pacific" and major landforms along it.

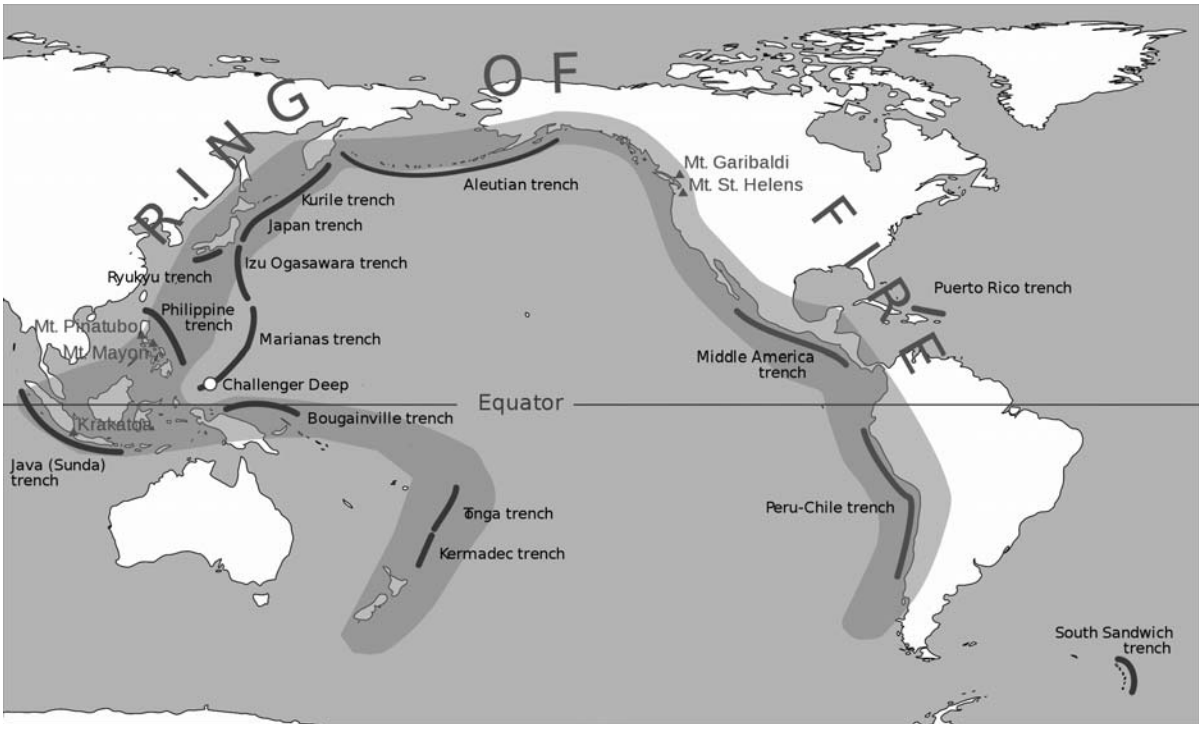
(250 words)

Approach

1. **Briefly discuss about 'Ring of Fire' and its location, size and extent.** ***(50 words)***
2. **Discuss the formation of pacific ring of fire according to plate tectonics and landforms associated with it.** ***(150 words)***
3. **Conclude with signifying importance of the region from geography point of view.** ***(50 words)***

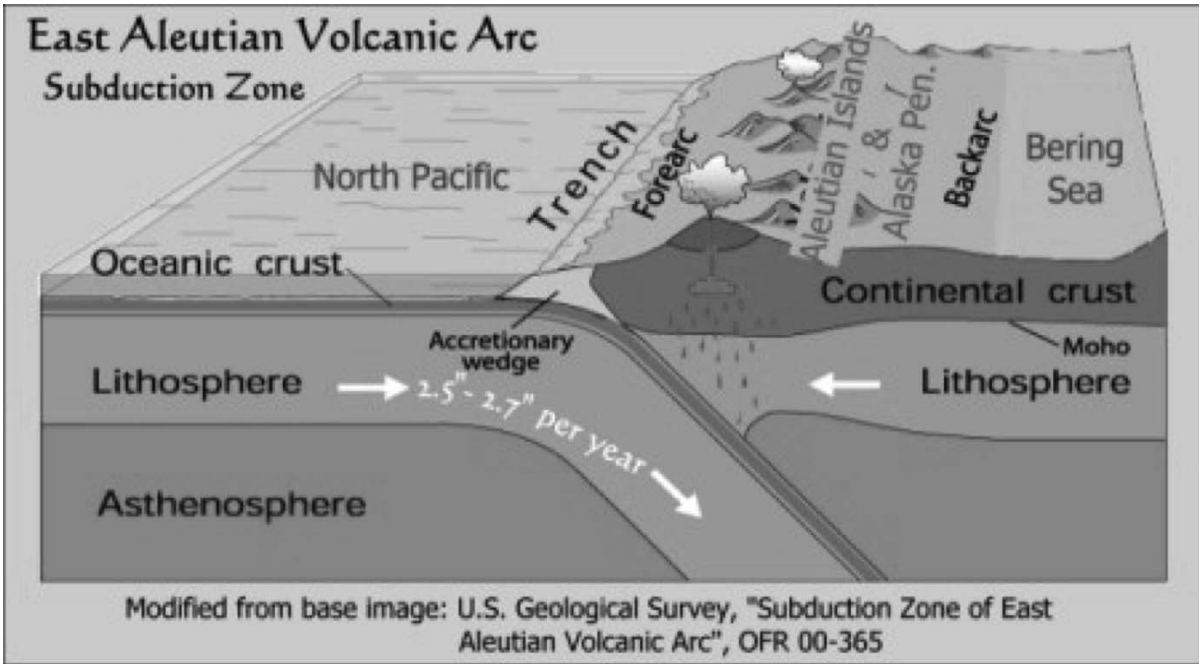
Hints

The Ring of Fire is a Pacific region home to over 452 volcanoes, including three of the world's four most active volcanoes i.e. Mount St. Helens in the USA, Mount Fuji in Japan and Mount Pinatubo in the Philippines. It has an extension of 40,000 km and appears as horse-shoe shaped rather than a ring. It is also sometimes called the circum-Pacific belt. Pacific ring of fire or the " Fire Girdle of Pacific" is an example of subduction zone volcanism which occurs where two plates are converging on one another. One plate containing oceanic lithosphere descends beneath the adjacent plate, thus consuming the oceanic lithosphere into the earth's mantle.



Formation of pacific ring of fire according to plate tectonics

- The Ring of Fire is a ring of volcanoes around the Pacific Ocean that has been formed as a result of subduction of oceanic tectonic plates beneath lighter continental plates at subduction zone.

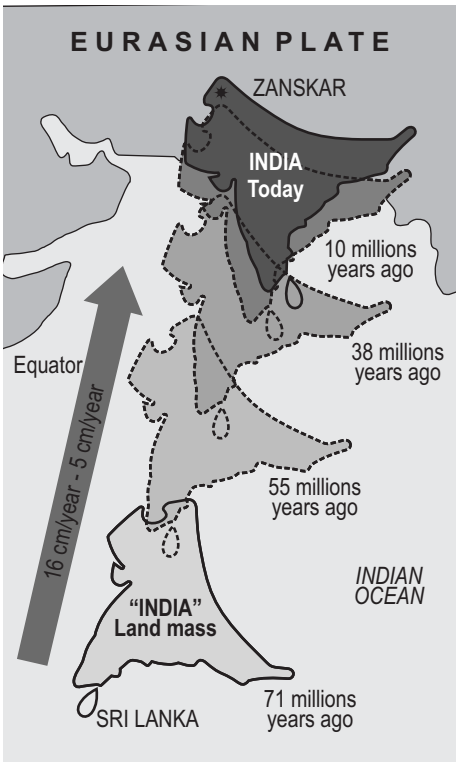


- The Ring of Fire is a direct result of plate tectonics: the movement and collisions of lithosphere plates, especially subduction in the northern portion.

- Pacific plate is moving at the rate of 6cm/year against other plates specially three major plates such as North American, Indo-Australian plate and Eurassian plate and other minor plates such as the Juan de Fuca, Cocos, Nazca, and Philippine Plates.
- Subduction zones of these plates (shown in fig) causes volcanism when oceanic crust of heavier plate goes inside the continental crust of others. These plates are destroyed under massive heat and pressure and remerge in form of volcanoes and causing earthquake.
- Series of volcanoes in form of horse-shoe shape is referred as Pacific ring of fire.

Landforms associated with Pacific ring of fire

- Due to convergence of oceanic-oceanic crusts, Island arcs and festoons are also formed along the ring of fire apart from young fold mountains such as the Andes and Rockies which are formed due to seduction of oceanic crust of a plate under continental crust of another plate. Examples of festoons are, the Aleutian Islands of Alaska, Kurlie Island and Japanese Archipelago.
- Faults such as the San Andreas Fault are also found among other features. It stretches along the central west coast of North America and is one of the most active faults on the Ring of Fire. It lies on the transform boundary between the North American Plate, which is moving south, and the Pacific Plate, which is moving north.
- The Ring of Fire is also home to hot spots, areas deep within the Earth's mantle from which heat rises. This heat facilitates the melting of rock in the brittle, upper portion of the mantle.



Conclusion:

About 90% of the world's earthquake and 82% of the world's massive earthquakes apart from major dormant and active volcanoes are concentrated in this region. World's highest active volcanic Ojos Del Salado which is located in Chile is also found in this region. Apart from it, major volcanic landforms including festoons, island arcs, Fold Mountains and faults are found in this region. The Pacific Plate, which drives much of the tectonic activity in the Ring of Fire, is cooling off which may lead to stability of the region. Due to location and extent, this region is important for research and study.

8. Discuss the Orogenesis of Himalayan Mountain ranges on the basis of plate tectonics. Elaborate with geographical evidences supporting collision of different types and nature of tectonic plates during process of orogeny.

(250 words)

Approach

1. Briefly introduce with plate tectonics theory ***(50 words)***

2. **Formation of Himalayas by the process of plate tectonics** ***(90 words)***
3. **Evidences that support the formation of Himalayas as explained by plate tectonics** ***(70 words)***
4. **Conclusion** ***(40 words)***

Hints

Plate tectonics has emerged as the most acceptable theory in modern time regarding formation of continents and oceans, Orogenesis, epeirogenesis and different other landforms. Himalayan mountains are young fold mountains and said to be still in the process of formation has been well defined by the theory of plate tectonics.

Formation of Himalayas by the process of plate tectonics

- 100 million years ago, Indian plate collided with the Eurasian plate. Before collision there was a swampy sea between the two plates called the Tethys Sea.

First stage: Collision Oceanic-Oceanic crusts and formation of festoons or Island arcs

- The oceanic crust of the Indian plate collided with the oceanic crust of the Eurassian plate and later being heavier subducted. This resulted in formation of island arc of explosive volcanic which developed in the Tethys Sea. Later they formed part of Ladakh and Tibet.

Second stage: Collision Oceanic-Continent crusts and formation of young fold mountains on margin of contienents

- Indian plate continued its march towards Eurasian plate which led to subduction of its oceanic crust into the Eurasian continental crust. This led to formation of young fold mountain on the margin of the Eurasian land mass in the form of Karakoram Range.

Third Stage: Collision of continent-continent crusts and formation of Himalayas

- Continent-Continent crusts of the Eurasians and Indian plate collided which resulted in folding of sediments of Tethy's sea. Due to folding activity, young fold mountain, the Himalayas started to rise up. There are various evidences which support this theory.

Evidences that support the formation of Himalayas as explained by plate tectonics

- Evidences of Island arcs in Drass sector of Himalayas.
- Evidences support that Karakorum ranges are of volcanic origin.
- Karewas in Kashmir valley prove that the valley was essentially a lake in the Pleistocene Epoch.

- Discovery of a hippopotamus' skull at 14,000 ft at Ladakh indicating that till recently the Himalayan region was a warm, low-lying swampy region.
- Evidence of stone-age man in the higher reaches, showing that the mountains' rapid rise was more recent than earlier believed and was even witnessed by primitive man.
- Proof that swarms of earthquakes and periods of quietude occur just before a giant earthquake strikes the region making prediction fairly accurate that Himalayas is still rising.

Conclusion:

Various evidences which support the theory of Orogenesis of Himalayan mountain ranges are in line with the process which was illustrated by the theory of plate tectonics. Predictions by the geologists about the Great Himalayan Earthquake and unconsolidated materials which leads to landslides in the Shiwalik region of Himalayas prove that the region is still tectonically active due to movement of the Indian plate towards the Eurasians plates and authenticate the plate tectonics as the most suitable theory to explain it.

9. Different physiographic divisions of India are complementary to each other and lead to socio-economic development of the nation. Explain.

(250 words)

Approach

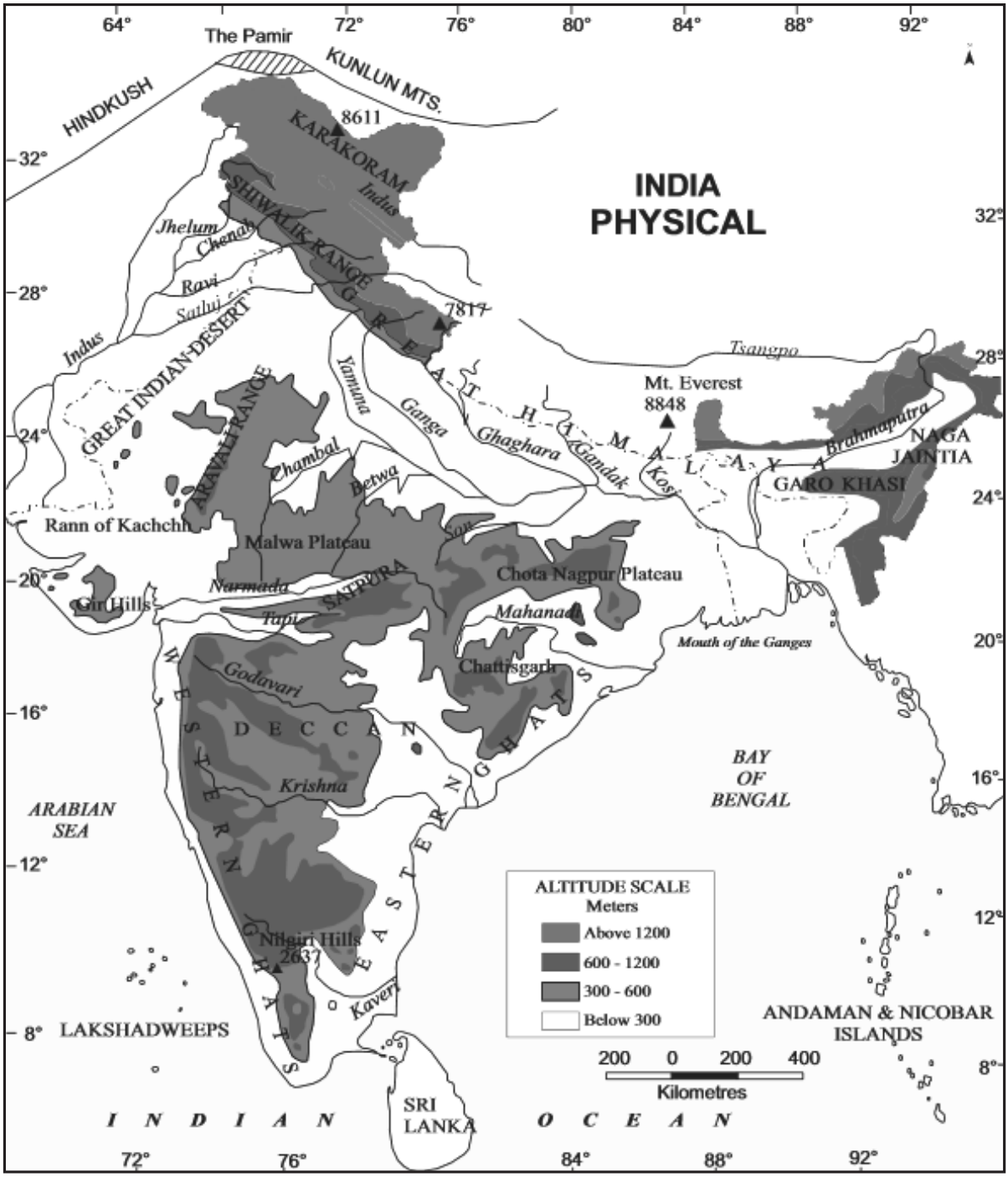
1. **Give a brief account of physiographic divisions of India** ***(40 words)***
2. **With the help of map, describe these divisions** ***(80 words)***
3. **Discuss how different physiographic divisions of India are complementary to each other and leads to socio-economic development** ***(90 words)***
4. **Conclusion** ***(40 words)***

Hints

The land of India displays great physical variation. The mainland extends to about 3214 km from north to south between the extreme latitudes. It also extends to about 2933 km from east to west between the extreme longitudes. It covers an area of 32,872,631 sq. km. Indian subcontinent is characterized by great and diversified physiographic conditions.

The physical features of India can be grouped under the following physiographic divisions:

- **The Himalayan Mountains:** The Himalayas, geologically young and structurally fold mountains stretch over the northern borders of India. These mountain ranges run in a west-east direction from the Indus to the Brahmaputra. The Himalayas represent the loftiest and one of the most rugged mountain barriers of the world. They form an arc, which covers a distance of about 2,400 Km. Their width varies from 400 Km. in Kashmir to 150 Km in Arunachal Pradesh.



- **The Northern Plains:** The northern plain has been formed by the interplay of the three major river systems, namely — the Indus, the Ganga and the Brahmaputra along with their tributaries. This plain is formed of alluvial soil. The deposition of alluvium in a vast basin lying at the foothills of the Himalaya over millions of years, formed this fertile plain. It spreads over an area of 7 lakh sq. km. The plain being about 2400 km long and 240 to 320 km broad, is a densely populated physiographic division.
- **The Peninsular Plateau:** The Peninsular plateau is a tableland composed of the old crystalline, igneous and metamorphic rocks. It was formed due to the breaking and drifting

of the Gondwana land and thus, making it a part of the oldest landmass. The plateau has broad and shallow valleys and rounded hills. This plateau consists of two broad divisions, namely, the Central Highlands and the Deccan Plateau.

- **The Indian Desert:** The Indian desert lies towards the western margins of the Aravali Hills. It is an undulating sandy plain covered with sand dunes. This region receives very low rainfall below 150 mm per year. It has arid climate with low vegetation cover.
- **The Coastal Plains:** The Peninsular plateau is flanked by stretch of narrow coastal strips, running along the Arabian Sea on the west and the Bay of Bengal on the east. The western coast, sandwiched between the Western Ghats and the Arabian Sea, is a narrow plain. It consists of three sections. The northern part of the coast is called the Konkan (Mumbai – Goa), the central stretch is called the Kannad Plain, while the southern stretch is referred to as the Malabar coast.
- **The Islands:** India has two main groups of Islands. There are 204 islands in Bay of Bengal called as Andaman and Nicobar islands and 43 islands in Arabian Sea called as Lakshadweep islands The Andaman & Nicobar island extend from north to south in Bay of Bengal

Complementarities and socio-economic utility of physiographic divisions of India

- It can be stated that physical features complement each other and make the country richer in its natural resources, thus helping the country develop.
- The northern mountains are the major sources of water and forest wealth. The northern plains are the granaries of the country. They provide the base for early civilizations.
- The plateau is a storehouse of minerals, which has played a crucial role in the industrialization of the country.
- The coastal region and island groups provide sites for fishing and port activities.
- The rivers originate in the high mountains and plateaus and drain the plains to make them inhabitable and agriculturally suitable.
- The plateaus provide the necessary minerals to assist the development of industries.
- Himalayas prevent the cold waves from north (Tibetan Pleateau), in absence of which; Gangetic-plains would have been absent. Similarly these would have destroyed the low-pressure system, which pulls the monsoon winds from the ocean.

Conclusion:

India has practically all major physical features of the earth, i.e., mountains, plains, deserts, plateaus and islands. The land of India displays great physical variation. Thus, the diverse physical features of the land have immense future possibilities of development.

10. Discuss the formation of intermontane plateaus and tectonic plateaus citing examples.

(250 words)

Approach

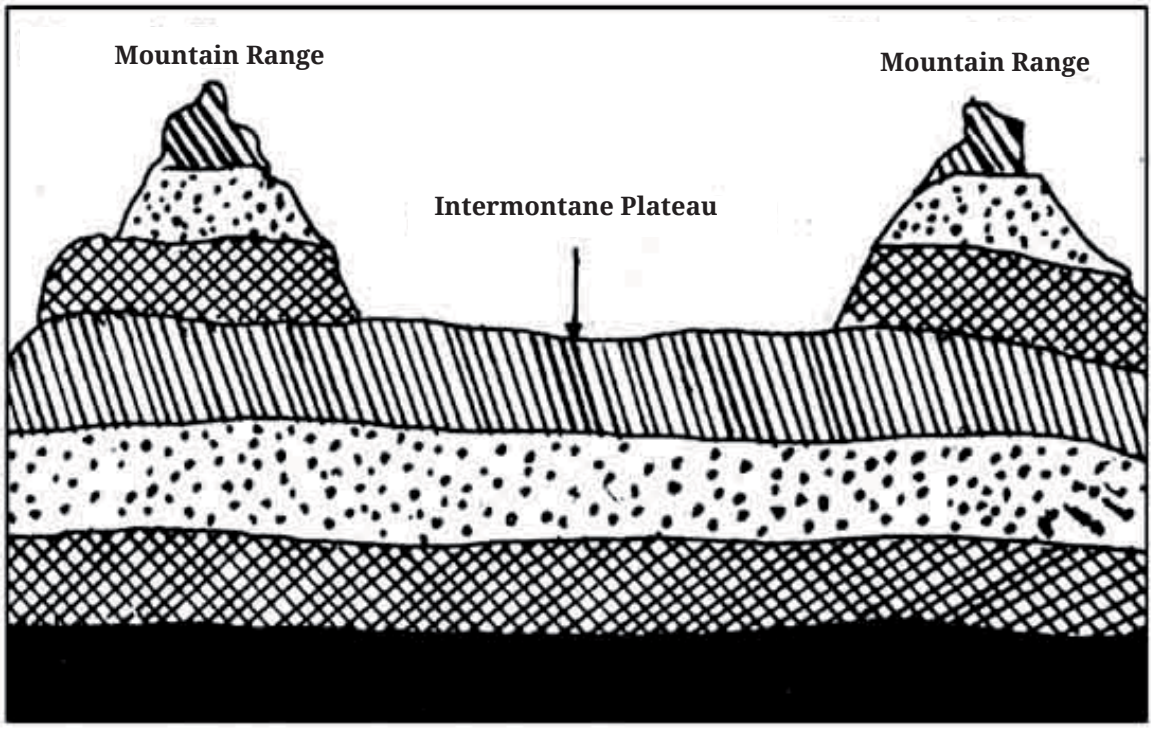
1. **Briefly discuss location and examples of intermontane and tectonic plateaus.** ***(30 words)***

2. **Discuss the formation of intermontane plateaus and tectonic plateaus with examples around the world.** ***(90 words)***

3. **Conclude with socio-economic importance of intermontane and tectonic plateaus.** ***(30 words)***

Hints

A plateau which is enclosed or surrounded by mountain ranges is known as an intermontane plateau. They borders the mountain ranges (generally fold mountains) or are partly or fully enclosed within them. The Plateau of Tibet and the Plateau of Mongolia are the two intermontane plateaus in Asia. The Plateau of Tibet is surrounded by the Kunlun Mountains in the north and the Himalayas in the south. The Plateau of Mongolia is enclosed between a number of mountains like the Sayan Mountains, Hentiyn Mountains and the Nan mountains. Similarly, Tectonic plateaus are formed from various processes that create mountain ranges such as by volcanism (Deccan Plateau), crustal shortening (thrusting of one block of crust over another, and folding occurs.



Formation of intermontane plateaus

- Many plateaus are located in or near mountain ranges, where tectonic uplift raised broad areas of flat land as a single unit. As a group, they are called intermontane plateaus. The largest plateaus on Earth formed where two tectonic plates collided.
- They are formed by folding and uplifting of flat land between the two mountains.
- Because they are lifted far above sea level, they are known as high altitude plateaus. The largest and highest is the Tibetan Plateau in South-Central Asia, which is a flat valley floor at about 15,000 feet above sea level, rimmed on the south by the Himalayas.

- The Altiplano, which literally means 'high plain,' is located in the Andes in western South America. It is the second largest high altitude plateau in the world, and it lies at an elevation above 12,000 feet.

Formation of Tectonic plateaus

- Tectonic plateaus are formed from various processes that create mountain ranges such as volcanism, crustal shortening i.e thrusting of one block of crust over another, folding and thermal expansion.
- It is formed by numerous small volcanic eruptions that slowly build up over time, forming a plateau from the resulting lava flows.
- Magma that escapes from the Earth's crust through fissures or narrow cracks reaches the surface and spreads over a large area, and later solidifies to form a plateau. These types of plateaus are typically made up of layers of lava sheets. There are two types of volcanic plateaus: lava plateaus and pyroclastic plateaus.
- Lava plateaus are formed as a result of highly fluid basaltic lava that flows through vents after numerous eruptions and are formed when volcanic eruptions are quiet eruption and lava flow is of low viscosity. Columbian snake plateau in United States is fine example of such plateau.
- Pyroclastic plateaus which are also known as ignimbrite plateaus, are formed due to large pyroclastic flowsand are essentially layers of pyroclastic, such as volcanic ash, tephra, and agglomerate that have been cemented into felsic, mafic, or tuffs. North Island Volcanic Plateau in New Zealand is fine example of this plateau.

Conclusion:

Intermontane plateaus are highest plateaus in the world. These plateaus provide habitats at high altitude and are center of transhumance i.e seasonal migration of people in search of food and pastures, due to their rich pastoral grounds. Tibetan people for example practices transhumance for their livelihood. Similarly, tectonic plateaus are rich in black soil and other minerals which make them productive regions of the world. These regions produce crops such as cotton and sugarcane. Hence, location and formation of plateaus significantly help a region to prosper in a better way.

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