

# Geography Syllabus

There is one Theory paper of three hours duration divided into two parts.

Part I (30 marks) is compulsory and consists of Section A and Section B. Section A includes compulsory short answer questions testing knowledge, application and skills related to elementary/fundamental aspects of the entire syllabus. Section B consists of one question on map work.

Part II (40 marks) consists of seven questions. You are required to answer four out of seven questions. Each question in this part carries 10 marks.

## 1. Geography - its interdisciplinary approach and future prospects

Geography as an integrating discipline. Physical Geography and Natural Sciences; Geography and Social Sciences.

Branches of Geography:

**(i) Systematic approach:** Physical Geography (Geomorphology, Climatology, Hydrology); Human Geography (Historical, Social, Population and Settlement, Economic, Political).

**(ii) Regional approach:** Regional/ Area Studies, Regional Planning, Regional Development.

## 2. Earth's Interior

### (i) Composition and structure.

Methods of measuring age of the earth: Tidal force, Sedimentation, Rate of Erosion, Salinity of the Ocean, Radioactivity – a brief understanding.

Structure and composition of the earth's interior: crust, mantle, core; their properties - temperature, pressure, thickness.

### (ii) Rocks.

Definition of rocks and minerals. The mineral groups responsible for different rocks formed on the earth: Silicates, carbonates, sulphides, metals.

Classification of rocks by origin: igneous, metamorphic and sedimentary rocks – their distribution in India; characteristics, types, economic importance.

The rock cycle.

## 3. Changing Face of the Earth

## Land forms and Processes of Gradation

### **(i) Formation of the Earth.**

Theories of formation of the earth: steady state, Big Bang and the developments today.

**(ii) Endogenous processes:** theory of plate tectonics and the process of drifting continents, theory of Isostasy by Pratt and A. Holmes.

Definition of endogenetic force, difference between slow and sudden forces, vertical and horizontal forces and their effects. Sea floor spreading, continental drifting and isostasy.

**(iii) Landforms** - mountains, plateaus and plains and their types.

Meaning and differentiation between the three main land forms of the earth.

Classification of mountains on the basis of their origin or mode of formation: fold, block, volcanic and residual with examples from the world.

Classification of plateaus on the basis of their situation: intermontane, piedmont and continental with examples from the world.

Classification of Plains on the basis of formation: structural, erosional and depositional with examples from the world.

(Candidates should be able to recognise, interpret and create models of the Earth's common physical features in mapping representation including contour maps.)

**(iv) Vulcanicity** - materials and processes. Major volcanic forms.

Explanation of how volcanoes are formed; identification of the type of volcano; recognition of the properties of volcanic materials; explanation of why volcanoes are more in the areas of converging plates.

### **(v) Earthquakes.**

Origin of earthquakes, waves and their behaviour, hypocentre (focus), epicentre; their causes and distribution; effects; isoseismal and homoseismal lines, sea quakes, tsunamis; measuring earthquakes and their intensity. Studying the effects of earthquakes on a country like Japan.

### **(vi) Exogenetic process and associated landforms.**

Weathering and gradation – difference between the two. Role of weathering in gradation. Different types of weathering.

### **(vii) Soil.**

The factors affecting soil formation; soil profile; physical and chemical properties, distribution and characteristics of soils in the world - zonal, azonal and intrazonal – only

broad characteristics related to Indian soils to be done (detailed distribution not required).

Alluvial, red, yellow, black and laterite soils in India and the problems related to their management.

### **(viii) Fluvial processes and associated landforms.**

Work of rivers - concept of baselevel; processes of erosion, transportation and deposition. Types of erosion - headward, vertical, lateral; transportation mode and deposition.

Landforms made by the river - gorges, rapids, waterfalls, alluvial fans, levees, floodplains, meanders, braided channels, oxbow lakes, deltas - delta plains.

Development of river valleys, drainage patterns. Diagrams and examples from India with photographs.

### **(ix) Aeolian processes and associated landforms.**

Process of wind erosion – abrasion, attrition, deflation. Ideal conditions for erosion in hot deserts; landforms resulting from erosion - deflation hollows, pedestal rocks, yardangs, desert pavement; landforms resulting from deposition - sand dunes and their types, loess. Diagrams and examples from India and Asia.

### **(x) Glacial processes and associated landforms.**

Continental and mountain or valley glaciers, processes of glacial erosion – plucking, abrasion, attrition; erosional features, e.g. cirque and its components, U shaped and hanging valleys, roche moutonnes, depositional formations, moraines of various types. Some Indian glaciers - Siachen, Gangotri, Baltoro. Diagrams and examples from India.

### **(xi) Work of ground water and associated landforms. Water Conservation.**

Definition of ground water, water table, aquifers, springs. Process of erosion by groundwater solution, corrosion. Features formed by underground water (karst topography) – sink holes, dolines, caves, caverns, karst lakes, depositional features - stalactites, stalagmites, cave pillars, dripstones: their formation. Diagrams and examples from India and Australia.

Emerging water problems and conservation of water resources.

### **(xii) Marine processes and associated landforms.**

Erosional process of sea waves – abrasion, attrition, solution and hydraulic action; coastline and shoreline, erosional features; sea cliffs, sea caves, stacks and depositional landforms, e.g. - bays, bars and lagoons; Coral reefs: types – fringing, barrier and atolls; submerged and emergent coastlines. Diagrams and examples from India, Australia and West Europe (wherever relevant).

Note: For topics (viii) to (xii) only diagram or photograph based questions will be asked. Photograph based information should be made use of to emphasize the different processes of gradation.

## **4. Atmosphere**

### **(i) Composition and structure of atmosphere.**

Layers of the atmosphere: troposphere, stratosphere, ozonosphere, mesosphere, ionosphere; their height; composition; special characteristics of each layer; ozone depletion.

### **(ii) Atmospheric temperature.**

Heating and cooling of the atmosphere, radiation, conduction, convection. Insolation and factors influencing it – angle of sun's rays, duration of day, transparency of atmosphere. Heat budget, i.e. balance between insolation and terrestrial radiation- areas of surplus and deficit heat in different latitudes resulting in latitudinal heat balance.

Factors controlling its horizontal and vertical distribution, temperature anomalies and their nature. Isotherms: their characteristics; isotherm maps of the world in July and January. Reasons for the variations in temperature.

### **(iii) Atmospheric Pressure.**

Its horizontal and vertical distribution, factors affecting the distribution, characteristics of isobars on world maps for July and January. Patterns and the causes for the distribution of isobars.

Pressure belts and winds – types of winds, air masses and atmospheric disturbances, cyclones of temperate and tropical areas; anticyclones – their types and associated weather. World map showing major paths of cyclones. Jet Streams – concepts to be introduced with reference to India.

### **(iv) Atmospheric Moisture.**

Processes of evaporation, condensation and precipitation; relative and absolute humidity; forms of condensation - cloud, fog, dew, frost; precipitation – its forms: snow, hail, rain; types of rainfall: orographic, cyclonic, convectional. Monsoons – origin and factors that affect. Examples from different parts of the world.

## **5. The Realms of Water**

### **(i) Submarine relief and deposits of the Atlantic, Pacific and Indian Oceans.**

The depth and the features. The sea floor deposits and their characteristics, the importance of marine resources. Ocean pollution and ways to overcome them.

### **(ii) Ocean water - salinity, temperature, density.**

Composition of seawater and factors that control distribution of salinity and temperature.

### **(iii) Ocean water movements.**

Direct and indirect tides - origin, time, spring and neap tides. Waves – parts, characteristics, formation. Currents - factors affecting currents, currents of Indian, Pacific and Atlantic oceans. Role of currents in modifying climates of coastal areas. Introduction to El Nino and El Nina as conditions that affect the intensity of the monsoons over India.

## **6. Biosphere - Life on the Earth**

### **(i) Nature of Biosphere, concept of ecosystems, components of ecosystem.**

Meaning, nature of interaction between the different components of the biosphere. Understanding the concept of biodiversity. To appreciate various reasons for valuing and conserving biodiversity (ethical, moral, economic, aesthetic).

### **(ii) Biodiversity for sustenance of mankind.**

The various roles played by biodiversity in sustaining mankind - as a source of food, medicine, pollution control, etc.

### **(iii) India as a mega diversity nation.**

A basic understanding that India with its varied climate and landscape is home to a variety of unique ecosystems and endemic species e.g. the largest mangrove forest in the world - the Sundarbans, vast mountain forests in the Himalayas, tropical evergreen forests in the Western ghats and the North East region, desert vegetation in Rajasthan, thorn and scrub forests in the plateaus, etc.

### **(iv) Loss of biodiversity - threatened, endangered and extinct species.**

Understanding the implications of loss of biodiversity.

Categorizing species in different groups like - threatened, endangered and extinct. Examples of plants and animals.

### **(v) Strategies for conservation of biodiversity – in-situ and ex-situ.**

Looking at various in-situ and ex-situ strategies for their efficacy and viability:

In-situ strategies - protected areas (biosphere reserves, national parks, wildlife sanctuaries).

Ex-situ strategies - captive breeding, zoo, botanical garden, gene banks and their use.

## **7. A. World Climatic types**

**Low latitude / tropical climates** (i) Equatorial (ii) Monsoon and tradewind littoral (iii) Wet - dry tropical (iv) Dry tropical (desert).

**Mid latitude/temperate climates** - (i) Mediterranean (ii) Marine west coast (iii) Dry sub-tropical (iv) Moist subtropical (v) Moist continental (vi) Dry mid latitude (cold deserts).

**High latitude/polar climates** - (i) Boreal (ii) Tundra (iii) Ice sheet.

**Highland climates.**

For each of the above climatic types, the following is to be studied:

- Location, climatic conditions and areas;
- Description of major human activities (both farming and forestry.)

**B. Climate Change** – causes/factors of climatic changes in the recent past.

Natural and man-made factors, with special reference to climatic changes in India. Measures taken to adapt to these changes in urban and rural India.

## **8. Natural hazards, their causes and management**

**(i) Hazards of volcanic eruptions and earthquakes.**

Major volcanic areas and their problems; major earthquake prone areas - effects on land and human life. Seismic zones of India and measures to reduce the fury of earthquakes.

**(ii) Identification of major drought prone areas.**

Characteristics of drought prone areas. Causes, problems and remedial measures (like rain water harvesting) adopted with special reference to India.

**(iii) Areas prone to floods / landslides - India.**

Landslides - causes, effects and measures adopted to check (Himalayan region). The causes of flooding and checking floods (like construction of dams and afforestation) – with special reference to India.

## **8. Map Work**

A question on map work will be set to identify, label and locate any of the following items studied in topics from Principles of Physical Geography and cities from Climatic Regions only.

**Mountains:** Himalayas, Hindukush, Elburz, Zagros, Kirthar, Caucasus, Alps, Pyrenees, Carpathians, Urals, Khingan, Kunlun, Altai, Drakensburg, Kjolen, Andes, Rockies, Appalachian, Great Australian Alps, Verkhoyansk, Great Dividing Range, Southern Alps.

**Plateaus:** Tibetan, West Australian, Iranian, Anatolian, Pamirs, Ethiopian, Bolivian, Deccan, Guiana, Colorado, Brazilian, Labrador, Arabian.

**Water Bodies (bays, gulfs, straits, sea, oceans):** Arctic Ocean, Atlantic Ocean, Indian Ocean, Pacific Ocean, Southern Ocean, Beaufort Sea, Hudson bay, Gulf of California, Gulf of Mexico, Panama Canal, Bering Sea, Sea of Okhotsk, Sea of Japan, East China Sea, South China Sea, Yellow Sea, Timor Sea, Tasman Sea, Persian Gulf, Red Sea, Black Sea, Mediterranean Sea, Caspian Sea, Arabian sea, North Sea, Baltic Sea, Suez Canal, Strait of Magellan, Bay of Biscay, Bay of Bengal, Andaman Sea, Lakshwadeep Sea.

**Rivers:** Mississippi, Missouri, Mackenzie, Amazon, Orinoco, St. Francisco, Parana, Orange, Nile, Zaire, Niger, Zambezi, Rhine, Rhone, Seine, Danube, Volga, Euphrates, Tigris, Dnieper, Thames, Ob, Yenisei, Lena, Amur, Hwang Ho, Yangtze Kiang, Sikiang, Mekong, Irrawaddy, Salween, Indus, Ganga, Godavari, Murray, Darling.

**Ocean Currents:** North Pacific current, Alaska current, North Atlantic Drift, Gulf Stream, Labrador current, North Equatorial current, South Equatorial current, Equatorial Counter current, Peru current, South Pacific current, South Atlantic, Current, West wind drift, South Indian current, Benguela Current, Brazilian current, Southwest Monsoon current, Indian counter current, Mozambique current, West Australian current, KuroShio current, Oyashio current, East Australian current, Guinea current, Falkland current.

**Islands:** Greenland, Hawaii, Aleutian, West Indies, Tierra del Fuego, Galapagos, Baffin, Newfoundland, Iceland, British Isles, Canaries, Corsica, Sardinia, Crete, Cyprus, Sicily, Madagascar, Sri Lanka, Philippines, Papua New Guinea, Indonesia, Japan, Australia, New Zealand, Tasmania.

**Climatic Regions:** Equatorial, Monsoon, trade wind littoral, Wet - dry tropical, Dry tropical (desert), Mediterranean, Marine west coast, Dry sub-tropical, Moist subtropical, Moist continental, Dry midlatitude (cold deserts), Boreal, Tundra, Ice sheet, Highland climates.