

**University of Calcutta**  
**Geography Honours**  
**B.A/B.Sc(2002-2005)**  
**3 year Degree Course**

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Part 1 (1<sup>st</sup> and 2<sup>nd</sup> year)

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| PAPER 1: GEOMORPHOLOGY AND HYDROLOGY                   | GROUP-A: PHYSICAL BASIS OF GEOGRAPHY<br>GROUP-B: GEOMORPHOLOGY<br>GROUP-C: ELEMENTS OF HYDROLOGY |
| PAPER 2: SOIL GEOGRAPHY, CLIMATOLOGY AND BIO-GEOGRAPHY | GROUP-A: CLIMATOLOGY<br>GROUP-B: SOIL GEOGRAPHY<br>GROUP-C: BIO-GEOGRAPHY                        |
| PAPER 3: GEOGRAPHY OF RESOURCES                        | GROUP-A: CONCEPTS OF RESOURCES<br>GROUP-B: ECONOMY<br>GROUP-C: HUMAN RESOURCES                   |
| PAPER 4: PRACTICAL                                     | APPLIED GEOGRAPHICAL TECHNIQUES-I  |

## **Paper-1: GEOMORPHOLOGY AND HYDROLOGY**

### **Group-A: Physical Basis of Geography**

1. Concept of Physical Environment
2. Place of Geomorphology within the discipline of Geography
3. Geomorphology and Environment (Degradation and Conservation)
4. Climate and Geomorphology
5. Soil-Plant-Water relationship
6. Basic concepts of Hydrology

### **Group-B: Geomorphology**

7. Structure of the Earth- crust and interior
8. Theory of Continental Drift, Plate Tectonics, Orogeny, Sea-Floor spreading and Vulcanism
9. Earth movement and their resultant structures with reference to different types of Fold and Faults
10. Influence of lithology on landforms
11. Landforms on different types of structures: horizontal, homoclinal, folded, faulted and domal
12. Weathering and Mass-wasting (rapid and slow processes), resultant landforms
13. Evolution of landforms under different geomorphic processes: (a)Fluvial, (b)Glacial, (c)Aeolian, (d)Coastal and (e)Karst processes
14. Cyclic and non-cyclic concept- Davis, Penck, L.C.King, and Hack.

### **Group-C: Elements of Hydrology**

15. Scope and content of hydrology
16. Hydrological cycle
17. Factors influencing surface run-off (lithology, structure, slope, sunshine, rainfall, snowfall, snow melt water, forest, evapotranspiration)
18. Ground water circulation

## **Paper-2: CLIMATOLOGY, SOIL AND BIO-GEOGRAPHY**

### **Group-A: Climatology**

1. Atmosphere nature, composition and layering- importance of Ozone layer
2. Insolation: factors affecting insolation; heat budget of the atmosphere
3. Horizontal and vertical distribution of temperature: Inversion of temperature; Green house effect on global environment
4. (a)Global pressure belts and (b)Wind systems of the earth- General circulation, Jet stream and Monsoon
5. Different forms of atmospheric moisture: Processes and forms of condensation. Mechanization and forms of precipitation, evaporation
6. Atmospheric disturbance: Tropical and Mid- Latitude cyclones; Thunderstorms- their genesis and characteristics
7. Basis of climatic classification

### **Group-B: Soil Geography**

8. Scope and content of Soil geography
9. Factors of Soil Formation
10. Development of Soil Profile
11. (a) Physical properties of Soil: Soil Colour, texture, structure, moisture. (b) Chemical properties of soil: soil reaction, soil organic matter.
12. Distribution and profile character of major soils of the globe: Zonal-Podzol, Chernozem and Laterite, Azonal-Alluvial and Intrazonal- Saline and Alkaline

### **Group-C: Bio-Geography**

13. Definition and nature of Biosphere: Scope and significance of Bio-geography
14. Concept of Ecosystem and Basic ecological principles, Bio-energy Cycle and Bio-geo-chemical cycle; Food Chain
15. Concept of Biomes- Ecotone and community; Distribution and character of terrestrial Biomes- Tropical Rain Forest, Taiga, Tropical and Temperate grasslands.
16. Deforestation and its impact on environment

### **Paper-3: GEOGRAPHY OF RESOURCES**

#### **Group-A: Concepts**

1. Concept of resources: definition (economic approach, environmental approach) and resources perception; Functional theory of resources and resource creating factors; resource classification; renewable; non-renewable, fund and flow resources; definition of resource systems
2. Resource processes and their nature with special reference to (a) energy (b) minerals (c) other non-renewable resources
3. Resource utilization and technology: alternative energy, resource conservation (recycling and substitution)
4. Resource utilization and environmental quality

#### **Group-B: Economy**

5. Distinctive characteristics of the following forms of economy: (a) Gathering and agriculture in tribal societies (b) Agricultural economy; traditional, plantation and modern; (c) Urban-Industrial economics
6. Studies of selected production systems emphasizing physical, social and economic forces and processes:
  - (a) Intensive culture in Monsoon Asia
  - (b) Extensive Wheat cultivation in Temperate Grassland
  - (c) Tea and Rubber plantations in South and South East Asia
  - (d) Cotton Textile Industry in India and USA
  - (e) Iron and Steel industry in India, UK and USA
  - (f) Petro-chemical Industry in India and USA
  - (g) Forest: India , Canada and Scandinavian countries
  - (h) Fish: Temperate marine fisheries
7. Brief outline of selected models of economic systems:
  - (a) Von Thunen
  - (b) Weber
  - (c) Economic growth- stage model
  - (d) Gunnar Myrdal's model of circular causation

#### **Group-C: Human Resources**

8. Population as resources:
  - (a) Human energy/ manual labour
  - (b) Division of labour and skill
  - (c) Entrepreneurship
  - (d) Resource perception
  - (e) Size of population
9. Characteristics of world's human resources:
  - (a) Socio-economic evolution of mankind
  - (b) Spatio-temporal variations in global population growth
  - (c) Problems of balance of population and resources: case studies of India and China
10. A general treatment about the nature and quality of population in developed and less developed countries
  - (a) Growth rate (birth rate/ death rate and migration)
  - (b) Age-Sex composition
  - (c) Education level/ literacy
  - (d) Nutrition and health
  - (e) Level of urbanization

#### **Paper-4: APPLIED GEOGRAPHICAL TECHNIQUES (practical)**

1. **Concept of scale:** construction of linear, linear vernier and diagonal scales (aspects of enlargement and reduction)
2. **Surveying:** Contouring on the basis leveling along 3 radial lines by a Dumpy Level along with measurement of bearing of the lines by a prismatic compass
3. **Cartograms and Thematic mapping** with:
  - (a) Physical data: relative relief after Smith (by Isopleth)
  - (b) Climatic data: composite climograph
  - (c) Population Data: Distribution (by dot/ sphere) and density (Choropleth- line/ shade)
  - (d) Agricultural data: land use (by divided proportional piegraphs)
  - (e) Traffic and transport data: goods / passengers, number of vehicles (by flowchart)
  - (f) Industrial data: employment/ production (by bargraph)
4. **Interpretation of Topographical maps**( scale 1:50000 or 1: 63360)
  - (a) Hill and (b) Plateau with analysis of (i) Landforms (ii) Drainage, (iii) Natural Vegetation, (iv) Settlement pattern (v) Communication network (vi) correlation between physical and cultural elements.

Morphometric Techniques to identify the characteristics of relief and Drainage, viz Average Slope (Wentworth's method), Ruggedness Index, Drainage Pattern and density. Drawing and analysis of profiles to depict relief, transect chart, settlement pattern and road density maps.

5. **Megascopic identification of rocks and minerals:**

Rocks- Granite, Basalt, Dolerite, Coal, Shale, Sand stone, Limestone, Conglomerate, Laterite, Slate, Phyllite, Schist, Marble, Quartzite, Gneiss.  
Minerals- Talc, Gypsum, Calcite, Mica, Feldspar, Quartz, Chalcopyrite, Hematite, Magnetite, Bauxite, Galena.
  6. Laboratory note-book and Viva-voce
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**PART 2 (3<sup>RD</sup> YEAR)**

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| PAPER-5: SOCIAL AND REGIONAL GEOGRAPHY | GROUP-A: CONCEPTS IN SOCIAL GEOGRAPHY<br>GROUP-B: SETTLEMENT GEOGRAPHY<br>GROUP-C: REGIONAL GEOGRAPHY OF INDIA |
| PAPER-6:                               | GROUP-A: GEOGRAPHICAL THOUGHT<br>GROUP-B: SPECIAL PAPER(CARTOGRAPHY)   |
| PAPER-7: PRACTICAL                     | APPLIED GEOGRAPHICAL TECHNIQUES-II   |
| PAPER-8: PRACTICAL                     | GROUP-A: STATISTICAL TECHNIQUES<br>GROUP-B: SPECIAL PAPER<br>PRACTICAL(CARTOGRAPHY)                            |

## PAPER-5: SOCIAL AND REGIONAL GEOGRAPHY

### GROUP-A: Concepts of Social Geography

1. Scope and content of social geography
2. Concepts of Geographical space, material space, social space and their inter-relations
3. Concepts of Social groups (ethnic status, economic status, urban status): social space, social processes, social areas, social behavior and contemporary social environmental issues
4. Settlements and regions as social entities

### GROUP-B: Settlement Geography

5. Aspects of settlement study-site, situation, size, patterns, function, house types, layout, morphology and spatial distribution
6. Rural settlements:
  - (a) Definitions and census categories
  - (b) patterns-dispersed and clustered (linear, nucleated, agglomerated)
  - (c) A general treatment of functional types: agricultural, fishing, forest based, mining, handicraft based, animal husbandry based etc.
7. Urban settlements:
  - (a) Origin and development of urban settlements
  - (b) Physical and ecological definitions of city
  - (c) Functional classification of towns and cities
  - (d) Christaller's theory of Central Place hierarchy
  - (e) Urban morphology (concentric zone, sector and multiple nuclei models)

### GROUP-C: REGIONAL GEOGRAPHY OF INDIA

8. Concept of regions and different approaches to regionalization; nature and types of regions; scale and dimensions of regionalisations; macro, meso, micro regions
9. Outline of Physical Geography of India-Structure, relief, climate, soil and vegetation
10. Basis of regional division of India- Physical and economic
11. Study of the following regions with sub-regional details:
  - (a) Vale of Kashmir
  - (b) Chhotanagpur Plateau
  - (c) Calcutta Metropolitan Region
  - (d) Deccan Trap region

## PAPER-6: GEOGRAPHICAL THOUGHT AND SPECIAL PAPER

### GROUP-A: Geographical Thought

1. Definition and scope of geography
2. Three basic characteristics: man-environment relation, regional differentiation, location and space
3. Outline of basic geographical approaches: Encyclopaedism, Positivism, the quantitative revolution and the views of Radical geography
4. A short review of the evolution of geographical thought: Determinism, Possibilism, Structuralism, Materialism and Ecological Approach.

### GROUP-B: SPECIAL PAPER-CARTOGRAPHY

1. Nature and scope; history of cartography; classification of maps
2. Use and choice of Cartographic symbols: point, line, area and volume
3. Principles of map making, design, layout, drafting and reproduction techniques
4. Principles of determining planimetric position of points of plane table traverse and plane table intersection surveys
5. Methods of determination of height and distance of an object by Theodolite (base accessible and inaccessible)
6. Concepts, properties, limitation and uses of the following map projections. Determination of co-ordinates, distance and azimuth
  - (a) Polar Zenithal Equal-area
  - (b) Polar zenithal equidistant
  - (c) Polar zenithal Gnomonic
  - (d) Simple conic with two standard parallels
  - (e) Bonne's
  - (f) Mercator's
  - (g) Sinusoidal
7. Thematic mapping of-
  - (a) Qualitative data,
  - (b) Quantitative point, linear, area and volume data
8. Remote sensing principles; aerial photographs vis-à-vis, maps

## PAPER-7: APPLIED GEOGRAPHICAL TECHNIQUES-II

1. Measurement of area by graphical method and planimeter
2. Map projection: (a) Simple conic with 2 standard parallel  
(b) Cylindrical equal area  
(c) Polar stereographic  
(d) Polyconic  
(e) Mercator's
3. Interpretation of Geological Maps and drawing of sections:  
(a) Homoclinal and tilted structures  
(b) Simple folds  
(c) Unconformity
4. Interpretation of Indian daily Weather report:  
(a) Pre monsoon  
(b) Monsoon  
(c) Post monsoon seasons
5. Field Report and Viva-voce
6. Laboratory notebook and viva-voce

## PAPER-8: STATISTICAL TECHNIQUES AND SPECIAL PAPER PRACTICAL-CARTOGRAPHY

1. Nature of statistical data: Discrete and continuous, Ordinal and Cardinal, Parametric and Non-Parametric, Use of percentages.
2. Sampling techniques: Concept of Simple, Random and Stratified.
3. Tabulation and Classification of statistical data.
4. Frequency distribution: Histogram, Polygon, Ogive, Normal and skewed distribution
5. Measures of Central tendency: Mean, Median, Mode.
6. Partition Values: Quartiles, Deciles and Percentiles.
7. Measures of Dispersion: Mean deviation, quartile deviation, standard deviation, coefficient of variation.
8. Time series analysis (linear trend)
9. Simple Bivariate regression based on absolute numbers and fitting of trend line.
10. Test of significance
11. Laboratory notebook and viva-voce

### Group-B: Special paper- Cartography practical

1. **Preparation of large scale maps** by Plane table survey
2. **Determination of height and distance of an object by Theodolite** (base accessible and inaccessible) in the field
3. **Preparation and interpretation of thematic maps** using:
  - (a) Point symbol- dot map of rural population (comparative study with size and volume of dots)
  - (b) Line symbol-Administrative maps, railway/road traffic flow map
  - (c) Area symbol-Piegraph/ proportional circles, choropleth maps
  - (d) Volume symbol- Map to show urban population by spheres.
4. **Drawing of graticules of the following projections** for showing map of:
  - (a) World in a single sheet- (i) Mercator's  
(ii) Interrupted sinusoidal
  - (b) World in hemisphere- (i) Polar zenithal equal area  
(ii) Polar zenithal equidistant
  - (c) India- (i) Simple conic with two standard parallels  
(ii) Bonne's
  - (d) Antarctica- Polar zenithal Gnomonic
5. **Calculation of scale of air-photographs. Stereoscopic fusion practices, Identification of natural and man-made features on air-photographs and preparation of maps from photographs**
6. Laboratory notebook and viva-voce

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