

UNIVERSITY OF CALCUTTA

SYLLABI

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**THREE-YEAR HONOURS AND GENERAL
DEGREE COURSES OF STUDIES**



GEOGRAPHY

2010

COURSE STRUCTURE

Full Marks- 800

Theoretical	500
Practical	300

PART I **200 Marks**

<u>Module No</u>	<u>Theoretical/Practical</u>	<u>Theme</u>	<u>Marks</u>	<u>Duration</u>
1	Theoretical	Geotectonics and Geomorphology	50	4 hours
2	Theoretical	Hydrology and Oceanography	50	
3	Theoretical	Economic Geography	50	2 hours
4	Practical	Cartograms and Geological Maps Scale Cartograms Geological Maps Identification of Rocks and Minerals Laboratory Note Book and Viva-Voce	50 06 12 16 08 08	4 hours

PART II**200 Marks**

<u>Module No</u>	<u>Theoretical/Practical</u>	<u>Theme</u>	<u>Marks</u>	<u>Duration</u>
5	Theoretical	Climatology	50	
6	Theoretical	Soil and Biogeography	50	4 hours
7	Theoretical	Social, Cultural and Political Geography	50	2 hours
8	Practical	Map interpretation and Survey with instruments Interpretation of Topo- graphical sheets Survey with instruments Laboratory Note Book and Viva-Voce	50 (22) (20) (08)	4 hours

PART III**400 Marks**

<u>Module No</u>	<u>Theoretical/Practical</u>	<u>Theme</u>	<u>Marks</u>	<u>Duration</u>
9	Theoretical	Population and Settlement Geography	50	
10	Theoretical	Regional Geography of India	50	4 hours

<u>Module No</u>	<u>Theoretical/Practical</u>	<u>Theme</u>	<u>Marks</u>	<u>Duration</u>
11	Theoretical	Philosophy of Geography	50	
12	Theoretical	Contemporary Issues in Geography	50	4 hours
13	Practical	Mapping Techniques Map Projection Cartograms Thematic Mapping Laboratory Note Book And Viva-Voce	50 20 (12) (10) (08)	6 hours
14	Practical	GIS, RS and Field Report Geographical Information System Remote Sensing Laboratory Note Book and Viva-Voce Field Report and Viva-Voce	50 (10) (10) (3+2) (15+10)	
15	Practical	Statistical Techniques Statistical Exercises Laboratory Note Book and Viva- Voce	50 (42) (08)	4hours
16	Practical	Contemporary Techniques in Geography Techniques Laboratory Note Book and Viva- Voce	50 (42) (8)	4 hours

PART 1

Module 1

GEOTECTONICS AND GEOMORPHOLOGY (Th.)

50 Marks

Unit I: Geotectonics

- 1.1 Origin of the Earth with particular reference to Big Bang Theory; Geological time scale and related topographic and structural evolution (03)
- 1.2 Isostasy: Airy and Pratt (02)
- 1.3 Folds and Faults—origin, types and their topographic expressions (03)
- 1.4 Plate Tectonics: plate tectonic processes--sea floor spreading, subduction, orogenesis, earthquake and vulcanicity (06)

Unit II: Geomorphology

- 2.1 General degradational processes: processes of rock weathering and their effects on landform (03)
- 2.2 Fluvial processes and landforms (03)
- 2.3 Glacial processes and landforms; fluvio-glacial landforms (03)
- 2.4 Aeolian processes and landforms; fluvio-aeolian processes (03)

Unit III: Geomorphology and Structure

- 3.1 Basic concepts of Geomorphology as postulated by Thornbury (03)
- 3.2 Landforms on granite and basalt (02)
- 3.3 Landforms on limestone (02)
- 3.4 Development of river network and landforms on uniclinal and folded structure (04)

Unit IV: Theories of Geomorphology

- 4.1 Normal cycle of erosion by W.M.Davis (04)
- 4.2 Views of W. Penck on normal cycle of erosion (03)
- 4.3 Cycle of Pediplanation by L.C.King (03)
- 4.4 Dynamic Equilibrium theory by J.T. Hack (03)

- figures in the parentheses indicate number classes

Module 2

Hydrology and Oceanography (Th.)

50 Marks

Unit I: Surface Hydrology

- 1.1 Definition, scope and content of Hydrology (02)
- 1.2 Global hydrological cycle: its physical and biological role (03)
- 1.3 Drainage basin as a hydrological unit (03)
- 1.4 Run off: controlling factors--infiltration, evaporation and transpiration;
Run off cycle (04)

Unit II: Groundwater Hydrology

- 2.1 Physical properties of ground water (02)
- 2.2 Chemical properties of ground water (02)
- 2.3 Components, factors, and processes controlling storage and movement of
ground water (04)
- 2.4 Types of aquifers and issues related to their over utilization (03)

Unit III: Ocean Water

- 3.1 Physical properties of ocean water (02)
- 3.2 Chemical properties of ocean water (02)
- 3.3 Concept of water mass; Waves, Tides and their influence (04)
- 3.4 Ocean currents and their influence (04)

Unit IV: Ocean Basins

- 4.1 Oceanic sediments: origin and classification (03)
- 4.2 Coral reefs and atolls: types and factors, coral and volcanic islands (04)

4.3 Major features of the ocean floor: formation explained by Plate Tectonics(05)

4.4 Resource potential of the oceans (03)

Module 3

ECONOMIC GEOGRAPHY (Th.)

50 Marks

Unit I: RESOURCES

- 1.1 Concept and classification of resources: Economic and Environmental approaches to resource utilization. (02)
- 1.2 Resource depletion and resource conservation; Forrester-Meadows model on Limits to Growth; Sustainable use of resources (03).
- 1.3 Land as resource; Problems of land acquisition in developing countries; Development of EPZ and SEZ; Land reforms in India with special reference to West Bengal . (04)
- 1.4 Global scenario of resource related problems and trend of management with reference to Iron Ore, Bauxite, Coal, Petroleum and Nuclear power (05)

Unit II: PRIMARY ACTIVITIES

- 2.1 Primary activities: Concept, classification and importance. (01)
- 2.2 World view of primary activities-- problems and trend of management with reference to forestry, fishing and livestock farming. (03)
- 2.3 Critical appreciation of agricultural systems: Intensive agriculture (Rice), Extensive agriculture (Wheat), Plantation farming (Tea) and Mixed farming (NW Europe). (04)
- 2.4 Land use and Agricultural models: L.D.Stamp ,Von Thunen and Weaver (02)

Unit III: SECONDARY ACTIVITIES

- 3.1 Secondary activities: concept, classification and importance (01)
- 3.2 Factors of industrial location; industrial location and economic growth models: Weber, Losch and Gunnar Myrdal . (03)

3.3 Industries-- their resource base, distribution, potentials of growth and problems with reference to Iron and steel (UK, Japan, and India), Cotton textile (USA and India), Petrochemicals (USA and India) and Food processing (India). (08)

3.4 Industrial association, integration, infrastructure and problems with reference to Lake District, Kanto Plains, and Kolkata-Haldia. (04)

Unit IV: TERTIARY ACTIVITIES

4.1 Tertiary activities and service: concept, classification and importance (01)

4.2 Trade: as an engine and hindrance to growth, determinants, trade strategies – import substitution and export promotion. (03)

4.3 International trade: Ricardian theory, international trade with reference to GATT and WTO. (03)

4.4 Transport: concept of distance, accessibility and connectivity relative cost advantage of different modes of transport; (03)

* figures in the parentheses indicate number classes required.

Module 4

Cartograms and Geological Maps (Pr.)

50 Marks

1.1 Scale: (6 marks)

- a) Linear
- b) Diagonal
- c) Vernier

1.2 Cartograms: Representation of economic data (12 marks)

- a) Divided proportional circles
- b) Flow diagram

c) Bargraphs

1.3 Interpretation of Geological maps (16 marks)

a) Study of Horizontal, Vertical and tilted beds along with alignment of contours:

Study of strike, dip and bedding plane

b) Drawing of sections on uniclinal and simple folded structures depicting unconformity, succession of beds and their thickness

c) Interpretation of the section covering geological history and relation between topography and structure

1.4 Megascopic Identification of rocks and minerals (08 marks)

a) Rocks: granite, basalt, dolerite, shale, sandstone, limestone, conglomerate, laterite, slate, phyllite, schist, marble, quartzite, gneiss

b) Minerals: talc, gypsum, calcite, mica, feldsper, quartz, chalcopryrite, hematite, magnetite, bauxite, galena

1.5 Laboratory Note Book and Viva Voce (4+4 marks)

PART II

Module 5

Climatology (Th.)

50 Marks

Unit I: Atmospheric Layers and Thermal Variation

1.1 Nature, composition and layered structure of the atmosphere (02)

1.2 Factors controlling insolation ; heat budget of the atmosphere (03)

1.3 Horizontal and vertical distribution of temperature; Inversion of temperature(02)

1.4 Green house effect and importance of ozone layer (04)

Unit II: Atmospheric Layers and Wind Circulation

2.1 Global atmospheric pressure belts and their oscillation (02)

2.2 General wind circulation (03)

- 2.3 Jet stream and index cycle (04)
- 2.4 Monsoon mechanism with reference to jet stream (04)

Unit III: Precipitation and Air mass

- 3.1 Processes and forms of condensation (02)
- 3.2 Mechanism and forms of precipitation- Ice Crystal theory, Collision-coalescence Theory (04)
- 3.3 Air mass: typology, origin and characteristics (03)
- 3.4 Warm and cold fronts; frontogenesis and frontolysis (04)

Unit IV: Weather Disturbance and Climatic Classification

- 4.1 Tropical cyclone (03)
- 4.2 Mid-latitude cyclone and anti-cyclone (03)
- 4.3 Climatic classification after Koppen (03)
- 4.4 Climatic Classification after Thornthwaite: 1931 and 1948 (04)

* figures in the parentheses indicate number classes required.

Module 6

Soil and Bio-Geography (Th.)

50Marks

Unit I : Soil Formation, Profile Characteristics and Properties

- 1.1 Definition and factors responsible for soil formation (02)
- 1.2 Concept of V.V. Dokuchaev- ektodynamomorphic and endodynamomorphic soils; Concept of N.M.Sibirtzev-Zonal, Azonal and Intra zonal soils (03)
- 1.3 Profile characteristics of Pedalfer group :Laterite and Podzol; Profile characteristics of Pedocal group: Chernozem (06)
- 1.4 Physical properties of soil: Texture, Structure and Moisture; Chemical properties of soil: pH, Organic matter and NPK (03)

Unit II: Soil and Land Management

- 2.1 Soil erosion: Processes and controlling factors (02)
- 2.2 Various measures of soil conservation (03)
- 2.3 Principles of soil classification: Genetic School and USDA

Principles of land classification: UK and USDA	(06)
2.4 Land capability classification by Storie	(01)

Unit III: Concepts in Bio -Geography

- 3.1 Scope and content of Bio Geography; Nature of Biosphere (02)
- 3.2 Concepts of Ecology, Ecosystem and major natural ecosystems: terrestrial and marine; Trophic structure, Food chain and Food web (04)
- 3.3 Laws of Thermodynamics (02)
- 3.4 Energy flow in ecosystems (03)

Unit IV: Ecological Aspects of Bio -Geography

- 4.1 Bio-geo-chemical cycles (04)
- 4.2 Concept of Biomes, Ecotone, and Community; study of Tropical rain forest, Taiga and Grasslands (05)
- 4.3 Deforestation: Causes and consequences (02)
- 4.4 Significance of Biodiversity and controlling factors (02)

* figures in the parentheses indicate number classes required.

Module -7

Social, Cultural and Political Geography (Th.)

50 Marks

Unit I: Concept in Social Geography

- 1.1 Definition, scope and content of Social Geography (02)
- 1.2 Evolution of Social Geography: Approaches- Possibilistic, Behavioral, Radical and Welfare (03)
- 1.3 Social structure and Social processes: macro and micro; Social patterns (03)
- 1.4 Concept of Space: Social space, Material space; Social wellbeing (04)

Unit II: Components of Social Geography

- 2.1 Region as a social unit (02)
- 2.2 Social Elements; Class, caste and ethnicity with special reference to India (03)
- 2.3 Social issues in urban areas: Social area analysis; Social ecology (04)
- 2.4 Social Groups: Tribal, Traditional and Modern society (04)

Unit III: Cultural Geography

- 3.1 Concept of culture in Geography; definition, scope and content of Cultural Geography (02)

- 3.2 Cultural groups with reference to India: ethnic, linguistic and religious (03)
- 3.3 Cultural regions, Cultural areas and Cultural landscape (03)
- 3.4 Cultural assimilation, integration and diffusion (03)

Unit IV: Political Geography

- 4.1 Definition and scope of Political Geography (01)
- 4.2 Approaches and Schools of thought in Political Geography (Landscape school, Functional school and Morphological school (05)
- 4.3 Geo- strategic views of Mackinder and Spykeman (04)
- 4.4 Political Geography of India: Impact of partition of India (04)

* figures in the parentheses indicate number classes required.

Module 8

Map Interpretation and Survey with Instruments (Pr.) 50 Marks

UNIT-1 : Topographical Sheet (22 Marks)

- 1.1 Principles of toposheet numbering as followed by Survey of India; Thorough study of plateau region on toposheet of 1:50,000 scale
- 1.2 Morphometric techniques in 10 x 12 cm area :
Relative relief (after Smith), Average slope (after Wentworth), Drainage density and grid-wise Road density with interpretation
- 1.3 Drawing and analysis of profiles and transect chart with interpretation
- 1.4 Analysis of landforms and correlation between physical and cultural elements under the heads of: relief, drainage, natural vegetation, settlements and transport

Unit II: Survey with instruments (20 Marks)

- 2.1 Contouring by leveling along radial line by a Dumpy Level: at least three radial lines to be set out from a common centre and their relative position to be obtained by measurement of magnetic bearing and/or included angle by Prismatic Compass
- 2.2 Preparation of Level Book
- 2.3 Longitudinal /profile leveling by Dumpy Level
- 2.4 Closed traverse survey by Prismatic Compass

Unit III: Laboratory Note Book and Viva Voce (4+4 Marks)

PART II

Module 9

Population and Settlement Geography (Th.)

50 Marks

Unit I: Population Dynamics

- 1.1 Factors influencing spatial distribution and density of population (04)
- 1.2 Population growth: global trends and patterns (04)
- 1.3 Population structure: Age and Sex specific (02)
- 1.4 Population composition: Economic and Ethnic (02)

Unit II: Demographic Attributes

- 2.1 Determinants and Measures of Fertility, Morbidity and Mortality; Migration (05)
- 2.2 Theories of Population Growth: Malthus and Marx (04)
- 2.3 Demographic Transition Model (02)
- 2.4 Population- Resource Region (as per Zelinsky) (02)

Unit III: Rural Settlements

- 3.1 Definition, nature and characteristics of rural settlements (02)
- 3.2 Morphology of rural settlements: site and situation, layout-internal and external (04)
- 3.3 Rural house types with reference to India (03)
- 3.4 Social segregation in rural areas; Census categories of rural settlements (03)

Unit IV: Urban Settlements

- 4.1 Census definition and categories in India (02)
- 4.2 Urban morphology: Classical models-Burgess, Homer Hoyt, Harris and Ullman (04)
- 4.3 Metropolitan concept, City-region and Conurbation (03)
- 4.4 Functional classification of cities: Harris, Nelson and McKenzie (04)

* figures in the parentheses indicate number classes required

Module 10

Regional Geography of India (Th.)

50 Marks

Unit I: Concepts and Bases

- 1.1 Concept of regions, nature and types of regions (02)
- 1.2 Approaches to regionalization--scale and dimension (03)
- 1.3 Bases of regional division--physical (03)
- 1.4 Bases of regional division – socio-economic (03)

Unit II: General Geography of India

- 2.1 Structure and Physiography (04)
- 2.2 Drainage (Peninsular and Extra Peninsular) (03)
- 2.3 Climatic, Edaphic and Biotic regions of India (05)
- 2.4 Agricultural regions (as per ICAR) (03)

Unit III: Case Studies

- 3.1 Meghalaya Plateau as Physiographic Region (03)
- 3.2 Damodar Valley as Planning Region (03)
- 3.3 Western Rajasthan as Arid Region (03)
- 3.4 Sundarbans as Biotic Region (03)

Unit IV: Studies of Geographical Problems

- 4.1 Problems of unreliability of rainfall (03)
- 4.2 Problems of soil salinity and its mitigation (03)
- 4.3 Problems of development of SEZ in India (03)
- 4.4 Problems of slum and urban rehabilitation in India (03)

* figures in the parentheses indicate number classes required

Module 11

Philosophy of Geography (Th.)

50 Marks

Unit I: Nature of Geography

- 1.1 Geography and its relation with other disciplines (02)
- 1.2 Encyclopaedism, Geographical ideas during ancient period (03)

- 1.3 Development of Geography during medieval period (03)
- 1.4 Emergence of scientific ideas in Modern Geography (04)

Unit II: Basic Concepts

- 2.1 Ideographic and Nomothetic approaches (03)
- 2.2 Man-Environment relation (03)
- 2.3 Location, time and space (03)
- 2.4 Areal differentiation and Spatial organization (04)

Unit III: Modern Thoughts

- 3.1 Empiricism (02)
- 3.2 Positivism (02)
- 3.3 Environmental determinism (05)
- 3.4 Possibilism (03)

Unit IV: Contemporary Thoughts

- 4.1 Structuralism (02)
- 4.2 Quantitative Revolution (04)
- 4.3 Radicalism (03)
- 4.4 Humanistic and Behavioural Approaches (04)

* figures in the parentheses indicate number classes required

Module 12

Contemporary Issues in Geography (Th.)

50 Marks

Unit I: Climatic and Biotic Hazards in the Indian Sub –continent

- 1.1 Concept of hazards and disaster: Natural, quasi-natural and man-made hazards (02)
- 1.2 Seasonal climatic hazards: Flood, and drought—mechanism, environmental impact and management (04)
- 1.3 Occasional climatic hazards: Hailstorm and tornadoes- mechanism, environmental impact and management (03)
- 1.4 Biotic hazards: Deforestation and loss of bio-diversity-impact and conservation of biotic resources (03)

Unit II: Other Terrestrial Hazards in the Indian Sub-continent

- 2.1 Edaphic hazards: Salinization and Desertification-mechanism, impact and management (03)
- 2.2 Geomorphic hazards: Landslide, River bank erosion and Coastal erosion--mechanism, impact and management (06)
- 2.3 Tectonic hazards: Earthquake--impact and precautionary measures (02)
- 2.4 Water related hazards: Contamination of ground water and fall of piezometric level (03)

Unit III :Human Development in the Third World

- 3.1 Concept of development and under development; Basic indicators of economic development (02)
- 3.2 Economic disparity as constraint of development: per capita income, purchasing power and standard of living (03)
- 3.3 Poverty: Poverty line, Unemployment, Dependency ratio, Work participation and Poverty alleviation (04)
- 3.4 Economic impact of globalization (03)

Unit IV: Human Development in the Third World

- 4.1 Basic indicators of human and gender development (02)
- 4.2 Social inequality as constraint of development: caste and religious fundamentalism; gender bias (03)
- 4.3 Demographic constraint: Population growth, Malnutrition, Food security and Hunger, Morbidity and Mortality (04)
- 4.4 Sustainable development (03)

*figures in the parentheses indicate number classes required

Module 13

Mapping Techniques (Pr.)

50 Marks

Unit I: Map Projection (20 Marks)

- 1.1 Concept, classification and suitability (04 Marks)
- 1.2 Construction and properties of Zenithal Stereographic Projection(Polar Case)
- 1.3 Non Perspective Projection: : Simple Conical with one standard parallel, Bonne's, Sinusoidal, Polyconic and Cylindrical Equal Area

1.4 Mercator's Projection (16 Marks)

Unit II: Cartograms: Representation of Population Data (12 Marks)

2.1 Choropleth

2.2 Proportional squares

2.3 Dots and Spheres

2.4 Age-Sex Pyramid

Unit III: Thematic Mapping with Climatic and Soil Data (10 Marks)

3.1 Climatic chart

3.2 Ternary diagram

3.3 Diagram with data on soil profile

Unit IV: Laboratory Note Book and Viva Voce (4+4)

Module 14

GIS and Remote Sensing (Pr.)

50 Marks

UNIT-1: GIS (10 Marks)

1.1 Georeferencing of scanned maps and satellite images applying reference spheroids (WGS-84 and Everest) and Projections (Universal Transverse Mercator's and Polyconic)

1.2 Digitization of *point, line and polygon* layers; Attachment of appropriate attribute tables

1.3 Digitization of administrative maps and attachment of attribute tables

1.4 Preparation of thematic maps: Choropleths and maps with Bar and Pie diagrams

Unit II: Remote Sensing (10 Marks)

2.1 Principles of Photogrammetry, Types of aerial photographs, Determination of scales of aerial photographs

2.2 Identification of physical and cultural features by fusing two overlapping photographs and their verification with topographical sheets with interpretation.

2.3 Preparation and interpretation of land use/land cover map using three overlapping aerial photographs

2.4 Resolution of satellite sensors with special reference to landsat and IRS series;

Preparation of standard false colour composites from Landsat and IRS data;
Preparation of land use/land cover map with interpretation.

Unit III: Laboratory Note Book and Viva Voce (3+2)

Unit IV: Field Report and Viva Voce (15+10)

The following specifications to be followed:

4.1 Selection of either a Rural area or an Urban area based on cadastral or municipal maps to study specific problems.

4.2 Collection of primary data on physical and socio-economic aspects at household level.

4.3 Objectives and Methodology of the study should be clearly stated to establish the relation between physical and cultural landscape

4.4 Plot to plot Landuse survey and preparation of Landuse map based on cadastral /municipal map

4.3 Suitable maps and diagrams to be prepared on the basis of primary and secondary Data

4.4 Limits with guide lines:

a) The text of the report should not exceed 20 typed A4 pages with line spacing of 1.5 and neatly drawn maps and diagrams with photographs not more than 20 pages. Computer graphics are not permissible.

b) Dry letters, Fix-O-Pull etc. are not permissible.

c) The report should be hand written and should be written in English.

d) Each lesson of the report should be signed by the concerned teacher of the respective college who conducted the field work..

e) Recurrence of visit to the same field area is prohibited.

Module 15

Statistical Techniques (Pr.)

50 Marks

UNIT-1: Basic Concepts

1.1 Significance of statistical techniques in Geography, nature of statistical data:

discrete, continuous, parametric and non-parametric.

1.2 Sampling techniques : random, stratified random and purposive

1.3 Frequency Distribution : Histogram, frequency polygon, ogive, normal and skewed distribution

1.4 Measures of central tendency : mean, median, mode; partition values –quartile, decile and percentile

Unit II: Dispersion and Regression

2.1 Measures of dispersion: mean deviation, quartile deviation, standard deviation and Co-efficient of variation.

2.2 Bivariate scatter diagram and regression trend line

2.3 Coefficient of correlation after Karl Pearson

2.4 Time series analysis: Moving average, semi average and least square method

Unit III: Laboratory Note Book and Viva Voce (4+4)

Module 16

Contemporary Techniques in Geography (Pr.)

50 Marks

Unit L: Natural Hazards and their Management in the Indian Sub-continent (20 Marks)

1.1 Preparation and interpretation of Ombrothermic charts and Rainfall dispersion diagram (based on IMD data)

1.2 Preparation of Station models for different meteorological stations of India with the help of synoptic chart

1.3 Preparation and interpretation of Rating curves, Hydrographs and Unit hydrographs of rivers flowing through the Indian sub-continent

1.4 Hazard Mapping: Identification and zoning of the following hazards, collation of maps and their interpretation:

- i) Meteorological drought
- ii) Flood
- iii) River bank erosion

Unit II: Economic and Human Development in Third World (20 Marks)

2.1 Computation of Human and Gender Development Index and ranking of countries/states/districts based on HDI and GDI

2.2 Preparation of Questionnaire and Survey schedule for assessment of development and

for perception study

2.3 Measures of spatial and size class distribution:

- i) Dominant distinctive functions
- ii) Rank size rule
- iii) Lorenz curve

Unit III: Laboratory Note Book and Viva Voce (5+5)

Question Pattern for Theoretical Papers

There shall be two categories of questions A and B

The expected answer types will be as follows:

Category and Marks	Answer Type
A. With 10 marks each	Essay type involving both informative and conceptual contents along with very short questions wherever necessary.
B. With 4 marks each	Brief analytical/ comparative type oriented towards explanations of concepts and scientific principles.

The Group-wise distribution of different categories will be as follows:

		Number of Questions to be answered	Number of Questions to be answered
Full Marks	Category-wise Marks	Category A with marks	Category B with marks
50	A. 30 + B. 20	3 out of 5(10x3)	5 out of 8(4x5)

GEOGRAPHY

GENERAL

PART-I

Paper – I

100 Marks

MODULE I GEOTECTONICS AND GEOMORPHOLOGY (50 Marks)

- 1.1 Structure of the earth's crust
- 1.2 Influence of rocks on topography
- 1.3 Broad outline of plate tectonics and major crustal formations: fold mountains, trenches, island arcs
- 1.4 Development of landforms: Fluvial, Aeolian, glacial, coastal and karst; cycles of erosion

MODULE II SOCIAL AND ECONOMIC GEOGRAPHY (50 Marks)

- 2.1 Growth and distribution of world population; Migration: Types, causes and consequences
- 2.2 Contemporary social issues: literacy, poverty, gender issues
- 2.3 Sectors of economy: primary, secondary tertiary and quaternary: Changing emphasis through time ; Forms of economy
 - i) Tribal economies: hunting, gathering, shifting cultivation of India.
 - ii) Traditional economies: Intensive subsistence rice farming in India
 - iii) Modern Economies: Commercial grain farming and mixed farming
- 2.4 Scales of production, small-scale and large scale industries- general characteristics and examples.
- 2.5 Location, problems and prospects of Indian industries
 - i) Agro-based: Cotton textile industry
 - ii) Forest- based: Paper industry
 - iii) Mineral based: Iron and steel industry

PART-II

Paper –II

100 Marks

MODULE III CLIMATOLOGY, SOIL AND BIOGEOGRAPHY (50 marks)

- 4.1 Insolation and Heat Budget; Horizontal and vertical distribution of temperature and pressure; Greenhouse effect
- 4.2 Monsoon system: its origin and mechanism; Tropical disturbances: thunderstorm and cyclone
- 4.3 Climatic classification after Koppen
- 4.4 Origin of soils; Profile development; Concept of zonal, azonal and intrazonal soils
- 4.5 Properties of soil: Physical and chemical
- 4.6 Definition of ecosystem and Biomes; Tropical rainforest; Savannah; Hot desert;
- 4.7 Plant types and distribution (halophyte, xerophytes, hydrophytes and mesophyte); animal communities

MODULE IV REGIONAL GEOGRAPHY OF INDIA (50 marks)

- 5.1 Concept of region: formal and functional; scale macro, meso and micro
- 5.2 Broad physiographic regions of India with special reference to Western Himalayas
- 5.3 Vagaries of Indian Monsoon and its impact; problems of flood and drought; Forest resources of India: issues concerning deforestation and bio-diversity; Problems of soil erosion and conservation in India
- 5.4 Regions of India
 - i) Agricultural regions of India: with special reference to Punjab-Haryana wheat belt
 - ii) Industrial regions of India: with special reference to Hooghly Industrial Belt
 - iii) Planning regions of India; with special reference to DVC Region

**Paper-III
Practicle**

100 Marks

MODULE V APPLIED GEOGRAPHICAL TECHNIQUES-I (50 marks)

- | | | | |
|-----|-----------------------------------|--|-----------|
| 3.1 | Scale: | Concept of scale; drawing of linear scale | 5 marks |
| 3.2 | Statistics: | | 15 marks |
| | i) | Nature and classification of data | |
| | ii) | Process of tabulation and graphical representation :
histogram, frequency polygon, cumulative
frequency curve | |
| | iii) | Measures of central tendency: mean, median and
mode | |
| 3.3 | Map interpretation | | 22 marks |
| | i) | Basis of numbering and scale of topographical
sheets | |
| | ii) | Interpretation of 1: 50,000 topographical sheets:
plain and plateau region and extraction of
geographical information from maps, interpretation
and explanation with suitable sketches, profiles and
transect chart. | |
| 3.4 | Laboratory notebook and viva voce | | 4+4 marks |

MODULE VI APPLIED GEOGRAPHICAL TECHNIQUES-II (50 marks)

- | | | |
|-----|--|----------------|
| 6.1 | Map projections: Concept and classification; Simple Conic with One
standard Parallel, Cylindrical Equal Area; Polar Zenithal Stereographic. | 12 marks |
| 6.2 | Cartograms: Bar graphs, simple and compound; proportional divided
circles and choropleth. | 10 marks |
| 6.3 | Project Report: Collection of secondary and primary data on the basis of
questionnaire schedule (Mouza Wise/Ward Wise within West Bengal)
which must be submitted along with the report. Maps, diagrams and
photographs not to exceed 15 pages and text not to exceed 1500 words
(Report + viva voce) | 12+8= 20 marks |
| 6.4 | Laboratory notebook and viva voce | 4+ 4= 8 marks |

PART-III

Paper-IV

100 Marks

MODULE VII LAND USE AND SETTLEMENT GEOGRAPHY (50 marks)

- 7.1 Concept and attributes of land
- 7.2 Objectives and principles of land use
- 7.3 Factors influencing land use and land categories
 - i) Agricultural land use
 - ii) Non agricultural land use:
- 7.4 Rural and urban settlements:
 - i) Rural settlements: evolution, nature and characteristics, effect of physical environment;
 - ii) Urban settlements: definition, morphology and functions

MODULE VIII REMOTE SENSING AND THEMATIC MAPPING (20 marks)

- 8.1 Definition of remote sensing, different methods of remote sensing; air photo and satellite imagery
- 8.2 Air photo: characteristics, interpretation
- 8.3 Satellite imagery: Types of satellite imageries, characteristics of IRS imageries
- 8.4 Definition, objective and principles of thematic mapping (climatic, economic and population)

Practical

MODULE IX APPLIED GEOGRAPHICAL TECHNIQUES –III (30 marks)

- 9.1 Preparation of land use maps from cadastral maps based on primary or secondary data
- 9.2 Preparation of thematic maps: flow diagram and accessibility maps
- 9.3 Air photo interpretation by pocket stereoscope for identification of broad features
- 9.4 Laboratory Notebook and Viva-voce

SUGGESTED READINGS
(HONOURS)

Module 1 Geotectonic and Geomorphology

1. Bloom, A.L. 1992: Geomorphology- Systematic Analysis of Late Cenozoic Landforms, Prentice Hall India, New Delhi.
2. Chorley, R.J. 1969: Introduction to Fluvial Processes, Methuen, London
3. Chorley, R.J. 1969: Water Earth and Man, Methuen, London.
4. Chorley, R.J., Schumm, S. A. and Sugden, D.E. 1984: Geomorphology, Methuen, London
5. Cooke, R.U. and Warren, 1973: Geomorphology in Deserts, Batsford, London
6. Dayal, P. 1996: Textbook of Geomorphology, Shukla Book Depot ,Patna.
7. Fairbridge, R.W. 1968: The Encyclopaedia of Geomorphology, Dowden Hutchinson and Ross Inc, Philadelphia.
8. Hallam, A. 1973: A Revolution in Earth Science: From Continental Drift to Plate Tectonics, Oxford University Press, London.
9. Kale, V. and Gupta, A. 2001: Introduction to Geomorphology, Orient Longman, Kolkata
10. McCullagh, P. 1978: Modern Concepts in Geomorphology, Oxford University Press, Oxford.
11. Morisowa, M. 1968: Streams, their Dynamics and Morphology, McGraw Hill, New York.
12. Mukhopadhyaya, S. and Das, P.K 1993: Bhumirup: Udbhab O Prakriti (Bengali), Paschim Banga Rajya Pustak Parshad, Kolkata.
13. Ollier, C.D. 1975: Weathering, Longman, London
14. Ollier, C.D. 1981: Tectonics and Landforms, Longman, London
15. Selby, M. J. 1991: Earth's Changing Surface, Clarendon Press, London
16. Small, R.J. 1978: The Study of Landforms, Cambridge University Press, Cambridge

17. Sparks, B.W. 1960: Geomorphology, Longman, London.
18. Strahler, A.N. and Strahler, A.H. 1984: Elements of Physical Geography, John Wiley, New York.
19. Thornbury, W.D. 1954: Principles of Geomorphology, John Wiley, New York.
20. Wooldridge, S.W. and Morgan, R.S. 1959: The Physical basis of Geography- An Outline of Geomorphology, Longman, London

Module 2 Hydrology and Oceanography

1. Chorley, R.J., 1969 : Water, Earth and Man, Methuen, London
2. Chow, V. T., Maidment, D.R. and Mays, L.W. 1988: Applied Hydrology, McGraw Hill, New York.
3. King, C.A.M. 1962: Oceanography for Geographers, Arnold, London.
4. King, C.A.M., 1972: Beaches and Coasts, Arnold, London.
5. Linsley, K., Kohler, M. and Paulhus, J.L. 1975: Applied Hydrology, Tata McGraw Hill, New York.
6. Meinzer, O.E. 1942: Hydrology, Dover Publication Inc. New York.
7. Rahgunath, H.M. 1997: Hydrology- Principles, analysis, Design, New Age International Pvt. Ltd, New Delhi
8. Shepard, F.P., 1963: Submarine Geology, Harper and Row, New York
9. Small. R.J. 1989: Geomorphology and Hydrology, Longman Group Ltd, London.
10. Steers, J.A. 1953: The Sea Coast, Collins, London.
11. Sverdrup, H.U. 1942: The Oceans, their Physics, Chemistry and General Biology, Prentice-Hall, New York.
12. Todd, D.K. 1959: Ground Water Hydrology, John Wiley and Sons, New York
13. Walton, W.C. 1970: Ground Water Resource Evaluation, McGraw Hill, Tokyo.

Module 3 Economic Geography

1. Alexandersson, C, 1971: Geography of Manufacturing, Prentice Hall India, New Delhi.

2. Berry, B.J.L., Conklin, E.C. and Ray, M. D. 1976: The geography of Economic Systems, Prentice Hall, New Jersey.
3. Bradford, M.G. and Kent, W.A. 1977: Human Geography, Theories and Applications, Oxford University Press, Oxford.
4. Brock, J.O.M. and Webb, J.W. 1973: A Geography of Mankind, McGraw Hill, New York.
5. Gourtney, P. 1965: Plantation Agriculture, G. Bell and Sons, London.
6. Dhillon, J.S. Agricultural Geography
7. Guha, J.L. and Chattaraj, P.R. 1989: A New Approach to Economic Geography: A Study of Resources, World Press, Kolkata
8. Hartshorn, T.A. and Alexander, J.W. 1988: Economic Geography, Prentice Hall India, New Delhi.
9. Isard, W. et al 1956: Location, Space and Economy, Technology Press of MIT and John Wiley, New York
10. Isard, W. et al 1960: Methods of Regional Analysis, Technology Press of MIT and John Wiley, New York
11. Jhingam, M.L. 1978: Economics of Development and Planning, Vikash Publishing House, New Delhi.
12. Jones, C.F. and Darkenwald, G.G. 1954, Economic Geography, Macmillan, New York.
13. Leong. G.C. and Morgan, G.C. 1975: Human and Economic Geography, Oxford University Press, Hong Kong.
14. Miller, E. 1962: A Geography of Manufacturing, Prentice Hall, Englewood Cliff, N. J.
15. Morgan, W.B. and Manton, R.J.C. 1971: Agricultural geography, Methuen, London.
16. Paterson, J.H. 1976: Land, Work and Resources- An Introduction to Economic Geography, Edward Arnold , London
17. Sen, A. 1990: Jibanjatra O Arthaniti (Bengali) Ananda Publishers, Kolkata.
18. Simmons, I. G. 1981: The Ecology of Natural Resources, ELBS/ Edward Arnold, London.

19. Singh, J., 1974: An Agricultural Atlas of India: A Geographical Analysis, Vishal Publications, Kurukshetra.
20. Smith, D.N. 1971: Industrial Location- An Economical Geographical Analysis, John Wiley, New York.
21. Thoman, R.S. and Corbin, P.B. 1968: Geography of Economic Activity, McGraw Hill, New York.
22. Wheeler, J.O. and Muller, P.O., 1986: Economic Geography, John Wiley, New York.
23. World Development Report, Oxford University Press, New York, (Published annually).
24. Zimmermann, E.W. 1956: World Resources and Industries, Harper Brothers, New York.

Module 4 Practical (Cartograms and Geological Maps)

1. Monkhouse, F.J. 1971: Maps and Diagrams, Methuen, London
2. Singh, R.L. and Singh, R.P.B. 1992: Elements of practical Geography.
3. Dury, G.H. 1972: Map Interpretation, Pitman Publishing, London
4. Ishtiaque, M. 1989: Practical Geography, Heritage Publishers, New Delhi.
5. Platt, J.I., 1956 : Selected Exercises upon Geological Maps, Part I, Unwin, London
6. Robinson, A.H., Morrison, J.L., Muehrcke, P.C., Kimerling, A.J. and Guptill, S.C. 1995: Elements of Cartography, John Wiley and Sons, New York.

Module 5 Climatology

1. Ahmad, R. 1997: Abahaoa O Jalavayu Vijnan (Bengali) , University Of Rajshahi, Rajshahi, Bangladesh
2. Barry, R.G. and Chorley, R.J. 1985: Atmosphere, Weather and Climate, Methuen, London
3. Blair, T.A. and Fite, R.C. 1965: Weather Elements: A Text in Elementary Meteorology, Prentice Hall, New York
4. Critchfield, H.J. 1966: General Climatology, Prentice Hall, New York.
5. Das, P.K., 1988: The Monsoons, National Book Trust, India, New Delhi.

6. Das. P.K., 2004: Mousumi Vayu (Bengali), National Book Trust, India, New Delhi (Bengali).
7. Henderson-Sellers, A. and Robinson, P.J. 1966: Contemporary Climatology, ELBS/ Longman.
8. Lal, D.S. 1986: Climatology, Chaitanya Publishing House, Allahabad.
9. Lutgens, F.K. and Tarbuck, E.J. 1982: The Atmosphere: An Introduction to Meteorology, Prentice Hall, New York.
10. Lydolph, P.E. 1985: The Climate of the Earth, Rowman and Allan Held, New Jersey.
11. Mather, J.R.,1974.: Climatology: Fundamentals and Applications, McGraw Hill, New York
12. Musk, L.F. 1988: Weather Systems, Cambridge University Press, Cambridge.
13. Pettersson, S. 1958: Introduction to Meteorology, McGraw Hill, Tokyo.
14. Robinson, H. 1982: Biogeography, ELBS/ McDonald and Evans, London.
15. Saha, P.K. and Sarkar, M.K. 1994: Adhunik Jalavayavidya (Bengali), Paschim Banga Rajya Pustak Parshad, Kolkata.
16. Trewartha, G.T. 1968: An Introduction to Climatology, McGraw Hill, New York.

Module 6 Soil and Biogeography

1. Anderson: Ecology for Environmental Science.
2. Biswas, T.D. and Mukherjee, S. K. 1987: Text book of Soil Science, Tata McGraw Hill, new Delhi.
3. Buckman, H.R. and Brady, N.C. 1974: Nature and Properties of Soil, McMillan, New York.
4. Bunting, A. 1965: Geography of Soil, Hutchinson, London.
5. Chapman, J.L. and Reiss, M.J. 1992: Ecology Principles and Applications, Cambridge University Press, Cambridge.
6. Daji, J.A., Kadam, J.R. and Patil, N.D. 1996: A Textbook of Soil Science, Media Promoters and Publishers Pvt Ltd, Mumbai.
7. Das, P and Basu, S. 2003: Mrittikar Katha O Damodar Upattakar Mrittika Khayer Ruparekha, (Bengali), Sandip, Kolkata

8. De, N.K. and Jana, N.C.1997: Land – Multifaceted Appraisal and Management, Sribhumi Publishing Company, Kolkata.
9. De, N. K. and Sarkar, M. K. 1994: Mrittika Bhu-vidya, (Bengali) Paschim Banga Rajya Pustak Parshad, Kolkata.
10. Fitzpatrick, E.A. 1983: Soils, Their Formation, classifications and Distribution, ELBS/ Longman, London.
11. Foth, H.D. and Schafer, J.W. 1980: Soil Geography and Land Use, John Wiley, New York.
12. Joffe, J.S. 1965: ABC of Soil, Oxford Book Co., Kolkata.
13. Joy, T. et al 1989: Human Impact on The Ecosystem, Oliver and Boyd, London.
14. Kendeigh, S.C. 1975: Ecology with Special Reference to Man and animals, Prentice Hall, New York.
15. Kormondy, E.J. 1991: Concepts of Ecology, Prentice Hall India, New Delhi.
16. Mukhopadhyay, A.K. 1984: Mrittika Vigyan (Bengali), Paschim Banga Rajya Pustak Parshad, Kolkata.
17. Nebel, J.B. 1981: Environmental Science, Prentice Hall, New York.
18. Odum, F.P. 1971: Fundamentals of Ecology, W.B. Sanders, Philadelphia.
19. Shukla, R.S. and Chandel, P.S. 1930: Plant Ecology and Soil Science, S Chand, New Delhi.
20. Simmons, I. G. 1981: The Ecology of Natural Resources, ELBS/ Edward Arnold, London.
21. Simmons, I.G. 1980: Bio-geographical Processes, George Allen and Unwin, London.
22. Watts, D. Principles of Biogeography: An Introduction to Functional Mechanisms of Ecosystems, McGraw Hill, London.
23. Young, A. 1976: Tropical Soil and Soil Survey, Cambridge University Press, Cambridge.
24. Watoo, Principles of Bio-geography.

Module 7 Social,Cultural and Political Geography

1. Adhikari, S (2004) : Political Geography, Rawat Publication, New Delhi.
2. Admed, A (2004) : Social Geography, Rawat Publication, New Delhi
3. Beaujeu Garnier (1976): Methods and Perspective in Geography, Longman, London.
4. Carter, H. (1972): The Study of Urban Geography, Edward Arnold Ltd., London.
5. Chapman, K. (1979): People, Pattern and Process – An Introduction to Human Geography, Edward Arnold Ltd., London.
6. Dickinson, R. E. (1964): City and Region, Routledge, London.
7. Dwivedi R.L.(2004): Fundamentals of Political Geography, Chaitanya Publishing House, Allahabad
8. Freeman, T. W., (1961): Hundred Years of Geography, Gerald Duckworth and Co., London.
9. Jones, Emrys (1965): Human Geography, Chatto and Windies, London.
10. Jones, E. and Eyles, J. (1977): An Introduction to Social Geography, Oxford University Press, Oxford.
11. Kolars, J. E. and Nyestuen, J. D. (1974): Geography, McGraw Hill Book Co., New Work, London.
12. Leong, G. C. and Morgan, G. C. (1975): Human and Economic Geography, Oxford University Press, Hong Kong.
13. Rubenstein, J. M. and Becon, J. M. (1990): Cultural Geography, John Wiley and Sons Inc., New York.
14. Spencer, J. E. and Thomas, W. L. (1969): Cultural Geography, John Wiley and Sons Inc., New York.
15. Pound, J : Introduction to Political Geography, Oxford Publication.
16. Guha, R. C: Social Geography.

Module 8 Practical (Map Interpretation and Survey with Instruments)

1. Kanetkar, T.P. and Kulkarni, S.V. 1972: Surveying and Levelling, Pune Vidyarthi Griha Prakashan, Pune.
2. Misra, R.P. and Ramesh, A. 1986: Fundamentals of Cartography, McMillan, New Delhi
3. Monkhouse, F.J. and Wilkinson, H.R. 1980: Maps and Diagrams, B.I. Publications Private Limited, New Delhi.
4. Singh, R.L. and Singh, R.P.B. 1992: Elements of practical Geography, Kalyani Publisher, New Delhi.
5. Ishtiaque, M. 1989: Practical Geography, Heritage Publishers, New Delhi.
6. Robinson, A.H., Morrison, J.L., Muehrcke, P.C., Kimerling, A.J. and Guptill, S.C. 1995: Elements of Cartography, John Wiley and Sons, New York.

Module 9 Population and Settlement Geography

1. Agarwala, S.N. 1985: India's Population Problems, Tata McGraw hill, New Delhi.
2. Beaujeu- Garnier, J 1966; Geography of Population, Longman, London.
3. Bhende, A.A. and Kanetkar, T. 1978: Principles of Population Studies, Himalayan Publishing House, Mumbai.
4. Carter, H.1975: The Study of Urban Geography, Edward Arnold, London
5. Chandna, R.C. 1986: A Geography of Population, Kalyani Publishers, New Delhi
6. Clarke, J. I. 1971: Population Geography and the Developing Countries, Pergamon Press, Oxford
7. Clarke, J. I. 1972 Population Geography, Pergamon Press, Oxford
8. Daniel, P. and Hopkins, M. (1989): A Geography of Settlement, Oliver and Boyd, Essex.
9. Dickinson, R.E. 1964: City and Regions, Routledge & Keganpaul Ltd , London
10. Ghosh, S. 1998 : Settlement Geography, Orient Longman Ltd. , Kolkata.
11. Hassan, M.H. 2005: Population Geography, Rawat Publications, New Delhi
12. Hudson, F.S. 1977: A Geography of Settlements, Macdonald & Evans Ltd. Plymouth.
13. Johnson, J.H. 1977 Urban Geography- An Introductory Analysis, Pergamon press, Oxford.

14. Johnston, R.J. 1984: Urban Geography, Penguin, London
15. Mandal, R.B. 2001: Introduction to Rural Settlements, Concept Publishing Company, New Delhi.
16. Mayer, H.M. & Kohn, C.F. ed 1959 Readings in Urban Geography, The University of Chicago Press, Chicago
17. Trewartha, G.T. 1969: A Geography of Population- World Patterns, John Wiley, New York.
18. Trewartha, G.T. 1972: The Less Developed Realms-A Population Geography, McGraw Hill, New York.
19. Zacharia, E. and Sinha, V.C., 1986 : Elements of Demography, Allied publishers Pvt Ltd, New Delhi
20. Zelinsky, W. 1966: A Prologue to Population Geography, Prentice Hall India, New Delhi.

Module 10 Regional Geography of India

1. Chatterjee, S. P. (1973): Physiography of India, Gazetteer of India, Vol. I, Chopra, P. N. (Ed.), Govt. of India, New Delhi.
2. Dutta, S.: Indian Economy.
3. Mitra, A. : Regional Geography of India.
4. Roy Chaudhuri, S. P. et. al. (1963): Soils of India, Council of Agricultural Research, New Delhi.
5. Singh, R. L. (1989): India – A Regional Geography, National Geographical Society of India, Varanasi.
6. Spate, O. H. K. and Learmonth, J. A. (1972): India and Pakistan, Methuen Co. Ltd., London.
7. Ganguly, D. S., Damodar Valley Corporation.

Module 11 Philosophy of Geography

1. Adhikari, S. (1992): Fundamentals of Geographical Thought, Chaitanya Publishing . House, Allahabad.

2. Brown, E. H. and Mead, W. R. (Ed.) (1980): *Regional Geography – Yesterday, Today and Tomorrow*, Oxford University Press, U. K.
3. Freeman, T. W. (1961): *Hundred Years of Geography*, Gerald Duckworth and Co. Ltd., USA.
4. Gregory, D. (1978): *Ideology, Science and Human Geography*, Hutchinson, USA.
5. Harvey, D. (1969): *Explanations in Geography*, London.
6. Hartshorne, R. (1939): *The Nature of Geography: Association of American Geographers*, USA.
7. Harvey, Milton E. and Brian, P. Holly (Ed.) (1981): *Themes in Geographical Thought*, Rawat Publication, Delhi.
8. Hossain, M. (1988): *Evolution of Geographical Thought*, Rawat Publications, Jaipur.
9. Isard, W. (1975): *Introduction to Regional Science*, Prentice Hall, London.
10. Johnston, R. J. et al (Ed.) (1981) (a) *The Dictionary of Human Geography*, Blackwell, England. (b) *Anglo American Geography. A Post-World War Study*.
11. Peet, R. (Ed.) (1977): *Radical Geography*, Methuen, London.
12. Preston, E. James. *All Possible World Evolution of Geographical Thought*.
13. Haggett.: *Geography – A Modern Synthesis*.

Module 12 Contemporary Issues in Geography

1. *Citizens' Report: Centre of Science and Environment, New Delhi, Published Annually.*
2. *World Development Report: World Bank, Oxford University Press, Published Annually.*
3. *Human Development Report: Published Annually by Oxford University Press.*
4. *Natural Human Development Report: 2001- Govt. of India, Planning Commission, 2002 Oxford University Press.*
5. *Disaster Report, Centre for Development Studies: Trivandrum, Published Annually.*

6. India Development Report: Parikh, Oxford University Press.
7. Natural Hazard: Edited by White.
8. Environmental Geology: B. W. Murck and et al, John Willey.
9. Survey on Environment: Hindu, Chennai, Published Annually.
10. Weather Weapons: Nature Book Trust.
11. Settlement Geography of Through Desert: R. L. Singh.
12. Environment and Development: R. Bhattacharyya, (Edited).
13. Alexander, D. (1993): Natural Disasters, Research Press, New Delhi, 619 P.
14. Blaikie, P. Cannon, Davis and Wisenes (1994): At Risk, Natural Hazards, People's Vulnerability and Disasters, Pouthledge, London, 320 P.
15. Bryant, E. A. (1991): Natural Hazards: Cambridge University Press, Cambridge, Pg 294.
16. Burotn, I. Kates, R. W. and White, G. F. (1974): The Environment as a Hazard, Oxford University Press.
17. Coch, N. C. (1994): Geo-Hazards, Prentice Hall, N. Y., Pg.305.
18. Gilbert, F. White, ed. (1974): Natural hazards – Local, Natural and Global, Oxford University Press, N. Y.
19. Morrisawa, M., (1996):Geomorphology and Natural Hazards,Elsevia, Amsterdam, pg 411
20. Smith, K. (1996): Environmental Hazards: Assessing Risk and Reducing Disaster, Routledge, Pg.398
21. Wijkman, A. and Yimber Lake, L. (1988): Natural disasters- Acts of God or Acts of man, New Society Publication, Earth Scan, London.

Module 13 Practical (Mapping Techniques)

1. Kellaway, G.P., 1979: Map Projections, B.I. Publications, New Delhi
2. Misra, R.P. and Ramesh, A. 1986: Fundamentals of Cartography, Macmillan, New Delhi
3. Monkhouse, F.J. and Wilkinson, H.R. 1980: Maps and Diagrams, B.I. Publications Private Limited, New Delhi.

4. Robinson, A.H., Morrison, J.L., Muehrcke, P.C., Kimerling, A.J. and Guptill, S.C. 1995: Elements of Cartography, John Wiley and Sons, New York.
5. Singh, R.L. and Singh, R.P.B. 1992: Elements of practical Geography.
6. Steers, J.A.1954: An Introduction to the Study of Map Projections, University of London Press, London.

Module 14 Practical (GIS, Remote Sensing and Field Report)

1. Burrough, P.A and McDonnell, R.A.,1998: Principles of Geographical Information Systems, Oxford University Press, Oxford
2. Campbell, J.B. 1996: Introduction to Remote Sensing, Taylor & Francis, London.
3. Heywood, I., Cornelius, S. and Carver, S., 2001: An Introduction to Geographical Information Systems, Pearson Education, Indian Branch, Delhi
4. Lillesand, T.M. & Kiefer, R.W. 2003: Remote Sensing & Image Interpretation, John Wiley & Sons, Inc. New York.
5. Nag, P, ed 1992: Thematic Cartography and Remote Sensing, Concept Publishing Co., New Delhi
6. Nag, P. & Kudrat, M 1998: Digital Remote Sensing, Concept Publishing Co., New Delhi.
7. Narayan, L.R.A. 1999: Remote Sensing and Its Application, Universities Press (India) Ltd., Hyderabad.

Module 15 Practical (Statistical Techniques)

1. Alvi, Z. 1995: Statistical Geography-Methods & Application, Rawat Publications, Jaipur.
2. Clark, W.A.V. and Hosking, P.L. 1986: Geographical Methods for Geographers, John Wiley and Sons, New York
3. Croxton, F.E., Cowden, D.J. & Klein, S 1969: Applied General Statistics, Prentice Hall of India Pvt. Ltd., New Delhi
4. Dickinson, G.C. (1973): Statistical Mapping and Presentation of Statistics
5. Goon, A.M., Gupta, M.K. & Dasgupta, B. 1992: Fundamentals of Statistics, Volume 1, The World Press Pvt. Ltd., Kolkata

6. Goon, A.M., Gupta, M.K. & Dasgupta, B. 1992: Basic Statistics, Volume 1, The World Press Pvt. Ltd., Kolkata
7. Gregory, S. 1985: Statistical Methods and the Geographer, Longman, London
8. Mahmood, A. 1998: Statistical Methods in Geographical Studies, Rajesh Publications, New Delhi
9. Norcliffe, G.B. 1977: Inferential Statistics for Geographers-An Introduction, Hutchinson and Co., London
10. Pal, S.K. 1998: Statistics for Geo-Scientists- Techniques and Application, concept Publishing Company, New Delhi.

Module 16 Practical (Contemporary Techniques in Geography)

1. Basu, R. and Bhaduri, S. ed, 2007: Contemporary Issues and Techniques in Geography, Progressive Publishers, Kolkata.
2. Cole, J. P. and King, C.A.M., 1968: Quantitative Geography, Techniques and Theories in Geography, John Wiley & Sons Ltd, Glasgow.
3. Fukuda-Parr, S and Shiva Kumar, A.K. ed, 2003: Readings in Human Development, Oxford University Press, New Delhi
4. Hammond, R, and McCullagh, P. 1978: Quantitative Techniques in Geography: An Introduction, Oxford University Press, Oxford.
5. Human Development Report, 1995, UNDP, Oxford University Press, New Delhi
6. Human Development Report, 2007/2008, UNDP, Palgrave Macmillan, New York
7. Human Development Report, 2009, UNDP, Palgrave Macmillan, New York
8. Mahmood, A. 1998: Statistical Methods in Geographical Studies, Rajesh Publications, New Delhi

GENERAL

(Theoretical)

PHYSICAL GEOGRAPHY

1. Bandhyopahyaya, T. and Bhattacharyya, S. 2000: Adhunik Bhoo Parichay (Bengali), Chhaya Prakasani, Calcutta.
2. Das, P. K. 1988: The Monsoons, National Book Trust, New Delhi.
3. Monkhouse, F.J. 1975: Principles of Physical Geography, Hodder and Stoughton, London.
4. Mukhopadhyay, S. and Das, P. K. 1993: Bhumirup Udbhap O Prakriti, Paschim Banga Rajya Pustak Parshad, Calcutta.
5. Mukhopadhyaya, A. K. 19884: Mrittika Vigyan, Paschim Banga Rajya Pustak Parshad, Calcutta.
6. Lake, P. 1959: Physical Geography, McMillan, Calcutta.
7. Singh, S. 1993: Physical Geography, Prayag Pustak Bhawan, Allahabad.
8. Thornbury, W. D. 1969: Principles of Geomorphology, Wiley Eastern Limited, New Delhi.
9. Ahmed, Rajik, 2000: Jalabayuvidya, Dacca, Bangladesh.
10. Saha, P. K. and Bhattacharya, P. K. 1999. Jalabayuvidya.
11. Singh, S. 2000: Environmental Geography.

HUMAN AND REGIONAL GEOGRAPHY

1. Guha, J. L. and Chattaraj, P.R. , 1992: Human and Economic Geography, World Press, Calcutta.
2. Leong, G. C. and Morgan, G. C. 1982: Human and Economic Geography, Oxford University Press, Kuala-Lumpur.
3. Memoria, C. B. 1984: Economic and Commercial Geography of India, Shivalal Agarwal Publication Co. Agra.
4. Sharma, T. C. and Continho, 1988: Economic and Commercial Geography of India, Vikas Publishing House, New Delhi.
5. Spate, O. K. K. and Learmonth, A. T. A, 1967: India and Pakistan, Methuen, London.
6. Hartshorne, Alexander, Economic Geography.
7. Brock and Webb. Geography of Mankind.
8. Kurien India.
9. Chand and Puri Regional Planning.
10. Khullar India,
11. Janasankha Bhugol, Rajya Pustak Parishad.
12. Chandna, Population Geography.
13. Chatterjee, A. 2001: Arthanaitik Bhugol.

APPLIED GEOGRAPHY

1. Sen, Jyotirmoy, 2000, Janabasati Bhugol.
2. Dey, N. K. Land-multifaceted Appraisal and Management.
3. Bhattacharyya, B. Samaj Vigyani O Bhugol.
4. Nag, P. Cartography and Remote Sensing, Concept. New Delhi.
5. Ishtiaque Practical Geography.

(Practical)

APPLIED GEOGRAPHICAL TECHNIQUES

1. Singh, R. L. and Singh, R. P. B. 1991: Elements of Practical Geography, Kalyani Publishers, New Delhi.
2. Bandyopadhyay, T. and Sil. A. 1988: Byabaharic Bhugol Parichaya, Chhaya Prakashani, Calcutta.

MODULE I GEOTECTONICS AND GEOMORPHOLOGY (50 Marks)

- 1.1 Structure of the earth's crust
- 1.2 Influence of rocks on topography

- 1.3 Broad outline of plate tectonics and major crustal formations: fold mountains, trenches, island arcs
- 1.4 Development of landforms: Fluvial, Aeolian, glacial, coastal and karst; cycles of erosion

MODULE II SOCIAL AND ECONOMIC GEOGRAPHY (50 Marks)

- 2.6 Growth and distribution of world population; Migration: Types, causes and consequences
- 2.7 Contemporary social issues: literacy, poverty, gender issues
- 2.8 Sectors of economy: primary, secondary tertiary and quaternary: Changing emphasis through time ; Forms of economy
 - i) Tribal economies: hunting, gathering, shifting cultivation of India.
 - ii) Traditional economies: Intensive subsistence rice farming in India
 - iii) Modern Economies: Commercial grain farming and mixed farming
- 2.9 Scales of production, small-scale and large scale industries- general characteristics and examples.
- 2.10 Location, problems and prospects of Indian industries
 - i) Agro-based: Cotton textile industry
 - ii) Forest- based: Paper industry
 - iii) Mineral based: Iron and steel industry

MODULE III APPLIED GEOGRAPHICAL TECHNIQUES-I (50 marks)

- 3.4 Scale: Concept of scale; drawing of linear scale 5 marks
- 3.5 Statistics: 15 marks
 - i) Nature and classification of data
 - ii) Process of tabulation and graphical representation : histogram, frequency polygon, cumulative frequency curve
 - iii) Measures of central tendency: mean, median and mode
- 3.6 Map interpretation 22 marks
 - i) Basis of numbering and scale of topographical sheets

- ii) Interpretation of 1: 50,000 topographical sheets: plain and plateau region and extraction of geographical information from maps, interpretation and explanation with suitable sketches, profiles and transect chart.
- 3.4 Laboratory notebook and viva voce 4+4 marks

MODULE IV CLIMATOLOGY, SOIL AND BIOGEOGRAPHY (50 marks)

- 4.1 Insolation and Heat Budget; Horizontal and vertical distribution of temperature and pressure; Greenhouse effect
- 4.2 Monsoon system: its origin and mechanism; Tropical disturbances: thunderstorm and cyclone
- 4.3 Climatic classification after Koppen
- 4.4 Origin of soils; Profile development; Concept of zonal, azonal and intrazonal soils
- 4.5 Properties of soil: Physical and chemical
- 4.6 Definition of ecosystem and Biomes; Tropical rainforest; Savannah; Hot desert;
- 4.7 Plant types and distribution (halophyte, xerophytes, hydrophytes and mesophyte); animal communities

MODULE V REGIONAL GEOGRAPHY OF INDIA (50 marks)

- 5.1 Concept of region: formal and functional; scale macro, meso and micro
- 5.2 Broad physiographic regions of India with special reference to Western Himalayas
- 5.3 Vagaries of Indian Monsoon and its impact; problems of flood and drought; Forest resources of India: issues concerning deforestation and bio-diversity; Problems of soil erosion and conservation in India
- 5.4 Regions of India
 - i) Agricultural regions of India: with special reference to Punjab-Haryana wheat belt
 - ii) Industrial regions of India: with special reference to Hooghly Industrial Belt
 - iii) Planning regions of India; with special reference to DVC Region

MODULE VI APPLIED GEOGRAPHICAL TECHNIQUES-II (50 marks)

- 6.1 Map projections: Concept and classification; Simple Conic with One standard Parallel, Cylindrical Equal Area; Polar Zenithal Stereographic. 12 marks
- 6.2 Cartograms: Bar graphs, simple and compound; proportional divided circles and choropleth. 10 marks
- 6.3 Project Report: Collection of secondary and primary data on the basis of questionnaire schedule (Mouza Wise/Ward Wise within West Bengal) which must be submitted along with the report. Maps, diagrams and photographs not to exceed 15 pages and text not to exceed 1500 words (Report + viva voce) 12+8= 20 marks
- 6.4 Laboratory notebook and viva voce 4+ 4= 8 marks

MODULE VII LAND USE AND SETTLEMENT GEOGRAPHY (50 marks)

- 7.5 Concept and attributes of land
- 7.6 Objectives and principles of land use
- 7.7 Factors influencing land use and land categories
 - iii) Agricultural land use
 - iv) Non agricultural land use:
- 7.8 Rural and urban settlements:
 - iii) Rural settlements: evolution, nature and characteristics, effect of physical environment;
 - iv) Urban settlements: definition, morphology and functions

MODULE VIII REMOTE SENSING AND THEMATIC MAPPING (20 marks)

- 8.5 Definition of remote sensing, different methods of remote sensing; air photo and satellite imagery
- 8.6 Air photo: characteristics, interpretation
- 8.7 Satellite imagery: Types of satellite imageries, characteristics of IRS imageries
- 8.8 Definition, objective and principles of thematic mapping (climatic, economic and population)

MODULE IX APPLIED GEOGRAPHICAL TECHNIQUES –III (30 marks)

- 9.5 Preparation of land use maps from cadastral maps based on primary or secondary data
- 9.6 Preparation of thematic maps: flow diagram and accessibility maps
- 9.7 Air photo interpretation by pocket stereoscope for identification of broad features
- 9.8 Laboratory Notebook and Viva-voce