

UNIVERSITY OF RAJASTHAN, JAIPUR



# SYLLABUS

SCHEME OF EXAMINATION AND  
COURSES OF STUDY

**M.A./M.Sc. GEOGRAPHY**

FACULTY OF SCIENCE/SOCIAL SCIENCE

M.A./M.Sc. (Previous) Examination, 2014

M.A./M.Sc. (Final) Examination, 2015

## SCHEME OF EXAMINATION

### (Annual Scheme)

Each Theory Paper	3 Hrs. Duration	100 Marks
Dissertation/Thesis/ Survey Report/Field Work, if any.		100 Marks

1. The number of papers and the maximum marks for each paper/practical shall be shown in the syllabus for the subject concerned. It will be necessary for a candidate to pass in the theory part as well as in practical part (wherever prescribed) of a subject/paper separately.
2. A candidate for a pass at each of the Previous and the Final Examinations shall be required to obtain :
  - (i) Atleast 36% marks in the aggregate of all the papers prescribed for the examination, and
  - (ii) Atleast 36% marks in practical(s) wherever prescribed at the examination, provided that if a candidate fails to secure atleast 25% marks in each individual paper at the examination and also in the dissertation/survey report/field work, wherever prescribed, he shall be deemed to have failed at the examination notwithstanding his having obtained the minimum percentage of marks required in the aggregate for that examination. No division will be awarded at the Previous and the Final Examination. Division shall be awarded at the end of the Final Examination on the combined marks obtained at the Previous and the Final Examinations taken together, as noted below :

First Division	60%	}	of the aggregate marks taken together of the Previous and the Final Examination.
Second Division	48%		

All the rest will be declared to have passed the examination.

3. If a candidate clears any Paper(s) Practical(s)/Dissertation prescribed at the Previous and/or Final Examination after a continuous period of three years, then for the purpose of working out

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his division the minimum pass marks only viz. 25% (36% in the case of practical) shall be taken into account in respect of such Paper(s)/Practical(s)/Dissertation are cleared after the expiry of the aforesaid period of three years, provided that in case where a candidate requires more than 25% marks in order to reach the minimum aggregate as many marks out of those actually secured by him will be taken into account as would enable him to make up the deficiency in the requisite minimum aggregate.

4. The Thesis/Dissertation/Survey Report/Field Work shall be typewritten and submitted in triplicate so as to reach the office of the Registrar atleast 3 weeks before the commencement of the theory examinations. Only such candidates shall be permitted to offer Dissertation/ Field Work/Survey Report/Thesis (if provided in the scheme of examination) in lieu of a paper as have secured atleast 55% marks in the aggregate of all the papers prescribed for the previous examination in the case of annual scheme I and II semester examinations taken together in the case of semester scheme irrespective of the number of papers in which a candidate actually appeared at the examination.
5. The students are permmitted to use simple calculatar, Log Table & map stencils in the Examinations needed.

**N.B.** Non-collegiate candidates are not eligible to offer dissertation as per provisions of O. 170-A.

## M.A./M.SC. GEOGRAPHY

There will be four theory papers and a practical each in Previous and Final Examinations. Each of the theory papers will be 100 marks. Each theory paper will be of three hours duration. Candidate will be required to pass both in Theory and in Practicals separately.

### PREVIOUS

Paper-I Evolution of Geographical Thought

Paper-II Physical Basis of Geography

Paper-III Principles and Theory of Economic Geography

Paper-IV Any one of the following :

- (a) Advance Geography of Monsoon Asia
- (b) Geography of Rural Development.
- (c) Comparative Geography of the U.S.A. and Russia.
- (d) Geography of South Asian countries (Bangladesh, Nepal, Pakistan, Shrilanka).
- (e) Advanced Regional Geography of West Europe.
- (f) Man and Natural Environment
- (g) Quantitative Techniques in Geography.

### Practicals :

Distribution of Marks will be as follows :

1. Written Test on Lab. Work	Four Hrs. (4 Qs.)	40 Marks
2. Report Work & Viva Voce.	(20+10)	30 Marks
3. Project Report & Viva-Voce	(20+10)	30 Marks
<b>Total</b>		<b>100 Marks</b>

### Note :

1. 12 hours of teaching practicals be provided for a batch of 20 students per week.
2. Candidates will have to answer 4 questions out of six questions.
3. Examination in practical be conducted in batches of not more than 20 students in any case.

### FINAL

Paper-V Advanced Geography of India.

Paper-VI Any one of the following :

- (a) Population Geography.

- (b) Agricultural Geography (Elements & Applied)
- (c) Industrial Geography
- (d) Transport Geography.
- (e) Geography of Settlements.
- (f) Advanced Geomorphology

Paper-VII Any one of the following

- (a) Urban Geography.
- (b) Climatology.
- (c) Applied Geography.
- (d) Pedology
- (e) Medical Geography
- (f) Remote Sensing Techniques.

Paper-VIII

Any one of the following :

- (a) Political Geography.
- (b) Cultural Geography.
- (c) Bio-geography
- (d) Regional Planning.
- (c) Meteorology.
- (f) Research Methodology.
- (g) Geography of water resources, their management and utilization.

**Dissertation :**

*Practical :*

Surveying and Laboratory work.

The distribution of marks in the practical will be as following :

Making scheme for the purpose of practical examination :

1. Written Test on Lab. Work	Four Hrs. (4 Qr.)	40 Marks
2. Record Work & Viva Voce	(14 + 6)	20Marks
3. Field Survey & Viva-Voce	Four hrs. (14+6)	20 Marks
4. Camp. Work & Viva-Voce	7 days (14+6)	20 Marks
Total		100 Marks

**Note :**

1. 12 hours of teaching practicals be provided for a batch of 15 students per week.
2. Students will have to attempt four questions out of 6 questions in written paper of practical examination.

### Instructions for Geography Practical Examination.

1. The record work should have 50 sheets (1/6th of 20" × 30") and they should cover the total syllabus proportionately. The teacher should revise fresh exercises every time so that the student may not undertake tracing of old exercises. The work must be done in the class rooms and signed on the same date. This would discourage completing the whole work at the nick of the examination. Emphasis should be laid on ink; and colour maps.
2. The Viva-voce Exam. be held to judge the real knowledge of the student and to examine the authenticity of the record work. The marking on the record work and its viva-voce be based on the original work of the candidate and not by merely producing the record work got done by any other agency. Marks be deducted for the syllabus not covered.
3. On an average about 20 students be examined in one day, in M.A. previous. As far as possible practical exercise be set to judge the practical skill through the Practical exercises.
4. (a) In final each student be examined single on each of the prescribed instruments of surveying. The field Survey by instrument in M.Sc./M.A. Final be given for another 4 hours alongwith Viva-voce. Each students will have to do exercise on each instrument individually.  
(b) The practical examination in M.Sc./M.A. (Final) will be conducted in batches of not more then 10 to 15 students and the total examination for each batch be conducted in not less than two days in any case.
5. The theory paper in M.A. Final be so set that the questions are not duplicated with field exercises.
6. The surveying may not absorb unnecessarily long time. Surveying and field work be completed in the first three/four months of the session and camp be held immediately after the completion of the surveying course. The rest of the session may be engaged for covering other remaining course.
7. The External examiner be provided detailed syllabus and detailed instructions at the time of obtaining his consent.

Note : A copy of the instructions be sent to the examiners for their information.

## PREVIOUS

### *Syllabus :*

**Paper-I : Evolution of Geographical Thought :**

Time : 3 hrs.

Max. Marks : 100

### *Section-'A'*

Definition, Scope, Nature and purpose of geography. The beginning of geography in classical age, contribution of Greeks and Romans to geography with special reference to the work of Herodotus, Eratosthnesse Pasidonius, Strabo and Ptolemy. Geography in the middle ages, the geographical ideas of the Christian world. Contributions of Muslims to Medieval geography, the work of Al Biruni, Edrese, Ibn-Batutta, Ibn Khaldun, the Geography of ancient India.

### *Section-'B'*

The revival of scientific geography during 16th and 17th centuries, the works of Sebastian Munstar, Cluvarious, Carpenter, and Varenius, the development of Scientific geography during 18th and 19th centuries, the work of Brunhes.

Buching, Malti Baru, Kant, Founders of modern geography, Humboldt and Ritter, shifting view point of geography during the later half of 19th century-Geography as geophysics, geography as science of planet earth, geography as a science of distribution and geography as science of relationship, the works of Richthofen and Ratzel. The development of geographical ideas during the 20th century, geography as a chronological science, the contributions of Hettner and Hartshorne, Geography as a science of landscape morphology, the contribution of Selluter and Saur, Geography as Human Ecology, The view of Huntington, Blache and Brunches.

### *Section-'C'*

The debate between environmental determinism and possibilism, the dichotomy of regional and systematic geography, the dualism of Human and Physical Geography, Exceptionalism in Geography, Quantitative and conceptual revolution in geography, the influence of logical positivism on development of analytical geography, the development of Behavioural geography, Radical geography, the influence of idealism and phenomenology on the development of Geographic thought, the development of geography in India.

### *Reference Books :*

1. Richard Hartshorn : The Nature of Geography.

2. Richard Hart Shorne : Perspective on the Nature of Geography
3. Dickinson : The Makers of Modern Geography.
4. James, P.E. : All possible world.
5. Burnpury, E.H. : History of Ancient Geography.
6. Tozer, H.F. : A History of Ancient Geography.
7. Ahmed : Muslim contributions to Geography.
8. Harvey, David : Explanation is Geography.
9. Harvey and Poly : Themes in Geography.
10. Johnston, R.J. : Geography and Geographers.
11. Gregory : Idiology and Geography.
12. Taaffe : Geography.
13. Peet, Richard, : Modern Geographical Thought.

**Paper-II : Physical Basis of Geography.**

**Section-'A'**

Introduction to Physical Geography, Definition, Recent Trends in Physical Geography, Models and systems in Physical Geography.

**Geomorphology** : Zonig of the earths interior. Thermal state of the interior : Endogenetic forces, Mountain building theories, (Kober, jeffreys, Joly, Holms, Wegener and Plate tectonics), Volcanic activity and Earth quakes, Isostasy, Denudation types of Weathering : Physical and Chemical Weathering; factors affecting weathering processes. Rivers and Drainage basins : Work of rivers, classification of valleys, Drainage pattern, Drainage basin and morphometry, baseline changes, Glacial and Peri-glacial landforms. Desert and tropical landforms, process of desertificaton. Coastal Features, Factors affecting coast and shoreline processes. Cliffs and platforms, coastal classification. Karst and limestone topography. Landscape development, reconstruction of landscape, cyclic (Davis, Penck, King) and non-cyclic (Hacks) development of Landscape.

**Section-'B'**

**Climatology**: The structure of Atmosphere, Atmospheric energy, air temperature, heat balance, Layered structure of atmosphere and characteristics of each layer, Moisture in the Atmosphere, humidity and its expression, Evaporation and condensation, adiabatic non-adiabatic processes, stability and instability, Precipitation, Thunderstorms, World precipitation pattern, Air motion, Pressure variations, Pressure belts, forces governing air movement, upper air motion. General circulation, the planetary wind system, the mechanism



of the circulation, surface features and circulation. Fronts, air masses and types, Depression, cyclones (Tropical and extra tropical) and anticyclones. Climatic types : Koppen's, Thornhwaite's schemes of climatic classification.

### *Section-'C'*

**Soil and Vegetation** : Soil genesis, classification and distribution, biotic succession and major biotic regions of the world with special reference to ecological aspects of savannah and monsoon biomes.

**Oceanography** : Oceanic water circulation, Ocean bottom relief, horizontal and vertical distribution of temperature, ocean deposits, origin and impact of ocean currents, Tides and tidal theories, theories of coral reef formation, atolls and coral islands, marine resources-biotic, mineral and energy resources and their utilization.

### *Books recommended :*

1. Ahmad, E. : Coastal Geomorphology of India, New Delhi.
2. Wooldridge and Morgan : An Introduction to Geomorphology (Longmans, green and Co. London).
3. Steers, J.A. : Unstable Earth (Methuen and Co. London).
4. Strahler, A.N. : Earth Sciences (Harper and Row Publishers, New Delhi).
5. Strahler, A.N. : Modern Physical Geography (John Wiley and Sons, Inc. New York).
6. Youg, A : Slopes.
7. Thomas, M.F. : Tropical Geomorphology : A Study of Weathering and land Form Development in Warm Climate, Macmillan, Delhi, 1974
8. John, Pity: Introduction to Geomorphology.
9. Sharma, R.C. : Oceanography for Geographers (Chaitanya Publishers, Allahabad.)
10. Thornbury, W.D. : Principles of Geomorphology : (John Wiley, New York).
11. Lobeck, A.K. : Geomorphology : (McGraw Hill Book Co. New York).
12. Von-Engelin, O.D. : Geomorphology (Macmillan, New York).
13. King and Embleton, C.A.M. : Glacial and Peri-Glacial Geomorphology (Arnold).

14. University of Rajasthan, Studies in Geography, Vol. III 1970-71.
15. Dayal, P. Bhoo Akriti Vigyan.

**Books for reference :**

1. Holmes, Arthur : Physical Geology (Nelson).
2. Davis, W.M. : Geographical Essays (Dover).
3. Cotton, C.A. : Geomorphology (John Willey & Sons : New York)
4. Davison, C: Theories of Earthquakes (Mechmillan and Co., London).
5. Ramsey : Folding and Fracturing of Rocks.
6. Hodgson : Earthquakes and Earth-Structures.
7. While : Study of Earth.
8. John Pity : Sedimentary Rocks.
9. Lydolph : Physical Geography Laboratory Manual.
10. Platt : Simple Geological Structures.
11. Collar : Oceanography.
12. Jeffreys, H : The Earth-Its Origin History and Physical Constitution.
13. Soovel : Atlas of Land Forms.

**Books recommended :**

1. Kendrew, W.G. : The Climates of the Continents; Oxford University Press, New York.
2. Brooks, C.E.P. : Climate in Every day Life.
3. Critchfield, H.J. : General Climatology.
4. Trewartha, G.T. : Introduction to Weather and
5. Austin, H. : Climatology.
6. Blair, T.A. and Fite R.C. : Weather Elements : A Text book in Elementry Meteorology, Prentice Hall.
7. H. Lamdbern Dubis : Physical Climatology, Pre Gray Printing Co. U.S.A.
8. Das, P.K. : Monsoon, National Book Trust
9. Patternson : Weather Analysis and Forecasting
10. Sharma, R.C. : Oceanography for Geographers, Chaitanya Publishers, Allahabad.
11. Holmes Arthur : Physical Geology.
12. Cotter : Oceanography.
13. Lake, P. : Physical Geography.

## Paper-III : Principles and Theory of Economic Geography

### Section-'A'

Changing nature of economic geography as a field of study. Simple model of economy, environmental relations of the economy. Spatial structure of economy. Geographical basis of economic activities : systematic approach and spatial approach. Agricultural typology with special reference to subsistence agriculture, Plantation agriculture, Mediterranean agriculture. Mixed farming, Commercial grain farming, Livestock rearing.

### Section-'B'

Energy resources : Conventional and non-conventional spatial patterns and supply problems.

Manufacturing-Factors of production, Theories of plant location : Weber's Least cost theory, Losch's economics of location, Isard's space economy, Smith's spatial margins. Industries-Iron & Steel, Alluminium Industry, Paper and pulp, cotton textile, Chemical Industries-Fertilizer. Spatial variation in transport costs : Location and structure of transport costs. Transportation network and models, World transportation patterns.

### Section-'C'

Decision making process : Location decision-behavioural view. Spatial organisation of land use : Laws of return, concept of rent, Vonthunen's isolated state, Vonthunen's principles then and now, classical central place theory; Range of good, threshold, central place system, central place hierarchy, Modification of Christaller's model. Dynamics of World trade and investment : Trade and growth international co-operation in trade, Multinational enterprise toward a dynamic new theory of international commerce. Economic Region-Concept and methods of delineation, need of economic regionalisation for area development and planning-economic regions of India.

### References :

1. काशीनाथ सिंह एवं जगदीश सिंह : भूगोल के मूल तत्त्व, ज्ञानोदय प्रकाशन, गोरखपुर
2. Lloyd and Dickens : Location in Space : Theoretical Approach to Economic Geography.
3. McCart and Lindberg : A Preface to Economic Geography.
4. Smith, D.E. : Industrial Location : An Economic Geographical Analysis.
5. Hodder and Lee : Economic Geography.

6. Cox, K.P. Man, Location and Behaviour-An Introduction to Human Geography.
7. Brain, J.L. Berry, Edger C. Coonking and D. Michael Ray "Economic Geography" Prentice-Hall, New Jersey.
8. James, O. Wheeler and Peter, O. Muller : "Economic Geography" (Second Edition) John Wiley and Sons.

**Books Recommended :**

1. Smith, J.C. and Phillip, M.O. : Industrial and Commercial Geography (Hence Halt).
2. Reopke, H.G. : Readings in Economic Geography (Willey & Sons).
3. Miller, E.W. : A Geography of Manufacturing.
4. Ghose, B.C. : Industrial Location.
5. Estall, R.C. and Buenman : Industrial Activity and Economic Geography.
6. Garlson, A.S. : Economic Geography of Industrial Material.
7. Boesh, H. : A Geography of World Economy.
8. Bengston, N.A. and Royen, M.V. : Fundamentals of Economic Geography (Prentice Hall, New York).
9. Alexander, J.W. : Economic Geography (Prentice Hall, New York).
10. Briton John, N.H. : Regional Analysis and Economic Geography.
11. Sargent : Ports and their Hinterlands.
12. Morgan : Ports and Harbours.
13. Guha and Chaterjee : A New Approach to Economic Geography.
14. C. Langdo White, Paul F.F. Griffin and others : World Economic Geography.
15. Hutington and Ellsworth : Principles of Economic Geography.
16. Mac Carty, Harold and Lindberor James B. : A Preface to Economic Geography, (Prentice Hall New York).
17. Renner, T.H. and Others : World Economic Geography.
18. Robson, H. : Economic Geography (Mac Donald London)
19. Thoman, R.S. : The Geography of Economic Activity (Mc Graw Hill, New York).
20. Fried Sykes : Food Farming and the Future.

21. P. Sen Gupta and Galyna Sydasuk : Economic Region and Regionalisation in India.
22. Zimmeman, E.W. : World Resources and Industries (Harper & Co. New York).
23. Stateman: year Book.
24. F.A.O. year Book.
25. U.N.O. Statistical Year Book.
26. Indian year Book.

**Paper-IV : Any one of the following :**

**Paper-IV (a) Advanced Geography of Monsoon Asia**

3 hrs. duration

100 Marks

***Section-'A'***

Unity in Diversity in Monsoon Asia. Importance of location, Geological structure, Physiography, Drainage basins, Climate regions, Natural vegetation Mineral wealth.

Population and its characteristics, Power resources Agricultural characteristic. Importance of Monsoon lands with respect of food stuffs and raw materials, Natural rubber lands with respect to good stuffs and raw materials, Natural rubber and its world trade, Tea, Coffee Spices, Developments of transportation and accessibility.

***Section-'B'***

Singapore-Problems of industrial expansion, port developments, human resource. Phillippines-population and food problem and development programmes, Thailand-Problem of urbanisation and regional division and development programmes Indonesia-Population densities and its trends, mineral resources, type of agriculture, sugar industry Burma-regional divisions, agricultural, forest and mineral resources, Hong Kong—Urban growth, changing trade pattern, industrial development, changing Land use pattern. Korea-Agricultural and industrial development.

***Section-'C'***

China State farms and people communes, population and food supply industrialisation, changing pattern of industrial complex, Red Basin. The Hwango Ho, Yagize Kiang and Sikiang basins.

Japan-Coal resources, water power, Conservation of forest, copper production, tea, soyabean and rice culture, fishing industry, motor vehicle steel and industries. Industrial Belts.

**Books recommended :**

1. Dobbey, E.H.D. : South East Asia (John Willey and Sons), New York.
2. Fisher C.A. : South East Asia. A Social Economic and Political Geography (Mathuen and Co. Ltd., London).
3. Robequain, C. : Malaya, Indonesia, Borneo and Philippines. Longman Green and Co., New York.
4. Trewartha, G.P. : Japan. The University of Wisconsin Press.
5. Pruly, Dempost : Japan (Mathuen Co. Ltd., London)
6. O. Jia Bee : Malaya's Land and People.
7. Dobbey, E.H.G. : Monsoon Asia (University of London Press, London).
8. Rawsen, R.R. : Monsoon Lands (Hutchinsens University Library Series).
9. Ginsburg, N.: The Pattern of Asia : (Prentice Hall Inc., New York).
10. Stamp, L.D. : Asia (Mathuen & Co. London).
11. Cressey, G.B. : Land of 500 Millions.
12. Robnson : Monsoon Asia.
13. B.L. Garg and others : Monsoon Asia.

**Paper-IV (b) Geography of Rural Development :**

**Section-'A'**

Geography and rural development, Agricultural Geography and Rural Development, Agricultural location theory, Rural land use; Agricultural, pastoral, forestry and land use competition. Landuse and landscape. Approaches to rural development, growth center approach, infrastructure reformist. Rural settlement, Housing, Population and employment, Rural transport service provision, recreation; health and nutrition.

**Section-'B'**

Rural planning and land management; Resource development and integrated rural development : Crop and soil management, live stock range and management; Water management. Ecological management, desertification monitoring and control.

**Section-'C'**

Rural development in Rajasthan: major tools and techniques.

Rural development schemes-Irrigation and land development schemes, Drought prone areas schemes; Desert development programme; integrated rural development in Rajasthan, Tribal areas development; Wasteland development.

***Books recommended :***

1. Glig, A.W. : An introduction to Rural Geography, Edward, Arnold London, 1985.
2. Association of Country Councils : Rural Deprivation, London ACC, 1979.
3. Allan, J.A. : Remote Sensing in Land in Landuse Studies, Geography 65, 1980.
4. Tewari, A.K. (ed.) : Desertification : Monitoring and Control, Scientific Pubs, Jodhpur, 1988.
5. Anderson, J.R.L.J. Hardarkar-Agricultural decision Analysis, Ames, Lows State University Press. 1977.
6. Andrease, B : Farming Development and Space-World Agricultural Geography, New York, Water Cryter, 1981.
7. Morgan, W.B. and RJS Munon-Agricultural Geography, London Methuen, 1971.
8. Pacione, M. : Rural Geography, London, Parpur Clark, (ed) and Row 1984-Register of Research in Rural Geography Licester : Rural Geography Study Group, 1981.
9. Bowler I.R. : Agricultural Geography, Progress in Human Geography 8, 1948.
10. Newbury, Pa. Geography of Agriculture, Plymouth Macodonald and Evans, 1980.
11. Grigg, D.B. : The Agricultural Systems of the World. Cambridge University Press, 1974.
12. Grigg, D.B. : An Introduction to Agricultural Geography, London Hutchinson, 1984.
13. Jones, A. : Rural Housing. The Agricultural Tied College, London Bell, 1975.
14. Lassey. W.R. : Planning in Rural Environment, New York, McGraw Hill, 1977.
15. Lavery P. (ed.) : Recreational Geography, Newton Abbot: David and Charles, 1974.

16. Leasdale, R. : Settlement systems in sparsely populated regions & Homes (ed.) Oxford, Pergamon, 1981.
17. Menab, A : Integrated Rural Development, Gloucester Glanceser College of Arts, 1984.

**Paper-IV (c) Comparative Geography of U.S.A. & Russia :**

3 hrs. duration

Marks : 100

The study under the following heads :

**Section-'A'**

Strategic importance of location, geological structure, physical features and physiographic division, drainage pattern and river basins, climatic controls and climatic divisions, natural vegetation and vegetational divisions, demographic characteristics.

**Section-'B'**

Natural resources-Forest, soil mineral, livestock, development of power resources, development of Agriculture-Agricultural crop regions (Belts).

**Section-'C'**

Important industries, their location and distribution. Transportation networks (Rail, Road, Air, Water and pipelines).

International trade.

Detailed study of important regions-economic and industrial programmes for future development.

**Books Recommended : U.S.A.**

1. Ostrolenk, B. : Economic Geography of the United States (Thomas Y. Crowell Co., New York).
2. Shaw, E.B. : Anglo-America, A. Regional Geography (John Willey and Co., New York).
3. Smith, J.B. and Philip. M.G. : North America : (Harcourt Brace, New York).
4. Alexander : The North Eastern United States D. Vvan Nostranc Co., New York.)
5. Hait : The South Eastern United Co., N.Y.
6. Methn, Vendo : Soviet Economic development and Structure, Sterling Publisher Pvt. Ltd., AB/9 Safdarganj Enclave, New Delhi.
7. Russel I.C. : North America (Oxford University Press).



8. White, C.L. : Regional Geography of Anglo America (Prentice Hall, N.Y.)
9. Lames, P.E. : Latin America (Cassel And Co., London).
10. Martin, M.C. : The United States at Work (George G. Harrp and Co., N.Y.).
11. McCarry, H.H. : Geographic Basis of American Economic Life (Harper and Co., London).

***Books Recommended : U.S.S.R.***

12. Mirow, N.T. : Geography of Russia (John Willey and Sons, N.Y.).
13. Turin, S.P. : The U.S.S.R. (Mathuen and Co., London).
14. Shabad, T. : Geography of U.S.S.R. (Oxford University Press, Oxford).
15. Barg, L.S. Natural Regions of U.S.S.R. (Mac. Millian and Co., New York).
16. Balzak, S.S. : Economic Geography of Soviet Union (Mac Millian and Co., N.Y.).
17. Hodkins : Soviet Power, Energy, Resources, Production and Potentials (Prentice Hall, New York).
18. Schwartz, H. : Russia's Social Economy (Prentice Hall of India Delhi).
19. Robinson H. : The U.S.S.R. (University Tutorial Press, Ltd.)
20. Lydolph : Geography of the U.S.S.R. (John Willey and Sons, New York).
21. Miller, J. : The Soviet Russia (Mathuen and Co., London).
22. T. Shabad : Industrial Resources of U.S.S.R.

**Paper-IV (d) Geography of South Asian Countries  
(Bangladesh, Nepal, Pakistan, Srilanka).**

***Section-'A'***

Geographical realm of South Asia, Homogeneity and diversity, Study of Pakistan under the following heads-geographical and political units, climate and climatic regions, vegetation, agriculture, livestock, mineral resources, power resources, industries, trade population and natural regions, political relations.

***Section-'B'***

Study of Bangladesh under the following heads-geographical and

political units, climate and climatic regions, vegetation, agriculture, livestock, mineral resources, industries, trade, population, natural regions, political relations.

### *Section-'C'*

Study of Nepal, Bhutan, Srilanka and Maldive Islands under the following heads-geographical and political units, climate, vegetation, agriculture, livestock, industrial and economy, trade, population, political relations.

#### *Books recommended :*

1. Ahmed, N. (1958) Economic Geography of East Pakistan, Oxford University Press London.
2. Spencer, J.E. (1962) Asia East by South, John Wiley and Sons, London.
3. Kulshrestha, S.H. (1983) Simple Geography of Nepal, Educational Enterprise Pvt. Ltd. Kathmandu.
4. Rashid, R.E. (1977) Geography of Bangla Desh, University Press Ltd. Bangla Desh.
5. Johnson, B.L.C. (1975), Bangla Desh, Heinemann Education Books London.
6. Johnson, B.L.C. (1970) : Geography of South Asia.
7. Cooke : Ceylon.
8. Karan, P.P. The Himalayan Kingdom.

### **Paper-IV (e) Advanced Regional Geography of West Europe**

3 hrs. duration

Marks : 100

#### *Section-'A'*

Strategic importance of location, geological structure, physical features and physiographic divisions.

Drainage Pattern and River basins, Climatic controls and climatic division. Natural Vegetation, Vegetational division. Demographic characteristics.

#### *Section-'B'*

Natural resources-Forest, Soil mineral livestock. Development of power resources, Development of Agriculture-agricultural crop regions (belts).

#### *Section-'C'*

Important industries : their location and distribution. Transportation networks (Rail, Road, Air, Water and Pipe lines).

International trade.

Detailed study of important regions-economic and Industrial.  
Programme for future development.

**Books Recommended :**

J. Houston : Social Geography of Europe. Consult all the latest books.

**Paper-IV (f) Man and Natural Environment :**

3 hrs. duration

Marks : 100

**Section-'A'**

Perspective on man environment Relationship, symbiosis between man and environment, the effect of environment on man, biophysical, perceptual and behavioural related to resource availability, the effect of man on environment :

(a) direct and indirect

(b) man's capacity to modify the environment.

**Section-'B'**

The environmental crises, nature and causes of environmental problems, some case studies of India, Environmental pollution-Air, Water, Noise, Soil Pollutions.

**Section-'C'**

Criteria for environmental quality. Evolution of balanced and healthy environment, Sustainability of human ecosystem, Ecological basis of environmental management.

**Books Recommended :**

1. Arvilla R. : Man and Environment : Crises and strategy of Choice, Reguin, harmonds-worth, 1967.
2. Merrill, N.J. : Inherit the Earth : The story of man and Changing Planet, Fawcett, Greenwich, Connecticut, 1967.
3. Botking, Deniel B. and Keller, Edward, A. : Environmental Studies, Chales, E. Merrill Publishing Company. Columbus, Ohio, 1982.
4. C.S.E. : The State of India's Environment-A Citizen's Report, Centre for Science and Environment, New Delhi 1982.
5. C.S.E. : The State of India's Environment-The Second Citizen's Report. Centre for Science and Environment-New Delhi, 1984.
6. Dasman, R.F. : Environmental Conversation. John Wiley & Sons, New York. 1972.

7. Detwyler, J.R. : Man's Impact on Environment, John Wiley and Sons, New York, 1975.
8. Duffey, E. : Conservation of Nature, Collins, London 1970.
9. Edington, J.M. and Edington, M.A. : Ecology and Environmental Planning, Champan and Hall, London, 1977.
10. Harvey, B. and Hallet, J.D. : Environment and Society : An Introductory Analysis, Macmillan, London, 1977.
11. Hewitt, K. and Hari, F.K. : Man and Environment : A Conceptual Framwork Commission on College Georaphy Resources Paper 20, 1973 (AAG).
12. Park, C.C. : Ecology and Environmental Management, Butterworths, London, 1980.
13. M.I.T. : Study of Critical Environmental Problems, M.I.T., Massachusetts, 1970.
14. Sherlock K.L. : Man as a Geological Agent, Witherby London, 1972.
15. Thomas, W.L.(ed) : Man's Role in Changing the Face of the Earth, University of Chicago Press Chicago, 1956.

#### **Paper-IV (g) Quantitative Techniques in Geography**

3 hrs. duration

Marks : 100

##### **Section-A**

Probability : Theory of probabilities-law of addition and multiplication probabilities of distribution : normal, binomial, Poisson-sampling : basic concepts, sample units and design, sampling frame and procedures, standard error and sample size, testing the adequacy of samples.

Hypothesis Testing : Needs and types of hypotheses-goodness of fit and significance and confidence levels-parametric and non-parametric procedures; contingency tables, Chi-square test, binomial test, t-test, Mann-Whitney U test, Analysis of Variance (ANOVA)

##### **Section-B**

Bivariate Analysis; Forms of relation and measuring the strength of association and relation-construction and meanings of scatter diagram simple linear and regression analyses-Spearman's Rank and Product Moment Correlation Coefficients-the ordinary least square method of fitting a regression line-construction of regression line : interpolation, prediction, explanation and residual-statistical tests of significance of the estimates; residuals and their mapping.

##### **Section-C**

Multivariate Analysis; Basics of multiple regression-partial correlation coefficient regression analysis and ANOVA -testing the

overall significance of a regression auto correlation-multicolliniarity-basis principles and elements of Factor Analysis and principal component analysis.

Surface and Models : Gravity potential; model-spatial interpolation and trend surface analysis-simulation models; random walk and diffusion models-markov chain model similarity indices and region building construction of Thiessen polygons.

**Suggested reading :**

1. David Unwin: Introductory Spatial Analysis, Methuen, London, 1981.
2. Gregory, S. : Statistical Methods and Geographer, Longman, London, 1978.
3. Hammond R and P.S. McCullagh : Quantitative Techniques in Geography : An Introduction, Clearendan Press, Oxford, 1974.
4. John P. Cole and Cuchlanie A.M. King : Quantitative Geography, Johri Wiley, London, 1968.
- 5.. Johnston R.J.: Multivariate Statistical Analysis in Geography, Longman, London, 1973.
6. Kaustoniannis : Theory of Econometrics, Mcmillan, London, 1973.
7. Maurice Yeats : An Introduction to Quantitative Analysis in Human Geography, McGraw Hill, New York, 1974.
8. Peter Haggett, Andrew D. Cliff, & Allan Frey, : Location Methods.

**Practicals :**

1. Written test on Lab. Work.	Four hrs. (4Qs.)	40 Marks
2. Record Work & Viva-Voce	(20+10)	30 Marks
3. Project Report & Viva-Voce	(20+10)	30 Marks
<b>Total</b>		<b>100 Marks</b>

**Laboratory and Map Work**

- (i) The Art and Science of Cartography. History of Maps. Materials. Techniques and Preparation of Maps.
- (ii) Enlargement. Reduction and Finding of Area of Maps. Use of Planimeter.
- (iii) Study of geological maps and preparation of their section and interpretation.
- (iv) Interpretation of Weather maps and Weather Forecast.

(v) Elementary Trigonometry.

(vi) Maps Projections.

**Projections and their Classification :** Construction and characteristics of any three from each of the four classes of projections (mathematical constructions).

I. Conical Projections :

1. Equal Area with the One Standard Parallel (Lambert's Projections)
2. Equal Area with two Standard Parallels (Alber's Projections)
3. Bonne's, 4. Polyconic. 5. International.

II. Cylindrical Projections :

1. Cylindrical Equal Area, 2. Mercator's 3. Gall's Stereographic.

III. Zenithal Projections :

1. Gnomonic : (a) Polar Case (b) Eq. Case
2. Stereographic : (a) Polar Case
3. Orthographic : (a) Polar Case (b) Eq. Case.
4. Equal Area : (a) Polar Case (b) Eq. Case
5. Equidistant : (a) Polar Case (b) Eq. Case

IV. Conventional Projections :

1. Sinusoidal
2. Mollweide.
3. Interrupted Mollweids and Godde's.
4. Interrupted Sanson Flemsteed (Homolosine).
5. Aito's.

Choice of Projections, Projection is used for maps produced in India.

Geographical Maps and Diagrams : Computation of data, Preparation of frequency tables, representation of data by Histograms and ogives. Finding skewness, Computation of Mean, Median and Modes. Deviation-Standard Deviations and Mean Deviations and finding out of correlations. Theoretical basis of nearest neighbour analysis. Practical exercises of nearest neighbour analysis. Locational analysis of urban centers. Coefficient Variation. All these be computed from the Statistical data, preferably based on State, District, Tehsil and Community Development Block as unit areas and the following types of maps and diagrams be prepared.

One exercise on each of the following and their interpretations :

Isopleth, Choropleth and Chorochromatic map. Isochrone map  
Population Potential surface map. Population Pyramids map.

Three dimensional diagrams and cartograms of economics and social data.

**Diagrams** : Polygraph Semi-log and loggraphs, Trilinear chart, Circular graph, Climatograph, Taylors/Fosters Climograph. Annual water deficiency and water surplus graph.

**Project Report** : A candidate is to prepare project report of a village area. The candidate is free to select any supervisor amongst the staff members of the project. A supervisor can take only 5 candidates. the marking on the project report will be awarded by the external examiner in consultation with the supervisor concerned. The project should be based on primary data obtained by the candidates. The data should be represented by suitable cartographic methods.

**Books Recommended :**

1. Lawrence, G.R.P. : Cartographic Methods, London, 1971.
2. Robinson, A.H. & R.D., Sale : Elements of Geography, Wiley International Inc. New York, 1969.
3. Dickinson, G.C. : Maps and Air Photographs, London, 1969.
4. Dickinson, G.C. : Statistical Mapping and Mapping Statistics, London.
5. Raisz, Erwin : General Cartography.
6. Singh, R.L. : Elements of Practical Geography.

**M.A. FINAL**

**Paper-V : Advance Geography of India :**

3 Hrs. duration

Max. Marks 100

**Section-'A'**

Geological structure and its relation with relief and distributions minerals, Physiographic divisions. Climatic divisions, soil regions characteristics and distribution.

Resources potential : a general appraisal

**Section-'B'**

- (i) Land resources,
- (ii) Water resources,
- (iii) Vegetational resources

(iv) Animal resources and

(v) Human resources.

**Resources development :**

(i) Land utilisation,

(ii) Irrigation,

(iii) Agriculture,

(iv) Livestock development,

(v) Mineral development,

(vi) Power development,

(vii) Industrial development and

(viii) Transport development.

### **Section-'C'**

River basins of India, riverian problems of sharing water and their planning. Economic regions of India and Regional problems.

(i) Rajasthan-Regional studies.

1. Marusthal

2. Bangar

3. Chambal Valley

4. Aravalli

(ii) Power development in Rajasthan,

(iii) Irrigation development in Rajasthan,

(iv) Industrial development in Rajasthan.

Note : Two questions will be set from Rajasthan.

### **Books Recommended :**

1. GOI : Five Year Plans of India.

2. NCAER : Techno-Economic survey report of various States in India. Central Board of Water Power and Irrigation in India-Development of Irrigation in India, 1965.

3. Ramdas, L.A. : Crops and Weather in India I.C.A.R. New Delhi, 1960.

4. Singh, R.L. : India : A Regional Geography N.G.S.I. Varanasi 1971.

5. P. Sen Gupta and Galyna, Sydasuk : Economic Regions and Regionalisation in India, 1968.

6. Choudhary. M.R. : Indian Industries Development and Location.



7. Spate, O.H.K. : Geogrphay of India and Pakistan (Mathuen and Co., London).
8. Krishana, M.S. : Geology of India and Burma (Law Journal Office. Madras).
9. Kumar, I.S.S. and Others : Agriculture in India Vol. I & II (Asia Publishing House Bombay).
10. Indian Year Book : (Latest Education) Publication Division. Delhi.
11. Techno Economic Surveys of States (N.C.E.A.R.) Delhi.
12. Irrigation Atlas of India.
13. Chatterji S.B. : Climatology of India (Calcutta University, Calcutta).
14. Sharma, T.R. : Location of Industries in India (Hindu Kitab, Bombay).
15. Gazetteers of India : Publication Division, New Delhi.
16. S.P. Roy, Choudhary : Land and Soil (National Book Trust, New Delhi).
17. Time of India : Hindustan Year Book (Latest Edition).
18. Sinha : A treatise on Industrial Minerals.

**Paper-VI : Any One of the following :**

**Paper-VI : (a) Population Geography :**

3 Hrs. Duration

Max. Marks 100

***Section-'A'***

Definition and scope of Population Geography, Theory in Population Geography-Malthusian Neo malthusian and optimum Population theory and Biological Population Theory. Types of Data and Population census with special reference to the Indian census. Density and Distribution of population in the world. Factors affecting population distribution in the world. Measures of population density, Measures of dispersal and concentration of population and population potential. The Growth of population, world patterns of fertility and mortality. Demographic transition.

***Section-'B'***

Age and Sex composition, Marital status, Families and households, Language and literacy, Religious composition of population, Economic composition of population. Primary occupations, Manufacturing

industry. Transport, Trade and Service etc. Rural and urban population and urbanisation. Internal and international migration behavioural migration studies.

### Section-‘C’

The Growth of India's Population, The death rate and birth rate in India, Density and distribution of population in India. Is India over populated? Age and sex composition in India's population, Urbanisation in India. Occupational composition and internal Migrations.

Economic composition of India's population, Internal migration in India. The Population policy of Govt. of India.

### Books Recommended :

1. Clarks : Population Geography.
2. Johnes : A Population geography.
3. Trewarth : A Geography of Population.
4. Woods-Population Analysis in Geography.
5. Woods-Theoretical Population Geography.
6. Beanijen Garnier-Geography of Population.
7. Zelinsky : A prologue to population Geography.
8. Wilson-Population Geography.
9. Chandra-Population Geography.
10. Davis-The Population of India and Pakistan.
11. Clarks (ed) : Geography and Population.
12. Schnell & Monmonier : The study of Population-Elements Patterns and Processes.
13. Dyson and Crook : India's Demography.
14. Rees and Wilson : Spatial Population Analysis.
15. Pacione : Population Geography-Problems and Prospects.

**Paper-VI : (b) Agricultural Geography (Elements & Applied) :**

3 Hrs. Duration

Max. Marks : 100

### Section-‘A’

Concept, origin and dispersal of agriculture, development of agriculture through the age in important agricultural areas of the world, with special reference to India and Rajasthan, trends and practice, Factors influencing patterns and farm techniques.

- Physical factors : Relief, slope, soils, water-its availability and

quality climate (rainfall, temperature, sun shine, humidity, winds).

- Economic factors : Land tenure, transport, marketing and take, prices, level of mechanization, labour, capital fertilisers, irrigation, Sources of energy in agriculture, size of holdings & agriculture.

- Cultural : The food habits, castes, population, religion, land ownership, government policies, literacy etc.

Water-Water resources, quality, criteria of water for irrigation, various methods of irrigation and their comparative advantages, water requirement of important crops. Adverse effects of irrigation and their control.

Soils : Major soil types : distribution, characteristic, their main use and problems for agricultural use, soil nutrients : mineral and organic, Use of fertilizers and manures to improve agricultural productivity. Cultural practices influencing the soil characteristics.

Soil problems : Erosion and exhaustion-cause. Soil conservation: Physical and biological measures.

Types of agriculture, shifting cultivation, plantation, agriculture, Mediterranean type, collective and state farming extensive and intensive agriculture and their characteristics.

### **Section-'B'**

Agricultural land use : concept and history, land use surveys, principles, objectives, policies and planning of land use surveys, land classification : need and basis of land classification, British pattern, American pattern. Indian pattern, Irish pattern of land classification, land capability, land-use data-sources, types, mapping and problems.

Model in agricultural land use need and principles. Von Thunen's agricultural location theory. Preparation, planning and monitoring of a detailed proforma for land use surveys. Food storage technology, Green revolution in India. Live-stock combination, Dairy development, Agro forestry importance, status and scope in India.

*Note : The candidates will make field study. Field trip be organized, land use survey of a village be conducted and a question be asked in examination.*

### **Section-'C'**

Agricultural Statistics and their mapping. Measurements of the levels of agricultural development-Concept and methodology. Agricultural regionalization-Concept, methods of delimitation, Traditional

and statistical methods. Crop-ranking, Crop-combination regions-meaning; need and methodology. (Detailed study of Kendal's Weaver's Crop-Diversification, Concentration methods and deeducations. Commercialization index.

Agricultural efficiency -Concept, methods of measurement, Nutrition and food balance sheet, Crop-pattern and deficiency disease.

Agro-climatic zones of India with special reference to Rajasthan.

**Books Recommended :**

1. ICAR : Soil and Water Conservation Research (1956-71)
2. ICAR : Soil Conservation of India.
3. Singh, Jasbir : Agricultural Atlas of India, Vishal Publishers.
4. Singh, Jasbir : Agricultural Geography of Haryana.
5. Noor mohammad, Agricultural Land use in India, Inter-India Public. Delhi.
6. Ali Mohammad : Situation of Agricultural Geography, Rajesh Publication, New Delhi, 1981.
7. Ali Mohammad : Situation of Agricultural, Food and Nutrition in Rural India, Concept Publishing Co., Delhi.
8. Ali Mohammad : Synamics of agriculture Development in India. Concept Publication Co., Delhi.
9. Singh P.P. Govind Raju, K.C. and others : New Seeds Adoption and Yield, Sterling Publication Pvt. Ltd., New Delhi.
10. Symon Lesin : Agricultural Geography, G. Gell and Sons Ltd., London, 1967.
11. Singh, R.L. (Ed.) : Applied Geography, BHU Press, Varanasi.
12. Kostowickie, Z. : Agricultural Typology, Polish Academy, Warsaw.

**Paper-VI : (c) Industrial Geography :**

3 Hrs. duration

Max. Marks 100

**Section-'A'**

Location factor in manufacturing, concept of optimum location, Significance of cost and price, the Least Cost School and the Transport Cost School, The Market Areas School, the Marginal Location School, The Behavioural School.

The Reduction of weight of Materials. The Copper Industry, the Aluminum industry, the Pulp and Paper Industries. The Cement Industry.

**New Trends in Industrial Geography. Testing Location Theory, Empirical Studies, Significance of Enterprise and Firm.**

***Section-'B'***

**Important Industrial Regions of the world, selection one from each of U.S.A. Russia, Japan, Britain and West Europe.**

**Important Industrial Regions of India.**

**The changing character of geographical concentration and impact of technological change, changing character of industrial regions.**

**Formation of Industrial Regions, Industrial Regions in India.**

**Study of the following regions :**

**(i) The Hooghlyside Industrial Region.**

**(ii) The Damodar Valley Industrial Region.**

**(iii) The Ruhr Basin Industrial Region.**

**(iv) The Great Lakes Industrial Region.**

***Section-'C'***

**Influence of power and geographical inertia in manufacturing industries : The Textile Industry,**

**Multi-locational industries : Iron and Steel, Aluminium, Oil Refining.**

**Market Oriented Industries : Furniture, Textile Machinery.**

**Footlose Industries : Automobile, Commercial, Ship Building.**

**Raw Material Oriented Industries. The Locational Importance of reduction in materials : The Pulp and Paper Industry, The Cement Industry.**

***Books Recommended :***

1. Lloyd and Dicken : Location in Space : A theoretical Approach to Economic Geography.
2. M.C. Cart and Lindberg Hodder and Lee Economic Geography : A Preface to Economic Geography.
3. Smith, D.E. Cox K.P. Man : Industrial Location. A Economic, Geographical Analysis Location and Behaviour-An Introduction to Human Geography.
4. Riley, R.C. : Industrial Geography, 1973 Chalto and Windus, London.
5. Alexanderson Gnnar : Geography of Manufacturing (Englewood Cliffs, N.J.).
6. Alexander, J.W. : Economic Geography (Prentice Hall, New York).

7. Bengston, N.A. : Fundamentals of Economic Geography (Prentice Hall, New York).
8. Besoh, H. : A Geography of World Economy (D. Van Nostrand).
9. Britton, John, N.H. : Regional Analysis and Economic Geography (G. Bell and Sons, London).
10. Estall, R.C. and Buchanan, R.O. : Industrial Activity and Economic Geography (Hutchinson and Co., London).
11. Ghose, B.C. : Industrial London.
12. Hoover, E.M. : The Location of Economic Activity,, (Mc Graw Hill Books Co. New York).

**Paper-VI : (d)-Transport Geography :**

3 Hrs. Duration

Max. Marks 100

**Section-'A'**

The geographical study of transportation, definition, theory, growth and scope, network growth models.

Nature of inter regional flows, Basis for interaction, models of spatial interaction, distance decay theory, gravity models, potential surface models.

**Section-'B'**

Model accessibility and hinter-lands, accessibility and land use. Transport economics. Transport problems of metropolitan areas.

**Section-'C'**

Developments of transport system in India. Role of transportation in regional development in India. Major transport regions, Regional development in India.

Transport-Network, Structure, Connectivity, Linkages.

**Books Recommended :**

1. Saafe, E.L. and H.L. Gautir : Geography of Transportation, Prentice Hall, Englewood Cliffe, 1973.
2. Eliot, H. and E. Michael, (Eds.) : Transportation Geography Comments and Readings M.C. Growth M.S. 1974.
3. Hagget, P. and Red. Chorley : Network Analysis in Geography. St. Mairni, N.Y. and Edward Arnold, Loudh, 1919.
4. Kauesty, K.J. : Structure of Transportation Net Works Univer-sity of Chicago, Chicago, 1963.
5. Berry, B.J.L. : Essays on Commodity Flow and the Spatial

Structure of Indian Economy, University of Chicago, Chicago. 1966.

**Paper-VI-(e) : Geography of Settlement :**

3 Hrs. Duration

Max. marks 100

***Section-'A'***

Definition, Scope and Development of Settlement Geography, Theories in Settlement Geography, Methodology in Settlement Geography, Causes of origin of settlement types. The form of settlements types clustered. Semi-clustered and Dispersed, settlement pattern, size and spacing of Rural settlements.

***Section-'B'***

Site and situation of Rural Settlement, the evolution of street pattern in rural settlements. Morphological characteristics of rural settlement. Segregation and orientation of social group in settlements. The evolution of field boundaries and the field patterns. Fold housing, folk architecture and traditional building material.

***Section-'C'***

Urban Settlements-Their site and situation, size and spacing of urban settlement, Christallers system of urban hierarchy and spacing of cities Morphological characteristics of urban settlements, The cultural ecology of the city. Sector, concentric zone and Multiple Nucleu Models of urban settlements. Problems of urban housing and emergence of slums.

***Books Recommended :***

1. Hudson : Geography of Settlement.
2. R.D. Singh : Rural Settlement in Monsoon India
3. Baker : The Geography of Rural Settlements.
4. Johnson : Social Areas and Cities.
5. Taylor , Putnam : Geography of Urban places.
6. Roberts : Rural Settlements in Britain
7. Yadav : "Basti Bhugole"
8. L.N. Verma : "Adhivas Bhugole".

**Paper-VI (f) ADVANCED GEOMORPHOLOGY**

3 Hrs. duration

Marks : 100

### Section-A

Nature and scope of Geomorphology, Fundamental concepts- Geological structures and landforms, uniformitarianism, multicyclic and polygenetic evolution of landscapes, concept of threshold, Environmental change-climatic change and geochronological methods- documentary evidence, artifacts, major horizons, dendrochronology, pollen, thermoluminescence.

Earth movements-epirogenic, organic and cymatogenic earth movements. Forces of crustal instability, isostasy, plate tectonics, seismicity, vulcanicity, Orogenic structures with reference to the evolution of Himalaya.

### Section-B

Orogenic Processes : Concept of gradation, Agents and processes of gradation, causes, types and classification of weathering, mass movement erosional and depositional processes an resultant landforms and soil formation. Slope evolution, down wearing, parallel retreat and slope replacement models.

Geomorphic processes, dynamics of fluvial, glacial, Aeolian, marine and karst processes and resulting landforms, complexities in geomorphological processes, Erosion surfaces-techniques of identification and correlation.

### Section-C

Applied geomorphology-application of geomorphic mapping, terrain evaluation. Digital Elevation Model (DEM) and Tringulated Irregular Network (TIN) unit, land capability and land suitability classification, hydro-geomorphology, urban geomorphology, environmental geomorphology, geomorphic hazards.

#### *Suggested Readings*

1. Chorley, R.J. : Spatial Analysis in Geomorphology, Mathuen, London, 1972.
2. Cooke, R.U. and Doornkamp, J.C. : Geomorphology in Environmental Management-A introduction,, Clarendon Press, Oxford, 1974.
3. Duty, G.H. : The Face of the Earth, Penguin Harmondsworth, 1959.
4. Fairbridge, R.W. : Encyclopedia of Geomorphology, Reinhodts, New York, 1986.
5. Goudie, A. : The Nature of the Environment, Oxford & Blackwell, London 1993.
6. Garner, H.F. : The Origin of landscape-A Synthesis of Geomorphology, Oxford University Press, London, 1974.



7. Mitchell, C.W. : Terrain Evaluation, Longman, London, 1973.
8. Olier, C.D. : Weathering Longman, London, 1979.
9. Pitty, A.F. : Introduction to Geomorphology, Methuen, London, 1971.
10. Stoddart, D.R. (ed.) : Process and Form in Geomorphology, Routledge New York, 1996.
11. Skinner, B.J. & Porter, S.C. : The Dynamic Earth John Wiley, New York, 1995.
12. Sparks, B.W. : Geomorphology, Longman, London, 1960.
13. Sharma, H.S. (ed.) : Perspectives in Geomorphology, Concept, New Delhi, 1980.
14. Singh, S. : Geomorphology, Prayag Publication, Allahabad, 1998.
15. Thornbury, W.D. : Principle of Geomorphology, John Wiley, New York, 1960.

**Paper-VII : Any of the following :**

**Paper-VII-(a) urban Geography :**

3 Hrs. Duration

Max. Marks 100

***Section-'A'***

Aims and scope of Urban Geography, Factors affecting the growth of town during Neolithic period, Greek and Roman period, dark Ages, medieval period, renaissance period, Industrial revolution and Modern times, Chief characteristics of the town of each period.

Trends of urbanisation in the world. Urbanisation in India since 1901 and its problems. Census of India, definitions of urban centres.

Chief characteristics of modern town, City Conubation Metropolis, and Megalopolis.

Special pattern and distribution of urban centres. Types of cities-Central places. Transport foci and Centres of specialised services.

***Section-'B'***

Classification of cities based on functions.

urban Rank-Size relationship.

The Basic and Non-Basic concept of Urban economic functions and its application.

Urban hierarchy based on functions.

Urban morphology, Unplanned and planned growth of towns.

**Urban plans, Morphology of Indian cities.**

Functional structure of towns, Chief Characteristics of C.B.D. Residential area, and other functional areas, Theories and Models of urban structure

**Section- 'C'**

Centrifugal and Centripetal forces in Urban Geography.

Development of suburbs, rural urban fringe, satellite towns, ring towns, Sphere of urban influence (Umland) and its delimitation.

Principles of Town planning, preparation of a Master Plan, Study of Master Plan of Jaipur, Principles of Regional Planning.

**Books Recommended :**

1. Toyler G. : Urban Geography, (Muthuen and Co., London).
2. Abercrombie : Town and Country- Planning (Oxford University, Press London)
3. Dickinson R.E. : The West European City. (Routledge and Kegan Paul, London).
4. Cornish, V. : The Sociology of City Life.
5. Geddas : Study in City Development.
6. Singh, R.L. : Banaras : A study in Urban Geography (Student Friends Allahabad).
7. A.E. Smailes : The Geography of Towns (Hutchinson, University Library, London).
8. Dickinson, R.E. : City, Region and Regionalism. (Routledge and Kegan Paul London).
9. Mumford, L. : City development (Socket, Waburg, London).
10. Herrold M. Mayer : Readings in Urban Geography, (Central Book Depot, Allahabad).
11. V.L.S. Prakash Rao : Towns of Mysore State (Statistical Publishing House, Calcutta).
12. Shah, Manzoor Alam : Hyderabad and Secunderabad, Twin City Studies in Urban Geography (Allied Published, Delhi).
13. R.L. Singh : Bangalore : A Urban Survey, (National Geographical Society of India, B.H.U., Varanasi).
14. P.C. Malhotra : Survey of Bhopal City and Bairagarh (Asia Publishing Bombay).
15. N.V. Sovani : Urbanization and Urban India. (Asia Publishing House, Bombay).

16. V.K.R.V. Rao : Socio-Economic Survey of Greater Delhi. (Asia Publishing Bombay).

### Paper-VII (b) CLIMATOLOGY

3 Hrs. duration

Marks : 100

#### Section-A

Nature and scope of climatology and its relationship with meteorology. Composition, mass and structure of the atmosphere. Insolation, heat balance of the earth, green house effect, vertical and horizontal distribution of temperature, Atmospheric motion : forces controlling motion of air vertical motion and vorticity, local wind, jet stream, general circulation in the atmosphere, Atmospheric moisture: Humidity, evaporation, condensation, precipitation : types, acid rain, world pattern of precipitation.

#### Section-B

Tropical, temperature and high latitude weather systems-concept of air masses and atmospheric disturbances, ocean atmospheric interaction-EL Nino, southern oscillation (ENSO) and La Nina. Monsoon winds, norwesters and cyclones tropical and temperate phenomena, climate of India and its controls; Western disturbances.

#### Section-C

Climatic Classification of Koppen, and Thornthwaite, Major climates of the world-tropical, temperate, desert and mountain climate.

Climatic Changes Evidences, possible causes; global warming, environmental impacts and society's response.

Applied climatology : Data collection, archiving, accessing, interpretation and generation of climatic information specially for water balance studies, soils, agriculture activities, house types and health.

#### Suggested Readings

1. Barry, R.G. and Chorley P.J. : Atmosphere, Weather and Climate, Routledge, London and New York, 1998.
2. Critchfield, J.H.: General Climatology. Prentice Hall, India, New Delhi, 1993.
3. Lydolph, P.E. : The Climate of the Earth, Rowman, 1985.
4. Fein, J.S. and Stephens, P.N. Monsoons. Wiley Interscience, 1987.
5. India Met. Deptt. : Climatological Tables of Observatories in India. Govt. of India, 1968.

**Paper-VII (c) : Applied Geography :**

3 Hrs. Duration

Max. Marks 100

**Section-'A'**

Principles and methods, nature and scope.

Application of geographical methods of survey and analysis to contemporary, physical, socio-economic and political problems with special reference to problems of Agriculture, population and settlements.

**Section-'B'**

Geographical application of distinctive economic principles including the evolution of geographical mapping of production. Specialisation of areas.

Land classification, agricultural land use in India and other countries.

**Section-'C'**

Principles of urban land use planning, delimitation of urban-fields, functional zoning of urban land, problems of expansion of urban centres, meaning of communication and their relation to towns.

**Books Recommended :**

1. Stanp, L.D.: Applied Geography.
2. Freeman, T.W. : Geography and Planning.
3. Stmap, L.D. : The Land of Britain. Its Use and Misuse.
4. E.W. Zimmerman : World Resources and Industries.
5. Graham : Natural Principles of Land Use.
6. Stamp, L.D. : History of Land Use in Arid Regions.
7. Stapledon, R.G. : The Land of Tomorrow.

**Paper-VII (d) : Pedology :**

3 Hrs. Duration

Max. Marks 100

**Section-'A'**

Modern pedological Principle underlying soil formations; Soil genesis factors influencing it. Characterisation and classification of soil groups of the world and their distribution. Classification and distribution of Indian soils. Soil nutrients in relation to agriculture.

**Section-'B'**

Methods of soil survey, soil analysis; soil mapping, soil profiles;

their description, analysis and interpretation of results: Soil erosion soil exhaustion and soil conservation mechanical and biological measure with special reference to India.

### **Section-'C'**

Physical properties of soils, structure, texture, colour and moisture organic matter culture practices affecting soil characteristics. Manures and fertilizer in relation to soils with special reference to India. Soil survey for land capability and land utilisation. Detailed study of soils of Rajasthan. Soil productivity and Fertility differentiation. Management of Sandy, Loamy and Clayey soils.

#### **Books Recommended :**

1. Jaffe, J.S. : Pedology.
2. Comber : Scientific Study of Soils, Soil Survey Staff Bureau.
3. U.S. Deptt. of Agriculture : Soil Survey Manual.
4. Moghe B : Soils of Rajasthan, Hindi Academy.
5. Wright : Soil Analysis.
6. Sygmont : Principles of Soil Science.
7. Robinson, W.C. : Soil-Their Origin, Classification and Constitution.
8. Ray-Choudhary : Soils of India.
9. Russel F.I. : The World of Soil.
10. Agarwal, R.R. : Soil Fertility in India.
11. De. S.K. Methods of Soil Analysis : Soil-Geographical Zening of the USSR (Published by the Academy Sciences of the USSR, Moscow).
12. Volebuey, V.R. : Ecology of Soil.
13. Clarke : The Study of Soil in the Field.
14. Bunting B.T. : The Geography of Soil.
15. Proceeding of the Symposium of Fertility of Indian Soil Belletin No.26 of 1964 National Institute of Science of India, New Delhi.

### **Paper-VII (e) : Medical Geography :**

3 Hrs. Duration

Max. Marks 100

#### **Section-'A'**

1. Definition, nature, scope and contents. Relation of Medical geography with other allied disciplines. Elementary Knowledge

of Human Anatomy and Physiology, Geographical Pathology, Epidemiology and Geomedicine.

2. History and development of Medical Geography in the West and India.
3. Concept of health and disease, Major diseases and their geommedical classification.

#### **Section-'B'**

4. Geomedical data : Sources, methods of representation, analysis limitations and problems. Conceptual and Cartographic Models.
5. Pathogenic and geogenic aspects of Medical Geography Studies in disease environment association disease diffusion.
6. Spatial and tempotal variations in the physical, cultural and the biotic environment and its influence upon human health.
7. Nutritional levels in India, Disease of under-nutrition and malnutrition.

#### **Section-'C'**

8. Disease of civilization : Cancer, blood vascular the smoking disease accidents, drug abuse and drug abdications. Distribution of Major diseases in Rajasthan.
9. Community health : Distribution of Medical facilities and population. Health care planning in urban and rural area. A critical evaluation of health care delivery system in your own area/state. Family planning Programme in India. National Malaria Eradication Programme in India.
10. Survey of common epidemic and endemic diseases in a small area on the basis of field study, Standard of living : (i) Housing (ii) Diet (iii) Clothing (iv) Income (v) Sanitation.

#### **Books Recommended :**

1. Learmon., A.T.A. "So you want to be Medical Geographer? An open letter to students". In : Prakashan Rao, V.L.S. et al. (Eds.). The Golden Jubilee Volume, Madras. The Indian Geographical Society, 1976, pp. 280-85.
2. Learmonth, A.T.A. "Models and Medical Geography" in Mishra, V.C. (Ed) Essays in Applied Geography. Saugar. University of Saugar, 1976 pp. 17-38.
3. Lenian. J and Fletcher, W.W., (Eds.) Health and the Environment, Chapter 2 (pp. 30-56) Glasgow, Blackie, 1976.

4. May, J.M. "Medical Geography : Its Methods and Objectives", *Geographical Reviews* : Vol. 40, 1950 pp. 10-40.
5. May, J.M. *Studies in Disease Ecology*, New York Hafner, 1961.
6. May, J.M. *Ecology of Human Diseases*, New York, American Geographical Society 1958.
7. Mc Glashan, N.D. (Ed) *Medical Geography Techniques and Field Studies*. London Methuen, 1972.
8. Mishra, R.P. *The Medical Geography of Common Diseases in Rajasthan*. Unpublished Ph. D. Thesis Jaipur University of Rajasthan, 1981.
9. mishra, R.P. *The Medical Geography of India*, New Delhi National Book Trust, 1969. Park J.E. Park K. *Preventive and Social Medicine*.
10. Patwardhan, V.N. *Notification of India*, Bombay. *India Journal of Medical Sciences*, 1961.
11. Prothero, V.N. *Migrants and Malaria*, London, Longmans 1965.
12. Pyle. G.W. and Alan Dever, G.E. *Health Care Delivery : Spatial Perspectives*, New York, McGraw.
13. Shannon, G.W. and Alan Dever, G.E. *Health Care Delivery : Spatial Perspectives*, New York, McGraw.
14. Singh, Amar *The Lower Chambal Basin : A study in Medical Geography* Unpublished Ph. D. Thesis, Gwalior, Jiwaji University, 1978.
15. Stamp, L.D. *Some Aspects of Medical Geography*, Oxford, University Press, 1964.
16. Stamp, L.D. *The Geography of Life and Death*. London, Fontana, 1964.
17. Stevenson-Introduction of Food and Nutrition.
18. Wilson and Evad-Principles of Nutrition.

### **Paper-VII (f) Remote Sensing Techniques**

3 Hrs. duration

Marks : 100

#### **Section-A**

Historical development of remote sensing as a technology-  
Relevance of remote sensing in Geography-Concepts and basics:  
Energy source, energy and radiation principles, energy interactions in  
the atmosphere and earth surface features, remote sensing systems:  
platforms, sensors and radiation records.

**Air Photos and Photogrammetry :** Elements of photographic system : types, scales and ground coverage, resolution, radiometric characteristics, films, filters, aerial cameras, film exposures, geometric fundamentals of photogrammetry : elements of vertical photographs, relief displacement, image, parallax, stereoscopic, orthophotos, airphoto interpretation : shape, size, pattern, tone, texture, shadows, site.

### **Section-B**

**Satellite Remote Sensing :** platforms-LANDSAT, SPOT, NOAAVHRR, RADARSAT, IRS, INSAT : principles and geometry of scanners and CCD arrays, orbital characteristics and data products-MSS, TM, LSS I & II, SPOTPLA & MLA, SLAR.

**Image Processing :** types of imagery, techniques of visual interpretation, ground verification, transfer of interpreted thematic information to base maps-digital processing : rectification and restoration, image enhancement, -contrast manipulation, classification supervised and unsupervised, post-classification analysis and accuracy assessment, microwave sensing : interpretation of SLAR imageries, elements of passive microwave sensing.

### **Section-C**

**Applications :** Air and Image interpretations and mapping, landuse and land cover, land evaluation, urban landuse, landform and its processes, Weather studies and studies of water resources; integration of Remote Sensing and GIS, -remote sensing and hazard management, remote sensing and environmental management.

### **Suggested Reading :**

1. American Society of Photogrammetry : Manual of Remote Sensing. ASP. Falls Church, V.a. 1983.
2. Barrett E.C. and L.F. Curtis : Fundamentals of Remote Sensing and Air Photo Interpretation, Mcmillan, New York, 1992.
3. Compbell J. : Introduction to Remote Sensing. Guilford, New York 1989.
4. Curran, Paul J. : Principles of Remote Sensing. Longman, London, 1985.
5. Hord R.M. Digital Image Processing of Remotely Sensed Data, Academic, New York, 1989.
6. Luder D. : Aerial Photography Interpretation : Principles and Application McGraw Hill, New York, 1959.
7. Pratt W.K. Digital Image Processing, Wiley, New York, 1978.



8. Rao D.P. (eds.) : Remote Sensing for Earth Resources, Association of Exploration Geophysicist, Hyderabad, 1998.
9. Thomas M. Lillesand and Ralph W. Kefer, Remote Sensing and Image Interpretation. John Wiley & Sons, New York, 1994.

**Paper-VIII : Any One of the following :**

**Paper-VIII (a) : Political Geography :**

**3 Hrs. Duration**

**Max. Marks 100**

***Section-'A'***

Definition, scope and development of Political geography :

- (a) Definition and scope of political geography : its relation with other social sciences.
- (b) Geopolitics and German School of Thought.
- (c) Development of political Geography-Concepts of Mackinder, Spykman, Meining, Hooson, De Seversky, World's geostrategic regions.

**Methodology :**

- (a) The functional approach in Political geography by Hartshorne.
- (b) The Unified Field Theory of Political Geography by B.S. Jones.

***Section-'B'***

**State temporal and spatial Attributes.**

**Resources :**

- (a) The Elements of the State : Territory, population, organization and power.
- (b) The Heart of the State : Core areas.
- (c) The Focus : Capital City.

**Frontiers and Boundaries : Concepts and classi**

- (a) Frontiers, Boundaries and Buffer Zones.
- (b) Classification of Boundaries, changing concept.
- (c) The concept of Territorial sea and Maritime boundaries.
- (d) Landlocked States : Problem of access.

**Growth of Nations and disintegration of empires:**

- (a) Unitary and Federal States.
- (b) The Dying colonialism and resurgent nationalism.
- (c) Supernationalism : From State of Blocks.

**Section-‘C’**

Extending dimensions of political geography :

- (a) The Politics and transportation.
- (b) The Geography of foreign Aid & economic development.
- (c) Emergence of third World Block.
- (d) Politico-geographical study of India.
- (e) Political geography of administration.

The politico-geographical implications of space research.

The function and methods of Electoral Geography :

- (a) Electoral studies in political geography.
- (b) Conceptual model of the Voting decision.
- (c) Operationalisation of conceptual decision.
- (d) Garrymending in relation to India.

**Books Recommended :**

1. Alexander, J.L.M. : World Political Patterns (John Murray and Co., London).
2. Boggs, S.W. : International Boundaries (Columbia University Press, New York).
3. Bowman, I. : The New World-Problem in Political Geography, (World Co., Yonkers, on Hudson).
4. Golby, C.C. : The Geographic Aspect of International Relations (University of Chicago Press Chicago)
5. East, W.G. and Moodile, A.E.: The Changing World (George G. Harrap and Co., London)
6. East, W.G. and Spate, O.H.K. : The Changing Map of Asia, (Methuen and Co., London)
7. Eairgreive, J. : Geography and World Power (University of London Press, London)
8. Fawcett, C.B. : Frontiers. Study in Political Geography (Oxford University Press. Oxford)
9. Fitzgerald, W. : New Europe (Methuen and Co.)
10. Fizzgibbon. R.H. : Global Politics (University of California Press, Parkaley).
11. Goblet. Y.M. : Political Geography and World Map. (George Philips and Co., London).
12. Horradin, J.F. : An Outline of Political Geography (Alferd A. Knob. New York).

13. Huntington, E. : World Power and Evolution (Yale University Press, New Haven).
14. Moodie, A.E. : Geography Behind Politics (Hutchinson's University Library, London).
15. Percy, C.E. et al : World Political Geography (Thomas Y Crowell Co., New York)
16. Spengler, O : The Decline of the West (Alfred A Knof and Co., New York).
17. Valkenburg, S.V. and Sttz, C.L. : Elements of Political Geography. Second Edition (Eastern Economy Edition), Prentice Hall & Co., Ltd.
18. Stranz, R.H. : Geopolitics-The Struggle for space and Power (G.P. Pitman's and Sons, New York)
19. Stranz, R.H. and : International Relations (McGraw Hill Book Co., New York).
20. Spykman, N.J. : The Geography of Place, (Harcour Brace, New York)
21. Wegert, A.W. and : Principles of Political Geography (Appleton Century draft INC., New York).
22. Weigert, H.W. Stefransov, V. and Harrison, R.E. : New Compass of the World Macmillan and Co., New York.
23. Whittesey, D. : The Earth and State (Henry Holt and Co., New York).
24. W.A. Douglass Jackson : Politics and Geography Relationship (Prentice Hall, New York).
25. S.B. Cohen : Geography and Politics, Divided World (Methun and Co., London).
26. Corne : Background to Political Geography.
27. H. De Blij : Systematic Political Geography (John Wiley and Sons, New York)
28. Bergman, Edward E. : Modern Political Geography W.M.C Brown Company Publishers Iowa.
29. Dikshit, R.D. : Political Geography, A contemporary Perspective, Tata McGraw Hill Publishing Co., Ltd., New Delhi.
30. Sukhwai, B.L. : India-A Political Geography. Allied Publishers, New Delhi.

**Paper-VIII (b) Culture Geography**

3 Hrs. Duration

100 Marks

**Section- 'A'**

The Nature of cultural Geography. The evolutionary approach in cultural geography. The Framework of cultural Geography. The evolution of cultural Geography-The contribution of Otto Schuluter and Carl Sauer and others. Themes in Cultural Geography-The Cultural region : Functional Formal and Perceptual, Determinism and Posibilism, cultural Adaptation and Environmental perception. Man as modifier of the earth. Cultural integration, the Cultural landscape, the cultural history and sequent occuance.

**Section- 'B'**

Humanisation of the Earth-Pleistocene inheritance, The environmental changes during the Pleistocene, The Impact of glaciation, Land bridges and the pattern of land and sea. Shifting life zone of Pleistocene, Human ancestores, Food gathering and Mans tropical origin, Discovery of fire and building of shelter. Homo sapiens : their rise and dominance. Man's deployment over the continents, culture as a new method of evolution and interrelationships in human living.

The beginning of plant domestication, the regions the agriculture origins, evolution of cropping system, Origin of animal domestication, the Regions of animal domestication. The Consequences of animal domestication. The evolution of system of animal husbandry. The origin of metal extracting and the diffusion of metal smelting technology. The evolution of civilisation, The Main culture Hearths-Mesopotamia, The Nile Velle, The India's valley and the North China. The main cultural regions of the world with special reference to India and south-east Asian cultural regions.

**Section- 'C'**

The Geography of Language, the major linguistic families and their distribution in the world language and religion, Language and Nationalism. Language and Environment. The Geography of Religion-The major religions of the world and their distribution. The Health of semetic and Hindu religion. Places of Pilgrimage. Religions Landscape. Cultural Integration in Religion. Origin and causes of settlement types. Settlement patterns-Clustered, Semi-inclustered and dispersed. Building Materials and House types and fold architecture. Origin and diffusion of the city, especially the grid pattern city, population density region, death rate, birth, rate and population explosion, Quality of life.

**Books recommended :**

1. Jordan and Rowntree-The Human Mosaic
2. Spencer and Thomas-The Cultural Geography.

**Paper-VIII (c) Bio-geography:**

3 Hrs. Duration

100 Marks

**Section-‘A’**

Meaning and scope of Bio-geography, History of Zoo-geography and plant geography. Plant and animal ecology, Ecosystems-with special reference to mountain and desert. Energy flow in ecosystem.

Plant response to environment, the habitat and climatic factors. Taxonomic and ecological classification of plant. ecological succession, concept of Biome Ecotone and community. Factors controlling forest distribution. Characteristics and distribution of tropical forest and grassland.

**Section-‘B’**

Origin of Fauna and Flora, Taxonomic classification of animals. Animals classification according to general characteristics of Environment.

Barriers to distribution and means of dispersal of terresteoial animals. The effect of environment on animal distribution, geographical isolation of animals : The Zoo-Geographical region.

**Section-‘C’**

Aquatic environment and life, Marine and fresh water fauna Distribution of world fisheries in India. Conservation of natural resources : Forests and wild life and their management and conservation (with reference to India). Process of desertification, its consequences and management principles. Environmental pollution, courses and control with special reference to air and water. Bio-geo-chemical cycles.

**Books recommended :**

1. Robinson, H. : Biogeography, Eles, Mc. Donald and Evans London 1982.
2. Odum, E.P. : Fundamentals of Ecology, W.B. Sanders.
3. Mathur, H.S. : Essentials of Biogeography, Pointer Publishers, Jaipur, 1988.
4. Newbegin : Plant and Animal Geography.
5. Alar Schmid : Economical Animal Geography.
6. Cline : Foundation of Plant Geography.

7. G. Ponald : The Geography of Flowering Plants.
8. Newbegin : Animal Geography.
9. Darlington : Zoo-geography
10. Schimper : Plant Geography
11. Morris. J. Soloman : Better Plant Utilisation in India. A Blue Print of Action (I.S. Calcutta)
12. S.L. Hora : Fundamental Conception of Zoo-geography (NGSI, Banaras)
13. S.L. Hora : Torrential Fishes and the Significance of their distribution in geographical studies NGSI, Banaras.
14. M.L. Roonwal : Geographical and Geological causes of the Migration of Animals (NGSI, Banaras)

**Paper-VIII (d) Regional Planning :**

3 Hrs. Duration

100 Marks

***Section-'A'***

- (a) Regional Planning : Term, Task, Scope and objective.
- (b) Specific problems : Task and scope of regional planning in developing countries.
- (c) Principles and Determination of Regional Planning, Significance of the ecological potential of a country's region or regional planning.
- (d) Importance of the density, distribution and development population for regional planning.

***Section-'B'***

- (a) Significance of the term 'Integration' (Political, Economic, Social and Spatial) for regional planning.
- (b) Importance of the political system for regional planning.
- (c) Significance of the factor, adaptation of developments of different social classes of the population for regional planning.

***Section-'C'***

Methods of Regional Planning :

- (a) Factor Analysis.
- (b) Comparative Cost-analysis.
- (c) Industrial complex and analysis.
- (d) Shift analysis.

**Paper-VIII (e) Meteorology :**

3 Hrs. duration

100 marks

**Section-'A'**

**The Atmosphere :** Chemical composition, vertical structure, temperature distribution.

**Pressure :** Definition, Law and hydrostatic equilibrium. Variation of pressure, Laplace formula, Measurements of pressures, pressure system and isobars.

**Temperature :** Heat budget of atmosphere, Radiation, Measurement, various Lapse rates inversion Gas equation, Albedo, Isotherm and adiabatic processes in the atmosphere, Greenhouse effect.

**Humidity :** Vapour pressure, humidity quantities. The dry Bulb and Dew point Density of air, Stability and instability. Thermodynamic diagrams and instability. Thermodynamic diagrams, Virtual and potential temperature, Föhn effect.

**Clouds and Precipitation :** Classification of clouds and their description. Formation of clouds. Condensation, formation of rain, Bergeron's and Capture theories, Convective, Frontal and orographic precipitation. Snow, Hail and frost, thunderstorm and types.

**Section-'B'**

**Motion of Air :** Buys Ballot law, Coriolis force, Geostrophic and gradient winds, effect of friction, Sea and land breeze. Orographic winds, Thermal wind. Gust and squall. Variation of wind with height, Jet-Stream.

**Upper air observations :** History, theory of Pilot balloon observations, Radiosound, uses of radar and Satellites, upper observations in India.

**Synoptic Meteorology :**

**Structure of Pressure Systems :** Weather conditions associated with different types of pressure system.

General idea of air masses fronts. Frontogenesis and Frontolysis World circulation of air and geographical distribution of Fronts.

Intertropical convergence zones. Tropical revolving storms, development and movement of simple pressure systems and fronts. Mergals formula.

Effect of topographical features on development of weather.

### Section-'C'

**Monsoon** : Monsoon climatology and genesis of the Indian summer monsoon. The energetics of the monsoon and physics of monsoon rain. Distribution of rainfall in monsoon and associated pressure system. Longrange forecasts of monsoon rain. Consideration of Analogues charts.

**Climatology** : Climate classification of world-Koppens classification, precipitation and temperature criteria. Thornthwaite modification.

Seasons in India with special reference to western disturbance, North western monsoon depressions and dust storms, physical climatology.

Controls of Climate, Solar constant. Disposition of insolation in the atmosphere.

#### Microclimatology.

#### Practical :

1. Uses and upkeep of meteorological instruments.
  - (a) Surface
  - (b) Upper air
2. Codes and symbols.
3. Plotting of Surface and upper air charts.
4. Drawing of isobars and streamlines.
5. Elements of weather forecasting.
6. Preparation of climatological table.

#### Books Recommended :

##### Physical Meteorology :

1. Blair, Thomas. A. and Robert C. Fite. "Weather Elements" A text in Elementary Meteorology. New York Prentice Hall.
2. S.L. Hess : Introduction to Theoretical Meteorology New York Holt 8.53.
3. G.F. Taylor : Elementary meteorology.
4. S. Pettersson : Introduction of Meteorology 7.50.
5. H.R. Byers : General Meteorology 3rd Edition, New York, McGraw Hill.

##### Synoptic Meteorology :

6. C.F. Brooks : Why the Weather.
7. Lehr, Paul. E.R. Will Burnenntt and Herbert S. Lin Weather : Airmasses. Clouds Rainfall Storms. Weathers-Maps. climate.



8. Elementary : Forecasting by Her Majesty Stationery Publications.
9. Dr. P.R. Das : Monsoon National Book Trust Publications.
10. Richi, Herbst : Tropical Meteorology McGraw Hill, N.Y.

**Climatology :**

11. C.E.P. Brooks : Climate in Every life.
12. Crltechfied H.J. : General Climatology.
13. H. Landsbern Dubis : Physical Climatology Pa-Gray Printing Co., U.S.R.
14. Rudolf, Geigar : The Climates Near the Ground Cambridge University Press.
15. W.G. Kendrew : The Climates of the Continents, New York Oxford University Press.
16. Climatology & India Parts I and II : FMU. Pep. No. J-0122 issued Direction Gen. (Forestry), Poona-5.
17. Mason, Besile : Clouds, Rain and Rain making.
18. Spar, Jarome : Earth, Sea and Air.
19. Spar, John : Physical Meteorology C. New York Willey.
20. S. Patterson : Weather Analysis and Forecasting.
21. Geneva, Switzerland 1-85 : M.W.O. International Cloud Atlas Album by Abridged Allas.
22. Meteorological office London : Meteorological Glossary issued.
23. " : Climatic Change Evidence, Causes and Effect.
24. Glem, T. Trewarth : Introduction to Weather and Climate.
25. Hawribt and Austen : Climatology.

**Paper-VIII (f) Research Methodology :**

3 Hrs. duration

100 Marks

**Section-'A'**

Problems of geographical research. Identification of problems of regional and systemic geography sources and natures of data to be used. Hypotheses and models. Formation of research schemes.

Preparation of research projects and writing of reports, preparation of field reports. spatial data, classification and sampling problems. Need for sampling, types of sampling, sample size and sampling area.

**Section-'B'**

Selected techniques of spatial analysis. methods of measuring

concentration and dispersal of economic activities. Nearest neighbour analysis, Regional interaction analysis, gravity potential, inter-regional flow-analysis, Methods of delimiting regions, economic industrial regions, planning regions, agricultural regions.

### **Section-'C'**

Regional population analysis, population projection. Population migration projection; Network analysis, Techniques of urban analysis with reference to land use, population and hinterland relationship-delimiting sphere of city influence. Determining of core and marginal areas.

Techniques of map analysis, Morphometric analysis. Thalegaltimetric frequency graphs, Drainage basin analysis, slope analysis. Analysis of bio-geo-chemical cycles. Integrated area development planning.

### **Books Recommended :**

1. Worthington and Gant : Techniques of Map Analysis.
2. King, C.A.M. Techniques in Geomorphology.
3. Hoyle, B.S. (Ed.) : Spatial Aspects of Development.
4. Misra, R.P., (Ed.) : Regional Planning, Concepts, Techniques, Policies and Case Studies, 1969.
5. Isard and Cumberland : National Economic Planning 1961.
6. Mukerjee, R.K. : Planning the Country Side.
7. Stamp, L.D. : Applied Geography.
8. Stamp, L.D. : The Land of Britain : Its Use and Misuse.
9. Stamp, L.D. : The Geography of Life and Death.
10. Stamp L.D. : Our Development World.
11. Freeman : Geography and Planning.
12. Prakasa Rao : Regional Planning.
13. Prakasa Rao : Towns of Mysore.
14. Smailes : Geography of Towns.
15. Abercrombie : Town and Country Planning.
16. Chapin, F.S. : Urban Land Use Planning.
17. Morrill : Migration and Spread and Growth of Urban Settlement.
18. Chisholm : Rural Settlement and Rural Land Use.
19. Shafi, M. : Land Utilisation in Eastern Uttar Pradesh.
20. Graham, F.H. : Natural Principles of Land Use.
21. Hagget Peter : Geography : A Modern Synthesis.
22. Hagget and Chorley : Models in Geography.

**Paper-VIII (g) Geography of Water Resources**

3 Hrs. duration,

Marks : 100

**Section-A**

Water as a focus of geographical interest, inventory and distribution of world's water resources (surface and subsurface); world hydrological cycle : quantitative estimates, water storages. Glaciers, river channels, lakes and reservoirs, soil moisture, ground water.

The basic hydrologic cycle : precipitation, Potential, evapotranspiration and interception losses : runoff.

Water demand and use : methods of estimation-agricultural, industrial and municipal uses of water.

Agricultural use of water : estimation of crop-water requirement; soil-water-crop relationships; water balance and drought; major and minor irrigation : methods of distribution of water to farms; water harvesting techniques, soil water conservation.

**Section-B**

Irrigation-water logging, salinity and alkalinity of soil over exploitation of ground water, land subsidence, saline water intrusion into the alluvial aquifers. Water quality parameters, water pollution over and ground water-fluoride and arsenic.

Industrial use of water : methods of estimation; demand for water in the industrial sector of India.

Municipal use of water : General trends in water supply to the urban and rural communities in India. Internal navigation, hydel power and recreation.

**Section-C**

Problems of water resource management Floods-magnitude / frequency, structural and non structural adjustment of flood hazards; embankments, reservoirs, channel improvement, soil conservation, afforestation, flood forecasting, evacuation, floodplains, landuse regulation and insurance. Case studies of major floods.

Droughts-occurrence, major drought management with reference to Rajasthan.

Conservation and planning for the development of water resources-social and institutional considerations; integrated basin planning conjunctive use of surface and ground water resources; watershed management; international and interstate river water disputes and ties, some case studies.

### ***Suggested Readings***

1. Agarwal, Anil and Sunita Narain : *Dying Wisdom : Rise, Fall and Potential of India's Traditional Water Harvesting System*. Centre for Science and Environment, New Delhi, 1997.
2. Economic and social Commission for Asia and the Pacific United Nations : *Guidelines for the preparation of National Master Water Plans*, 1989.
3. Govt. of India, Ministry of Agriculture Report of the Irrigation Commission Vol. I to IV, New Delhi, 1972.
4. Govt. of India, Ministry of Energy and Irrigation, Rashtriya Barh Ayog (Report-National Commission of Floods. Vol. I & II, New Delhi, 1980.
5. Gulhati, N.D. : *Development of Inter-State Rivers : Law and Practice in India*. Allied Pub., Bombay, 1972.
6. International Water Resource Association and Central Board of Irrigation & Power, *Water of Human Needs*, Vols. I to V Proceedings of the Second World Congress on Wather Resources, 12-16 December, New Delhi, 1975.
7. Jones, J.A. : *Global Hydrology : Processes, Resources and Environmental Management*, Longman, 1997.
8. Krutilla, John V. and Eckstein, O. : *Multiple Purpose River Development : Studies in Applied Economic Analysis*, John Hopkin's Press, Boston, 1958.
9. Law. B.C. (ed.) *Mountains and Rivers of India* IGU National Committee for Geography, Calcutta, 1968.
10. Michael, A.M. : *Irrigation : Theory and Practices*, Vikas Publishing House Pvt. Ltd., New Delhi, 1978.
11. Matter, J.R., *Water Resources Distribution, use and Management*, John Wiley, Marylane, 1984.
12. Newson, M. *Land, Water and Development River Basin systems and their Sustainable Management*, Routledge, London, 1992.
13. Pareira, H.D. : *Landuse and Water Resources*, Cambridge University Press, Cambridge, 1973.

14. Rao, K.L. : *India's Water Wealth*, Orient Longman, New Delhi, 1979.
15. Kates R.W. and Burton, I. (ed.) : *Geography, Resources and Environment*, Ottawa, 1980.
16. Singh, R.A. and Singh, S.R. : *Water Management ; Principles and Practices*, Tara Publication, Varanasi, 1979.
17. Smith, K. : *Water in Britain : A study in Applied hydrology and Resource Geography*, McMillan, London, 1972.
18. Tebbutt, T.H.Y. (ed.) : *Advances in Water Engineering Elsevier Applied Science Pub.*, London 1985.
19. Tideman, E.M. *Watershed Management : Guidelines for Indian Conditions*, Omega, New Delhi, 1996.
20. Todd, D.K. : *Ground Water Hydrology*, John Wiley, New York, 1959.
21. U.S.D.A. : *The Year Book of Agriculture : Water*, Oxford and I.B.H. Publishing Co., New Delhi, 1955.
22. Verghese, B.G. : *Water of Hope : Integrated Water Resource Development and Regional Co-operation within the Himalayan-Ganga-Brahmaputra-Barak Basin*, Oxford IBH, New Delhi, 1990.
23. White, G.F.L. : *Environmental Effects of Complex River Development*. Westriver Press, Boulder, Colorado, 1977.

## **DISSERTATION**

Dissertation on and Geographical Problem.

**N.B. :** The candidates offering this paper will be required to submit dissertation four weeks after the theory examination. It will be examined by a board of two examiners. Three copies of thesis will be submitted to the University, out of which one copy will be returned to the Department/ College and one to the supervisor.

The dissertation should exclusively be based on field work and statistical analysis as far as possible and prepared under the guidance of a post graduate teacher of five year standing.

The Volume of the dissertation will not exceed 100 pages.

Dissertation can be offered in lieu of any one of the optional papers of Final Year Examination.

## PRACTICALS

1. Written Test on Lab. Work	Four Hrs. (4 Qs.)	40 Marks
2. Record Work and Viva-Voce.	(14+16)	20 Marks
3. Field Survey and Viva-Voce.	Four Hrs. (14+16)	20 Marks
4. Camp Work and Viva-Voce	7 days (14+16)	20 Marks
	<b>Total</b>	<b>100 Marks</b>

Students will have to attempt four questions out of six questions in written paper of Practical Examination.

The Art of surveying History of surveying, scope, utility and problems classification of surveying.

### Methods and techniques of representation of relief :

- (a) Methods and techniques of depicting relief
- (b) Profile, gradients and calculation of slopes
- (c) Block diagrams, field sketching, serial profile, hypsographic curves altimetric frequency graphs

### Interpretation of topographical maps :

A brief history of topographical maps of the world with special reference to India and their interpretation, detailed study of such toposheets which depict typical geomorphology and cultural landscapes.

Air photo interpretation and exercise on the determination of height of plan, parallax, number of runs and number of photographs, knowledge of stereoscopic vision, mosaics; types of cameras, emulsions and stereoscopes. Interpretation and identification of cultural and physical features on serial photographs. Photo interpretation of land use and settlements in the field.

### Field Surveying and camp-work.

Theodolite : Its parts and their function, use of theodolite, theodolite traverse and traverse computation independent coordinates.

use and application of plane table and clinometer in small area surveys. Traverse planetable, resectioning : Two and three point problems, Classification of levelling. Profile, precise and other types of levelling. use of Dumpy level. Practical countouring cross sectioning use and application of abney level.

Camp Work : A topographical survey of a settlement of about 500 acres of land will be done by organising a camp at least for a week away from the centre of the institution and maps and reports of the same will be prepared. (students are expected to stay in the camp at night).

“A Teacher will supervisor only five candidates in the camp and the marks in the camp work will be awarded by the External Examiner in consultation with the internal Examiner.”

***Books Recommended :***

1. Kanethkar, T.P. and Kukarni, S.V. : *Surveying and Leveling Vol. I* (A.V. Gria Prakash, Poona).
2. Deshpande, R.S. : *A text book of surveying and leveling.* (United Book Corporation, Poona).
3. James Clending : *Principles and use of surveying* (Blackie and Sons Ltd. Glasgow).
4. B.C. Punmia : *Surveying and Field Work Vol. I* (Standard Book Depot, Delhi).

***Reference Books :***

5. Breed, C.B. and Hosmer, G.L. : *The Principle of Surveying Vol. I and II* (New York).
6. Devis, R.E. and Foot, F.S. : *Surveying theory and practice* (McGraw Hill Book Co., New York).
7. T.R. Tracy : *Surveying theory and practice* (John Wiley and Sons, Inc., New York).
8. Thrilfall, H.S., *A Text Book of Surveying and Levelling* (Charles Graffilin, London).
9. Williamson : *Surveying and Field work* (Constable).
10. Roorke Engineering College : *Manual of Surveying.*
11. N.C. Gautam : *Urban Land use Studies through Airphoto Interpretation Techniques* : Pink Publishing House, Mathura.



# UNIVERSITY OF RAJASTHAN JAIPUR

## RULES FOR THE AWARD OF GRACE MARKS

- A. UNDER GRADUATE/POST GRADUATE (MAIN/SUPPLEMENTARY) EXAMINATIONS UNDER THE FACULTIES OF ARTS, FINE ARTS, SCIENCE, COMMERCE, SOCIAL SCIENCE, EDUCATION, MANAGEMENT, HOMOEOPATHY, LAW, AYURVEDA AND ENGINEERING & TECHNOLOGY.**

Grace marks to the extent of 1% of the aggregate marks prescribed for an examination will be awarded to a candidate failing in not more than 25% of the total number of theory papers, practicals, sessionals, dissertation, viva-voce and the aggregate, as the case may be, in which minimum pass marks have been prescribed; provided the candidate passes the examination by the award of such Grace Marks. For the purpose of determining the number of 25% of the papers, only such theory papers, practicals, dissertation, viva-voce etc. would be considered, of which, the examination is conducted by the University.

**N. B. :** If 1% of the aggregate marks or 25% of the papers works out in fraction, the same will be raised to the next whole number. For example, if the aggregate marks prescribed for the examination are 450, grace marks to the extent of 5 will be awarded to the candidate, similarly, if 25% of the total papers is 3.2, the same will be raised to 4 papers in which grace marks can be given.



## B. DIPLOMA IN PHARMACY, BACHELOR OF PHARMACY, B.Sc. (NURSING) AND B.D.S. EXAMINATIONS

1. A Student who obtains the required minimum pass marks in the total aggregate but fails to obtain the minimum pass marks in (i) two subjects, (ii) in one subject and in one practical or (iii) in two practicals, as the case may be, will be given grace marks according to the following scale, provided the candidate passes the examination by the award of such grace marks.

For 1 to 6 marks above  
the min. aggregate : 2 grace marks

For 7 to 12 marks above  
the min. aggregate : 3 grace marks

For 14 to 18 marks above  
the min. aggregate : 4 grace marks

For 19 and above the min. aggregate : 5 grace marks

(i) The theoretical and practical tests (wherever held) in a subject will count as 2 subjects.

(ii) In case it is necessary to secure minimum pass marks in one part of a subject the above rule will be applicable as follows.

“If a candidate fails in the compulsory part of the subject as well as in the whole subject, he will be deemed to have passed in the subject if the greater of the two deficiencies or where the two deficiencies are equal, one of them is covered by the grace marks to which he is entitled under the rules.

2. No grace marks would be awarded to a candidate who appears in part/supplementary examination.

### **C. M.B.B.S AND B.A.S.L.P. (BACHELOR OF AUDIOLOGY, SPEECH AND LANGUAGE PATHOLOGY) EXAMINATIONS**

1. The grace marks upto a maximum of 5 marks will be awarded to a student who has failed only in one subject (Theory and/or practical) but has passed in all other subject.
2. No grace marks would be awarded to a candidate who appears in part/supplementary examination.

#### **General**

1. A candidate who passes in a paper/practical or the aggregate by the award of grace marks will be deemed to have obtained the necessary minimum for a pass in that paper/practical or in the aggregate and shown in the marks sheet to have passed by grace. Grace marks will not be added to the marks obtained by a candidate from the examiners nor will the marks obtained by the candidate be subject to any deduction due to award of grace marks in any other paper/practical or aggregate.
2. If a candidate passes the examination but misses First or Second Division by one mark, his aggregate will be raised by one marks so as to entile him for the first or second division, as the case may be. This one mark will be added to the paper in which he gets the least marks and also in the aggregate by showing +1 in the tabulation register below the marks actually obtained by the candidate. The marks

entered in the marks-sheet will be inclusive of one grace mark and it will not be shown separately.

3. Non appearance of a candidate in any paper will make him ineligible for grace marks. The place of a passed candidate in the examination list will, however, be determined by the aggregate marks he secures from the examiners, and he will not, by the award of grace marks, become entitled to a higher division.
4. Distinction won in any subject at the examination is not to be forfeited on the score that a candidate has secured grace marks to pass the examination.

**Note :** The grace marks will be awarded only if the candidate appears in all the registered papers prescribed for the examination.