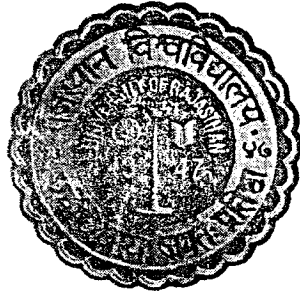


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**University of Rajasthan  
Jaipur**


**SYLLABUS**

**M.SC.**

**GEOGRAPHY**

**(ANNUAL SCHEME)**

**2015-2017**

  
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JAIPUR

# M.A./M. Sc. Geography (Annual Scheme)

(Regular/Non-Collegiate Candidates)

## SCHEME OF EXAMINATION

Each Theory Paper	3 Hrs. Duration	100 Marks
Dissertation if offered in lieu of an elective paper		100 Marks
Practical		100 Marks

N.B. Non-Collegiate candidate are not eligible to offer dissertation as per provisions of O. 170-A.

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. *Each theory paper will have a teaching of 4 hrs per week*
2. A candidate for passing at each of the Previous and the Final Examination 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 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 in 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 type written 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

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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 examination 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 permitted to use simple calculator, Log Table & map stencils in the Examinations if needed.
6. Non-collegiate candidates both in previous and final year are required to attend a practical training camp of forty eight hours at the Department of Geography, University of Rajasthan, Jaipur on payment of fee fixed by the University from time to time. The candidate should contact the Head, Department of Geography, University of Rajasthan, Jaipur for practical camps immediately after the filling the examination forms. Head, Department of Geography will issue a Certificate to each of the non-collegiate candidate for successful completion of the training camp. The candidate have to submit the Certificate at the time of practical examination.

### M.A./M.SC. Geography

There will be four theory papers and a practical each in Previous and Final Examination. 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 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) Advanced Geography of Monsoon Asia  
(b) Geography of Rural Development  
(c) Comparative Geography of U.S.A. and Russia  
(d) Geography of South Asian Countries (Bangladesh, Nepal, Pakistan, Srilanka)  
(e) Advanced Regional Geography of West Europe.  
(f) Man and Natural Environment.  
(g) Quantitative Techniques in Geography.  
Practicals

#### 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

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- (d) Transport Geography  
 (e) Geography of Settlements  
 (f) Advanced Geomorphology
- Paper –VII Any one of the following:  
 (a) Urban Geography  
 (b) Geography of Crimes  
 (c) Climatology and Oceanography  
 (d) Applied Geography  
 (e) Pedology  
 (f) Medical Geography  
 (g) Fundamentals of Remote Sensing and Geographical Information System
- Paper –VIII Any one of the following:  
 (a) Political Geography  
 (b) Cultural Geography  
 (c) Bio-Geography  
 (d) Regional Planning and Development  
 (e) Meteorology  
 (f) Research Methodology  
 (g) Geography of water resources, their management and utilization

**Dissertation:** In lieu of any elective paper of M.A. / M.Sc. Final.

## Practical

### Instructions for Geography Practical Examination (Both Regular and Non-collegiate)

1. The record work should have 50 sheets (1/6<sup>th</sup> of 20'' x 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 exercise. 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 color 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 batch in M.A. Previous. As far as possible practical exercise be set to judge the practical skill through the Practical exercise.
4. (a) The field Survey by instruments in M.Sc/M.A. Final be given 3 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 20 students.
5. The paper for written test in M.A. Final be so set that the questions are not duplicated with field exercise.

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6. The External examiner be provided detailed syllabus and detailed instruction before the commencement of examination.

## SYLLABUS

M.A./M.Sc. Previous

### Paper- I Evolution of Geographical Thought

#### Section A

Definition, scope, nature, purpose and philosophy of geography, fundamental concepts of geography; ancient Indian geography during Vedic and Puranic periods, ancient classical age: contributions of Greeks (Herodotus and Eratosthenese) and Romans (Strabo and Ptolemy); medieval geography: contributions of Al Biruni, Al Masudi, Idrisi, Ibn-Batutta, Ibn Khaldun, Geography during the period of Renaissance: contributions of Sebastian Munster, Philip Cluverious, Nathanael Carpenter, Varenius, Anton Friedrich Bushing, Immanuel Kant and Conrad Malte Brun.

#### Section B

Modern geography: geography in Germany-contributions of Humboldt and Ritter, Richthofen, Ratzel, Hettner and Schluter; geography as a chorological science, geography in France-Blache and Brunches, geography in Anglo-American- Sauer and Schafer, geography as science of distribution and relationship, geography as chorological science, geography as science of landscape morphology, geography as spatial science and human ecology.

#### Section C

Dualism in geography: physical and human geography, systematic and regional geography, environmental determinism and possibilism, qualitative and quantitative, reductionism and holism; quantitative revolution; philosophical pluralism- empiricism, logical positivism, humanistic geography and structuralism. Approaches in geography, behavioural, radical, feministic, Post modern and critical geography; Indian geography: development, problems, perspectives and prospects.

#### Recommended Readings:

Adhikari, S. 2009. Fundamentals of Geographical Thought. Chaitanya Publishing House, Allahabad.

बंसल, सुरेश चन्द. 2008: भौगोलिक चिन्तन के मूल तत्व। मीनाक्षी प्रकाशन, मेरठ।

Dickenson, R. E. 1967. The Makers of Modern geography. Routledge & Kegan Paul Limited. London.

Dear, M.J. and Flusty, S. (ed.) 2002: The spaces of Post modernity: Readings in Human Geography, Blackwell Publishers Ltd, Oxford.

Dikshit, R. D. 2004. Geographical Thought. A Critical History of Ideas. Prentice-Hall of India, New Delhi. (in English and Hindi).

Holt-Jensen, A. 1988. Geography: History and Concepts – A Student's Guide. Sage, Los Angeles (Fourth Edition).

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- आट, डी.सी. 2013: भौगोलिक चिन्तन का इतिहास। मलिक एण्ड कम्पनी, जयपुर।
- जैन, एस.एम. 2005: भौगोलिक चिन्तन एवं विधि तंत्र। साहित्य भवन पब्लिकेशन्स, आगरा।
- James, P.E.; All Possible Worlds 1972: A History of Geographical Ideas; Odessey Press, 622 pages.
- Johnston, R, Gregory D, Pratt G, Watts M. and Whatmore S. (2003): The Dictionary of Human Geography. Blackwell Publishers, Oxford. 5th edition.
- कौशिक, एस.डी. 2005-06, भौगोलिक विचारधाराएँ एवं विधि तंत्र, रस्तोगी पब्लिकेशन्स, मेरठ, आठवां संस्करण (पुनमुद्रित)।
- मौर्य, एस.डी. 2007, भौगोलिक चिन्तन का इतिहास, प्रयाग पुस्तक भवन, इलाहाबाद।
- Majid. H. 2007. Evolution of Geographical Thought. Rawat Publications, Jaipur.
- Peet, Richard 1998: Modern Geographical Thought. Blackwell Publishers, USA.
- सक्सेना, एल.के. व तिवारी, ए.के. 2003, भौगोलिक चिन्तन। राजस्थान हिन्दी ग्रन्थ अकादमी, जयपुर।

## Paper- II: Physical Basis of Geography

### Section A

Meaning, scope and development of physical geography, approaches and recent trends in physical geography, zoning of the earth's interior and thermal state, isostasy, endogenetic and exogenetic forces, mountain building theories (Kober, Jeffreys, Daly, Joly, Holmes) plate tectonics, denudation: erosion and weathering: types and processes, models of landscape evaluation: Davis and Penck.

Erosional and depositional landforms formed by running water, underground, wind, glacial-periglacial; process of desertification, models of slope development (Wood, Davis, Penck, King).

### Section B

Atmosphere: composition and layers, air temperature, heat balance, adiabatic and non adiabatic processes, stability and instability, evaporation, humidity and condensation, precipitation, world precipitation pattern.

Air pressure variations, pressure belts and planetary wind system, monsoon winds and local winds, air masses and fronts, secondary circulation: cyclones (Tropical and extra tropical) and anticyclones, world climatic classification: Koppen's and Thornhwaite's schemes.

### Section C

Oceanic bottom relief, oceanic deposits, horizontal and vertical distribution of temperature and salinity, oceanic water currents, tides and tidal theories, atolls and coral islands, theories of coral reef formation, marine resources biotic, mineral and energy resources and their utilization.

Soils: genesis, classification and distribution, biodiversity loss and measures for conservation, biotic succession and major biotic regions of the world with special reference to ecological aspects of savannah and monsoon biomes.

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## Recommended Readings:

- Chorley, R.J. 1972: Spatial Analysis in Geomorphology. Methuen, London.
- Cooke, R.U. and Doornkamp, J.C. 1974: Geomorphology in Environmental Management-A introduction. Clarendon Press, Oxford.
- Dury, G.H. 1959: The Face of the Earth. Penguin Harmondsworth.
- Fairbridge, R.W. 1986: Encyclopedia of Geomorphology. Reinholdts, New York.
- Garner, H.F. 1974: The origin of landscape-A Synthesis of Geomorphology. Oxford University Press, London.
- Goudie, A. 1993: The Nature of the Environment. Oxford & Blackwell, London.
- जाट, बी.सी. 2013: भौतिक भूगोल। मलिक एण्ड कम्पनी, जयपुर।
- Ollier, C.D. 1979: Weathering. Longman, London.
- Pitty, A.F. 1971: Introduction to Geomorphology. Methuen, London.
- Sparks, B.W. 1960: Geomorphology. Longman, London.
- Sharma, H.S. (ed), 1980: Perspectives in Geomorphology. Concept, New Delhi.
- Skinner, B.J & Porter, S.C. 1995: The Dynamic Earth. John Wiley, New York.
- Stoddart, D.R. (ed) 1996: Process and Form in Geomorphology. Routledge, New York.
- Singh, S. 1998: Geomorphology. Prayag Publication, Allahabad.
- Thornbury, W.D 1960: Principles of Geomorphology. John Wiley, New York.
- Young, A. 1972: Slopes. Longmans, London.

## Paper III: Principles and Theory of Economic Geography

### Section A

Meaning and scope of economic geography, simple model of economy and spatial structure of economy, environmental relations of economy, classification of the economies of the world (primary, secondary and tertiary), theories, concepts and models of development-developed, developing and under developed economies, 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 industrial location: Weber, Hoover, Losch, Isard and Smith, major industries: iron and steel, aluminum, paper and pulp, cotton textile, chemical and fertilizers, world transport patterns: accessibility and connectivity.

### Section C

Decision making process: Location decision-behavioral view, spatial organization of landuse: Central place theory of Christaller Von Thunen's Agriculture location theory, emerging patterns of world trade, barriers to trade, dynamics of blocks, economic development, regional disparities in economic development, economic regionalization for area development and planning-economic regions of India.

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## Recommended Readings:

- Alexander, J.W. 2001. Economic Geography. Prentice Hall of India, New Delhi.
- Chapman, K and Walker, D. 1991. Industrial Location: Principles and Policies. Blackwell, Oxford.
- Grigg, D. 1995. An Introduction to Agricultural Geography. Second edition, Routledge, London.
- Gupta, P. Sen and Sydasuk, Galyna: Economic Regions and Regionalization in India.
- James, O. W. and Peter, O. M. 1986. Economic Geography. John Wiley and Sons, New York.
- Jarret, H. R. 1977. A Geography of Manufacturing. Trans-Atlantic Publishers, London.
- जाट, बी.सी. 2014: आर्थिक भूगोल। पंचशील प्रकाशन, जयपुर।
- Hodder B.W. and Lee, R. 1974: Economic Geography. Methuen, London.
- Mandal, R. B. 1982. Land Utilization – Theory and Practice. Concept Publishing Company, New Delhi.
- Scott, A. J. 1988. New Industrial Spaces. Pion, London
- Shafi, M. 2000. Agricultural Geography of South Asia. Macmillan, New Delhi.
- Singh J. and Dhillon, S. S 2004: Agricultural geography. Tata Mc-Graw-Hill, New Delhi.
- Singh, Kashi Nath and Siddiqui, A.R.: Economic Geography, Prayag Pustak Bhawan, Allahabad.
- Smith, D. M. 1981. Industrial Location – an economic, geographical analysis. John Wiley, New York.
- Tyagi, B. P. 1998. Agricultural Economics and Rural Development. Jai Praksh Nath & Co., Merrut (sixth edition).
- Wheeler, J.O. and Muller, O.P. 1995: Economic Geography. John Wiley, New York.

## Paper IV Any one of the following:

### Paper IV (a): Advanced Geography of Monsoon Asia

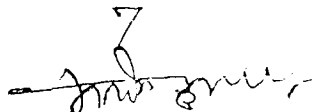
#### Section A

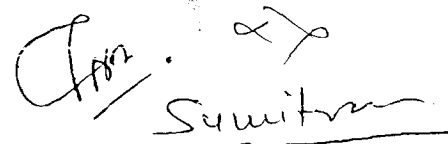
Unity in Diversity in Monsoon Asia, importance of location, geological structure, physiographic, drainage basins, climate regions, natural vegetation, mineral wealth, population and its characteristics, power resources, agricultural characteristic, importance of Monsoon lands with respect of food stuffs 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 resources, Philippines-population and food problem and development programme, Thailand-problem of urbanization and regional division and development programmes Indonesia-population

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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 industrialization, 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.

### Recommended Readings :

Hussain, M. 2004: World Geography. Rawat Publication, Jaipur.

Johnson, D.L. et al 2012: World Regional Geography: A Development Approach. PHI Learning Pvt. Ltd., New Delhi.

ममोरिया एवं अग्रवाल 2012: एशिया का भूगोल। साहित्य भवन, आगरा।

राव, बी.पी. एवं सतपथी, डी.पी. 2002: एशिया की भौगोलिक समीक्षा। वसुन्धरा प्रकाशन, गोरखपुर।

सतपथी, डी.पी. 1995: चीन की भौगोलिक समीक्षा। वसुन्धरा प्रकाशन, गोरखपुर।

Shafi, M. 2000: Agricultural Geography of Asia. Macmillan, Delhi.

सक्सेना, एच.एम. 2010-11: विश्व का प्रादेशिक भूगोल। रस्तोगी पब्लिकेशन्स, मेरठ।

Tikkha, R.N. 1997: World Regional Geography. New Academic Publishing Company, Jalandhar.

Wadia, D.N. 1919: Geology of India. Longman, London.

## 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, land use 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.

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## 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.

### Recommended Readings:

- Association of Country Councils 1979: Rural Deprivation, London, ACC.
- Allan, J.A. 1980: Remote Sensing in Land in Landuse Studies, Geography.
- Anderson, J.R.L.J. 1977: Hardarkar-Agricultural decision Analysis, Amès, Lows State University Press.
- Andrese, B. 1981: Farming Development and Space-World Agricultural Geography, New York, Water Cryter.
- Bowler, I.R. 1948: Agricultural Geography, Progress in Human Geography 8.
- Grigg, D.B. 1974: The Agricultural Systems of the World, Cambridge University Press.
- Grigg, D.B. 1984: An Introduction to Agricultural Geography, London Hutchinson.
- Glig, A.W. 1985: An introduction to Rural Geography, Edward, Arnold, London.
- Jones, A. 1975: Rural Housing, The Agricultural Tied College, London Bell.
- Lasey, W.R. 1977: Planning in Rural Environment, New York, Mcgraw Hill.
- Lavery P. (ed.) 1974: Recreational Geography, Newton Abbot: David and Charles.
- Leasdale, R. 1981: Settlement Systems in Sparsely Populated Regions and Homes (ed.), Oxford, Pergamon.
- Menab. A 1984: Integrated Rural Development, Gloucester Glanceser Collegel of Arts.
- Morgan, W.B. and RJS Munon-Agricultural Geography, London Methuen.
- Newbury, Pa. 1980: Geography of Agriculture, Plymouth Macodonald and Evans.
- Pacione, M. 1981: Rural Geography, London, Parpur Clark, (ed.) and Row 1984-Register of Research in Rural Geography Licester: Rural Geography Study Group.
- Tewari, A.K. (ed.) 1988: Desertification: Monitoring and Control, Scientific Pubs, Jodhpur.

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

### 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 vegetation divisions, demographic characteristics.

### Section B

Natural resources-forest, soil mineral, livestock, development of power resources, development of agriculture-agricultural crop regions (Belts).

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## 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.

### Recommended Readings:

Alexander: The North Eastern United States : (D. Vvan Nostranc Co., New York).

Barg, L.S.: Natural Regions of U.S.S.R. (Mac. Millian and Co., New York).

Balzak, S.S.: Economic Geography of Soviet Union (Mac Millian and Co., New York).

Hait: The South Eastern United Co., N.Y.

Hodkins: Soviet Power, Energy, Resources, Production and Potentials (Prentice Hall, New York).

Lames, P.E.: Latin America (Cassel and Co., London).

Martin, M.C.: The United States at Work (George G. Harrp and Co., New York).

McCarry, H.H.: Geographic Basis of American Economic Life (Harper and Co., London).

Mirow, N.T.: Geography of Russia (John Willey and Sons, New York).

Methn, Vendo: Soviet Economic Development and Structure, Sterling Publisher Pvt. Ltd., AB/9 Safdarganj Enclave, New Delhi.

Ostrolenk, B.: Economic Geography of the United States (Thomas Y. Crowell Co., New York).

Russel, I.C.: North America (Oxford University Press).

Robinson, H.: The U.S.S.R. (University Tutorial Press, Ltd.).

Shaw, E.B.: Anglo-America, A, Regional Geography (John Willey and Co., New York).

Smith, J.B. and Philip, M.G.: North America: (Harcourt Brace, New York).

Shabad, T.: Geography of U.S.S.R. (Oxford University Press, Oxford).

Schwartz, H.: Russia's Social Economy (Prentice Hall of India, Delhi).

Turin, S.P.: The U.S.S.R. (Mathuen and Co., New York).

T. Shabad: Industrial Resources of U.S.S.R.

White, C.L.: Regional Geography of Anglo America (Prentice Hall, New York).

## Paper IV (d): Geography of South Asian Countries (Bangladesh, Nepal, Pakistan, Srilanka)

### Section A

Geographical realms 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.

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## 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 Maldiv Islands under the following heads-geographical and political units, climate, vegetation, agriculture, livestock, industrial and economy, trade, population, political relations.

### Recommended Readings:

Ahmed, N. 1958: Economic Geography of East Pakistan, Oxford University Press, London.

Cooke: Ceylon.

Johson, B.L.C. 1975: Bangladesh, Heinemann Education Books, London.

Johnson, B.L.C. 1970: Geography of South Asia.

Karan, P.P.: The Himalayan, Kingdom.

Kulshrestha, S.H. 1983: Simple Geography of Nepal, Educational Enterprise Pvt. Ltd., Kathmandu.

Rashid, R.E. 1977: Geography of Bangladesh, University Press Ltd., Bangladesh.

Spencer, J.E. 1962: Asia East by South, John Wiley and Sons, London.

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

### 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, vegetation division, demographic characteristics.

### Section B

Natural resources-forest, soil mineral livestock, development of power resources, development of agriculture - major 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, programmes and plans for future development.

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### Recommended Readings:

- Houston J.M. 1963: Social Geography of Europe, Duckworth.  
वर्मा, एल.एन. 2001: प्रादेशिक भूगोल, राजस्थान हिन्दी ग्रन्थ अकादमी, जयपुर, तृतीय संस्करण  
Husain, M. 2012: world Geography, Rawat Publications, Jaipur  
Tikkha, R.N. 1997: World Regional Geography, New Academic Publishing Company, Jalandhar  
अल्ला, एल.आर. व अन्य 1999: प्रादेशिक भूगोल। कुलदीप पब्लिकेशनस, अजमेर  
सक्सेना, एच.एम. 2010-11: विश्व का प्रादेशिक भूगोल। रस्तोगी पब्लिकेशनक, मेरठ।  
Johnson, D.C. et al 2012: World Regional Geography: A Development Approach, PHI Learning Private Limited, New Delhi, Edition

### Paper IV (f): Man and Natural Environment

#### Section A

Definition and scope of environmental geography, its relation with other subjects, elements of the environment, man and environmental relationships: environmental determinism, possibilism and neo determinism, biosphere and its components, concept of ecology and ecological succession, types of ecosystems, energy flow in the ecosystem, soil system, geobiochemical cycles, major biomes of the world .

#### Section B

Environmental degradation and natural disasters, environmental crises: ozone depletion, green house gas effects, El-Nino, global warming and climate change, water scarcity, acid rain, sea level change, desertification, environmental pollutions: water, air, soil, noise and radioactive.

#### Section C

Environmental quality, sustainable development, environmental management, soil and forest resources management, water management, wildlife conservation, biodiversity and its conservation, environmental awareness and education, international efforts of environmental conservation.

### Recommended Readings :

- Agarwal, A. and Narain, S. 1997: Dying Wisdom: Rise, Fall and Potential of India's Traditional Water Harvesting System. Centre for Science and Environment, New Delhi.  
Detwyler, J.R. 1975: Man's Impact on Environment. John Wiley and Sons, New York.  
Economic and social commission for Asia and the Pacific United Nations 1989: Guidelines for the preparation of National Master Water Plans.  
Govt. of India, 1980: Ministry of Energy and Irrigation. Rashtriya Barh Ayog (Report

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National Commission of Floods. Vol. I & II, New Delhi).

Govt. of India, 1972: Ministry of Agriculture Report of the Irrigation Commission. Vol. I to IV, New Delhi.

गुर्जर, आर.के. एवं जाट, बी.सी. 2001: पर्यावरण भूगोल। पंचशील प्रकाशन, जयपुर।

Gulhati, N.D 1972: Development of Inter-State Rivers: Law and Practice in India. Allied Pub., Bombay.

Harvey, B. And Hallet, J.D. 1977: Environment and Society: An Introductory Analysis. Macmillan, London.

International Water Resource Association and Central Board of Irrigation & Power, Water of Human Needs, 1975: Vols. I to V Proceedings of the Second World Congress on Water Resources, 12-16 December, New Delhi.

Jones, J.A. 1997: Global Hydrology: Processes, Resources and Environmental Management. Longman.

Kates R.w. and Burton, I. (ed.) 1980: Geography, Resource and Environment. Ottawa.

Matter, J.R., 1984: Water Resources Distribution, Use and Management. John Wiley, Marylane.

Rao, K.L. 1979: India's Water Wealth. Orient Longman, New Delhi.

सिंह, जगदीश 2003: पर्यावरण एवं संविकास। ज्ञानोदय प्रकाशन, गोरखपुर।

शर्मा, पी.डी. 2009: पारिस्थितिकी एवं पर्यावरण। रस्तोगी पब्लिकेशन्स, मेरठ।

Singh, R.A. and Singh, S.R. 1979: Water Management: Principles and Practices. Tara Publication, Varanasi.

Singh, Savindra 2006: Environmental Geography. Prayag Pustak Bhawan, Allahabad.

Smith, K. 1972: Water in Britain. A Study in Applied Hydrology and Resource Geography. McMillan, London.

श्रीवास्तव, वी.के. एवं राव, बी.पी. 2002: पर्यावरण और पारिस्थितिकी। वसुन्धरा प्रकाशन, गोरखपुर।

Tebbutt, T.H.Y. (ed.) 1985: Advances in Water Engineering. Elsevier Applied Science Pub., London.

Thomas, W.L. (ed) 1956: Man's Role in Changing the Face of the Earth, University of Chicago Press, Chicago.

Todd, D.K. 1959: Ground Water Hydrology. John Wiley, New York.

U.S.D.A. 1955: The Year Book of Agriculture: Water. Oxford and I.B.H. Publishing Co., New Delhi.

Vergheese, B.G. 1990: Water of Hope: Integrated Water Resource Development and Regional Co-operation within the Himalayan-Ganga. Brahmaputra-Barak Basin, Oxford IBH, New Delhi,

## Paper IV (g): Quantitative Techniques in Geography

### 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.

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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 meaning 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-multicollinarity 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.

### Recommended Readings:

Gupta, S.P. 1979. Statistical Methods. Sultan Chand & Sons, New Delhi, (Twelfth thoroughly revised edition).

Mahmood, A. 1998. Statistical Methods in Geographical Studies. Rajesh Publication, New Delhi (fourth revised edition).

श्रीवास्तव एवं प्रसाद 2008, भूगोल की सांख्यिकी विधियाँ, वसुन्धरा प्रकाशन, गोरखपुर।

Kailash nath nagar, sankhiki ke mool tatva, 1992, Meenakshi Prakashan, Meerut.

David unwin, Introductory spatial Analysis, Methuen, London, 1981.

Gregory, S. Statistical Methods and Geographer, Longman, London, 1978.

Hammond R and P.S. McCullagh Quantitative Techniques in Geography: An Introduction, Clearendan Press, Oxford, 1974.

John P. Cole and Cuchlanie A.M. King, quantitative Geography, John Wiley, London, 1968.

Johnston R.J., Multivariate Statistical Analysis in Geography, Longman, London, 1973.

Kautsoniannis, Theory of Econometrics, Mcmillan, London, 1973.

Maurice Yeats, An Introduction to Quantitative Analysis in Human Geography, McGraw Hill, New York, 1974.

Peter Haggett, Andrew D. Cliff, & Allan Frey, Location Methods vol I and II, Edward Arnold, London, 1977.

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## Practicals

### Scheme of examination

Min. Pass Marks: 36	Non-collegiate candidate	Regular candidates	Max. Marks: 100
	Bifurcation of Marks		Time
Written test	60 (6 questions)	40	4 hrs.
Record work and viva voce	30+10	20+10	
Project report and viva voce	--	20+10	

**N.B.** In written test there shall be 2 questions from each section. Candidates have to answer 4 questions selecting at least one question from each section. All questions carry equal marks. Examination be conducted in batches of not more than 20 candidates in any case. 12 hours of teaching practicals be provided for a batch of 20 students per week.

## SYLLABUS

### Section A

The art and science of cartography, history of maps, materials, techniques and preparation of maps, enlargement, reduction and finding of area of maps, use of planimeter, Study of geological maps and preparation of their section and interpretation, interpretation of weather maps and weather forecast.

### Section B

Map projections (mathematical construction): classification and characteristics of any three from each of the four classes of projections.

#### 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

#### 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 Sanson Flemsteed (Homolosine)

Choice of projections, used for maps produced in India.

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## Section C

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 mode, deviation-standard deviations and mean deviations, theoretical basis of nearest neighbor analysis, practical exercises of nearest neighbor analysis, location 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.

Maps and their interpretations: isopleths, choropleth and chorochromatic, choroschematic and isochronic map, population pyramids map.

Three dimensional diagrams of economic and social data, accessibility and flow maps, <sup>Transport</sup> Network analysis.

Diagrams: Polygraph semi-log and log graphs, trilinear chart, circular graph, climatograph, Hythergraph, climograph, annual water deficiency and water surplus graph.

Project Report: A regular 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.

N.B. Project Report is not applicable in case of non-collegiate candidates.

### Recommended Readings:

चौहान, पी.आर. 2005: प्रयोगात्मक भूगोल, वसुन्धरा प्रकाशन, गोरखपुर।

Dickinson, G.C. 1973: Statistical Mapping and Mapping Statistics, London.

Khullar, D.R. 2000: Essentials of Practical Geography, New Academic Publishing Co., Jalandhar.

Lawrence, G.R.P. 1971: Cartographic Methods, Methuen, London.

Mahmood, A. 1998: Statistical Methods in Geographical Studies. Rajesh Publications, New Delhi.

Robinson, A.H. et al. 2004: Elements of Cartography, John Wiley & Sons, Inc., New York (Sixth Edition)

Rampal, K.K. 1993: Mapping and Compilation: Methods and Techniques Concept Publishing Company, New Delhi (Reprint 2009)

शर्मा, जे.पी. 2010-11: प्रयोगात्मक भूगोल की रूपरेखा, रस्तोगी पब्लिकेशन्स, मेरठ।

Singh, R.L. and Singh RPB 1991: Elements of Practical Geography, Kalyani Publishers, New Delhi (Reprint 2002)

तिवारी, आर.सी. एवं सुधाकर, त्रिपाठी 2009: प्रयोगात्मक भूगोल, प्रयाग पुस्तक भवन, इलाहाबाद।

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Paper V: Advanced Geography of India

Section A

Geological structure and its relation to distribution of minerals, physiographic divisions; climate: seasons and associated weather characteristics, mechanism of Indian monsoon, major climatic regions; soils: characteristics, distribution and major soil regions; drainage pattern, watersheds and river systems.

Section B

Resource potential and evaluation. Water resources & Multi-purpose irrigational projects. Vegetational resources. Agriculture:- typology, major crops, changing pattern of crops and green revolution. Animal resources. Mineral resources. Human resources & Population policies.

Section C

Resources development and utilization: power, industries and transport, river basins of India, riverine problems of sharing water and their planning, industrial regions and economic regions of India and regional economic disparities.

Recommended Readings:

Bansil, B.C. 1975: Agricultural Problems in India, Delhi.

चौहान, बी.एस. व गौतम, ए. 2012-13: भारत: भारतवर्ष का विस्तृत भूगोल। रस्तोगी पब्लिकेशन्स, मेरठ।

Deshpande, C.D. 1992: India-A Regional Interpretation. Northern Book Centre, New Delhi.

Gopal Krishnan, R. 2001: Geography of India, Jawahar Publishers & Distributions, New Delhi.

Govt. of India: National Atlas of India, NATMO Publication, Calcutta.

Govt. of India 1965: The Gazetteer of India, Vol. I & II Publication Division, New Delhi.

हसनैन, एन. 2001: जनजातीय भारत। जवाहर पब्लिशर्स एण्ड डिस्ट्रीब्यूटर्स, नई दिल्ली।

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Khullar, D.R. 2006. India a comprehensive Geography. Kalyani Publishers, New Delhi.

ममोस्त्रिा, सी. 1999: आधुनिक भारत का वृहत् भूगोल। साहित्य भवन पब्लिकेशन्स, आगरा।

Mitra, A. 1967: Levels of Regional Development India Census of India. Vol. I, Part I-A (i) and (ii), New Delhi.

Singh, G. 1998: A Geography of India. Atma Ram & sons, Delhi.

Singh, R.L. (ed.) 1971: India: A Regional Geography. National Geography Society, India, Varanasi.

Tirtha, R. 2000: Geography of India. Rawat Publications, Jaipur.

Wadia, D.N. 1967: Geology of India. McMillian & Co., London.

### Paper IV Any one of the following

### Paper VI (a): Population Geography

#### Section A

Population geography: definition, nature and scope and interdisciplinary study, theories of population growth: pre-Malthusian views, Malthus' Theory, Marxist theory, optimum population theory, demographic transition model, World population distribution growth, trends and determinants.

#### Section B

Migration: brief history, theories, trends and patterns of international and internal migration, population dynamics: fertility and mortality- measurement, determinants and distribution, World population composition and characteristics, World urbanization: trends, patterns and challenges.

#### Section C

India- population characteristics and relationship with development; population control movement and policies; urbanization and population explosion; post independence development: reproductive and child health programme, contemporary issues – ageing of population; declining sex ratio; HIV/AIDS.

#### Readings Recommended:

Bhende Asha A and Kanitkar 2002: Principles of Population Studies. Himalaya Publishing House, Mumbai.

Chandna, R. C. 2013: Population Geography. Kalyani Publishers, Delhi.

Chandna, R C 2006: Jansankhya Bhugol. Kalyani Publishers, Delhi.

Hassan, M.I. 2005: Population Geography. Rawat Publication, Jaipur.

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Premi, M.K. 1991: India's Population Heading Towards a Billion. B.R. Publishing Corporation, New Delhi.

Kundu, A. 2006: Trends and Patterns of Urbanization and their Economic Implications. India Infrastructure Report, pp. 28-41.

Garnier, J. B. 1978: Geography of Population. Longman, London.

Woods, R. 1997: Theoretical Population Geography. Longman, London.

Newbold, K. B. 2010: Population Geography: Tools and Issues. Rowman & Littlefield Publications, London.

Weeks, J. R. 1988: Population: An Introduction to Concepts and Issues. Springer, Wadsworth.

UNESCO 2013: Rural Urban Dynamics and the Millennium Development Goals: Global Monitoring Report.

## Paper VI (b): Agricultural Geography (Elements & Applied)

### Section A

Agriculture geography : nature and development, Origin Dispersal and Development of Agriculture. Field Survey and Mapping in Agriculture Geography. Determinants of Agriculture Land Use :Relief and Climate. Soils. Human Determinants of Agriculture.

### Section B

Agriculture typology, shifting agriculture, tropical plantation agriculture, mixed farming and mediterranean agriculture, Models in Agricultural Geography. Diffusion of Agriculture Innovations. Land Use and Land Capability Classification. Agricultural Efficiency and Productivity.

### Section C

Agricultural Evaluation Techniques: Crop Ranking Intensity, Crop Diversification and Crop Combination Regions Agricultural Regionalization. Green Revolution. Agricultural Scenario in India. Agro-Climatic Zones: India and Rajasthan. Agricultural Policy in India.

### Recommended Readings:

Ali Mohammad 1981: Situation of Agricultural Geography. Rajesh Publication, New Delhi.

Ali Mohammad: Situation of Agricultural, Food and Nutrition in Rural India. Concept Publishing Co., Delhi.

Ali Mohammad : Synamics of agriculture Development in India. Concept Publication Co., Delhi.

Dhillon, S.S. 2004: Agricultural Geography. Tata McGraw Hill Education, New Delhi.

Husain, M. 1996: A Systematic Agricultural Geography, Rawat Publications, Jaipur.

ICAR (1956-71): Soil and Water Conservation Research.

ICAR : Soil Conservation of India.

Jat, B.C. 2013: Arthik Bhugol. Panchsheel Prakashan, Jaipur.

Kostowickie, Z. : Agricultural Typology. Polish Academy, Warsaw.

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Mohamed, N. 1992: New Dimensions in Agricultural Geography: Landuse and Agricultural Planning. Concept Publishing Company, New Delhi.

Symon Lesin 1967: Agricultural Geography. G. Gell and Sons Ltd., London.

Singh, J. and Dhillon, S. 1994: Agricultural Geography. Tata McGraw Hill, New Delhi.

Singh, R.L. (Ed.) : Applied Geography. BHU Press, Varanasi.

Singh P.P. Govind Raju, K.C. and others : new Seeds Adoption and Yield, Sterling Publication Pvt. Ltd., New Delhi.

Singh, Jasbir : Agricultural Atlas of India. Vishal Publishers.

Singh, Jasbir : Agricultural Geography of Haryana.

## Paper VI (c): Industrial Geography

### Section A

Evolution of industrialization (India and World), locational factors of industries, theories of Industrial location: least cost school, transport cost school, market area school, marginal location school and behavioural school, new trends in industrial geography concept of entrepreneur and firm, significance of cost and price, concept of optimum location.

Geographical inertia, multi-locational industries, market oriented industries, foot loose industries, raw material oriented industries, manufacturing industries, processing industries..

### Section B

Formation and delineation of industrial regions, industrial complexes, industrial houses including public sector undertakings. industrial regionalization.

Industrial regions in India: Hooghly side industrial regions, Damodar valley industrial regions, DMIC (Delhi-Mumbai industrial corridor). industrial policies of India: liberalization, privatization and globalization (special reference of India); special economic zones (SEZs).

### Section C

Industries: cotton, jute, textile, iron and steel, aluminum, fertilizer, paper and pulp, copper, chemical and pharmaceutical, ship building, automobile, cottage and agro-based industries and tourism industry.

industrial regions of world: Ruhr basin industrial region and Great lakes industrial region.

### Recommended Readings:

Lloyd and Dicken: Location in Space: A theoretical Approach to Economic Geography.

M.C. Cart and Lindberg Hodder and Lee Economic Geography: A Preface to Economic Geography.

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Smith, J. Cox K.P. Man: Industrial Location. A Economic, Geographical Analysis  
Location and Behavior-An Introduction to Human Geography.

Riley, R.C. 1973: Industrial Geography, Chalton and Windus, London.

Alexander Gnnar: Geography of Manufacturing(Englewood Cliffs, N.J.).

Alexander, J.W.: Economic Geography (Prentice Hall, New York).

Jat, B.C. Arthik Bhugol, 2013: Panchsheel Prakashan, Jaipur.

Bengston, N.A.: Fundamentals of Economic Geography(Prentice Hall, New York).

Besoh, H.: A Geography of world Economy(D. Van Nostrand).

Britton, John. N.H.: Regional Analysis and Economic Geography (G. Bell and Sons,  
London).

Estall, R.C. and Buchanan, R.O.: Industrial Activity and Economic Geography (Hutchinson  
and Co., London).

Ghose, B.C.: Industrial London.

Hoover, E.M.: The Location of Economic Activity,(McGraw Hill Books Co. New York).

Wheeler, J.O. and Muller, O.P. 1995: Economic Geography. John Wiley, New York.

## Paper VI (d) : Transport Geography

### Section A

Meaning, scope and nature of transport geography, transportation and space, network growth models, nature of inter regional flows, basis for interaction, models of spatial interaction, distance decay theory, gravity models and potential surface models, issues and challenges in transport geography.

### Section B

Transportation and spatial structure, transportation models, model accessibility and hinterlands, accessibility and land use, transport economics, transport problems of metropolitan areas and urban travel patterns.

### 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 and transport mobility linkages.

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## Recommended Readings:

- Berry, B.J.L. 1966: Essays on Commodity Flow and the Spatial Structure of Indian Economy. University of Chicago, Chicago.
- Eliot, H. and E. Michael (eds.) 1974: Transportation Geography. Comments and Readings M.C. Growth M.S.
- Hagget, P. and Chorley, R. 1969: Network Analysis in Geography. Edward Arnold, London.
- Hoyle, B.S. 1998: Modern Transport Geography. Wiley, New York.
- Hensher, D.A. 2004: Handbook of Transport Geography and Spatial Systems. Elsevier, London.
- Kausty, K.J. 1963: Structure of Transportation Networks. University of Chicago, Chicago.
- Rodrigue, J.P. et al 2013: The Geography of Transport Systems, Routledge, New York.
- सिंह, के.एन. 2003: परिवहन भूगोल। ज्ञानोदय प्रकाशन, गोरखपुर।
- Taaffe, E.L. and Gautir, H.L. 1973: Geography of Transportation. Prentice Hall, Englewood Cliffe.
- White, H.P. and Senior, M.L. 1983: Transport Geography. Longman, London.

## Paper VI (e) : Geography of Settlements

### 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 settlements, the evolution of street pattern in rural settlements, morphological characteristics of rural settlements, segregation and orientation of social groups in settlements, the evolution of field boundaries and the field patterns, folk housing, folk architecture and traditional building materials.

### Section C

Urban settlements: their site and situation, size and spacing of urban settlements, Christallers system of urban hierarchy and spacing of cities morphological characteristics of urban

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settlements, the cultural ecology of the city, theories of structure of urban centres: grid, concentric zone, sector, multiple nuclei and irregular pattern models, problems of urban housing and emergence of slums.

### Recommended Readings:

- Bogue, D.J. 1969: Principles in Demography, John Wiley, New York.  
Bhende, Asha, A. and Kanitkar, 2002: Principles of Population Studies, 14th Edition, Himalaya Publishing House, Mumbai.  
Census of India 1991: India-A State Profile.  
Chandna, R. C. 2013: Population Geography, Kalyani Publishers, Delhi.  
Chandna, R.C. 2006: Jansankhya Bhugol, Kalyani Publishers, Delhi.  
Clarke, John I. 1973: Population Geography, Pergamon Press, Oxford.  
Garnier, J. B. 1978: Geography of Population, Longman, U.K.  
Hassan, M.I. 2005: Population Geography, Rawat Publication, Jaipur.  
Kundu, A. Lopamudra, R.S 2012: "Migration and Exclusionary Urbanisation in India", *Economic & Political Weekly*, XLVII (26/27): 219-227.  
Kundu, A. 2006: Trends & patterns of urbanization and their economic implications. India Infrastructure Report, pp. 28-41.  
Newbold, K. B. 2010: Population Geography: Tools and Issues, Rowman & Littlefield Publications, London.  
Premi, M.K. 1991: India's Population Heading Towards a Billion, B.R. Publishing Corporation, New Delhi.  
Rural Urban Dynamics and the Millennium Development Goals 2013: Global Monitoring Report.

## Paper VI (f) : Advanced Geomorphology

### Section A

Fundamental concepts of geomorphology; schools in geomorphology, recent trends in geomorphology, earth movements: epirogenic, orogenic types and classification of weathering, mass movement erosion. plate tectonics, seismicity, vulcanicity, orogenic structures with reference to the evolution of Himalaya, various models of landscape evolution (Davis, Penck, King, Hacks, Morisawa, Schumn, multicyclic and polygenetic evolution of landscapes.

### Section B

Geomorphic processes, dynamics of fluvial, glacial, Aeolian, marine, and karst processes and resultant landforms, polycyclic landforms, various models of slope development (Wood, Davis, Penck, King, R. Savigear, Strahler, Fisher-Lehmann, Young), concept

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morphogenetic region, Systems in geomorphology; Models in geomorphology, erosion surfaces-techniques of indentification and correlation.

### Section C

Terrain evaluation, geomorphic mapping. geomorphic hazards and mitigation measures; Digital Elevation Model (DEM) and Triangulated Irregular Network (TIN) unit, land capability and land suitability classification, hydro-geomorphology, urban geomorphology, environmental geomorphology, geomorphic hazards.

#### Recommended Readings:

- Ahmed, E. 1985: Geomorphology. Kalyani Publishers, New Delhi.  
Bloom. A. L. 1998/2001: Geomorphology. Prentice Hall of India, New Delhi.  
Chorley, R.J., Schumm S A and Sugden D E. 1984: Geomorphology. Methuen and Company Ltd., London.  
Cooke, R.U. and Doornkamp, J.C. 1974: Geomorphology in Environmental Management-A introduction. Clarendon Press, Oxford.  
Chorley, R.J. 1972: Spatial Analysis in Geomorphology. Methuen, London.  
Dayal, P. 1994: A Text Book of Geomorphology. Kalyani Publishers, New Delhi.  
Dury, G.H. 1959: The Face of the Earth. Penguin Harmondsworth.  
Fairbridge, R.W. 1986: Encyclopedia of Geomorphology. Reinholdts, New York.  
Goudie, A. 1993: The Nature of the Environment. Oxford & Blackwell, London.  
Garner, H.F. 1974: The origin of landscape-A Synthesis of Geomorphology. Oxford University Press, London.  
Jog, S. R. (ed.) 1995: Indian Geomorphology (2 vols.). Rawat Publications, Jaipur.  
Kale, V. and Gupta, A. 2001: Introduction to Geomorphology. Orient Longman, Hyderabad.  
Mitchell, C.W. 1973: Terrain Evaluation. Longman, London.  
Ollier, C.D. 1979: Weathering Longman. London.  
Pitty, A.F. 1971: Introduction to Geomorphology. Methuen, London.  
Singh, S. 2004: Geomorphology. Prayag Pustak Bhawan, Allahabad.  
Stoddart, D.R. (ed) 1996: Process and Form in Geomorphology. Routledge, New York.  
Sparks, B.W. 1986: Geomorphology. Longmans, London.  
Thornbury, W.D. 2005: Principles of Geomorphology. John Wiley and Sons, New York.  
Thornbury, W.D. 1960: Principles of Geomorphology, John Wiley, New York.

### Paper VII (a) : Urban Geography

#### Section A

Meaning, aims, importance and scope of urban geography, factors affecting growth of towns and cities of different historical periods: neolithic, greek and roman. dark ages, medieval renaissance, industrial revolution. and modern times, chief characteristics of the towns,

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pattern and trends of urbanisation in the world, urbanisation in india since 1901 and its problems, definitions of urban centres, chief characteristics of modern towns, city conurbation metropolitan and megalopolis, spatial pattern and distribution of urban centres, types of cities-central places and urban transportation and mobility.

### Section B

Functions and functional classification of towns urban rank-size relationship. concept of urban economic functions and its urban hierarchy based on functions law of primate city. urban morphology, unplanned growth of towns, urban master plans, morphology of indian cities. functional structure of towns, characteristics of C.B.C. residential area, and other functional areas central place theory (Christaller and Losch) and models of urban structure theory of urban structure (Burgess, Hoyt, Harris & Ullman, Mann, White).

### 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 control of urban problems: urban poverty, slums, transportation, housing, crime. principles of town planning, preparation of a master plan, study of master plan of jaipur city, principles of town and regional planning country.

### Recommended Readings:

- A.E. Smailes: The Geography of Towns. Hutchinson, University Library, London.  
Abercrombie: Town and Country-Planning. Oxford University Press, London.  
बंसल, एस.सी. 2010: नगरीय भूगोल, मीनाक्षी प्रकाशन, मेरठ।  
Carter, Harold 1995: The Study of Urban Geography, Arnold (Publisher) Pvt. Ltd., London.  
Dickinson, R.E.: City Region and Regionalism. Routledge and Kegan Paul London.  
Herold M. Mayer: Readings in Urban Geography, Central Book Depot, Allahabad.  
N.V. Sovani: Urbanization and Urban India. Asia publishing House, Bombay.  
P.C. Malhotra: Survey of Bhopal City and Bairagarh (Asia publishing Bombay)  
R.L. Singh: Bangalore as Urban Survey. National Geographical Society of India, B.H.U., Varansi.  
Shah Manzoor Alam: Hyderabad and Secuderabad, Twin City Studies in Urban Geography. Allied Published, Delhi.  
Singh, R.L.: Banars A study in Urban Geography. Student Friends, Allahabad.  
Taylor G.: Urban Geography. Muthuen and Co., London.  
V.K.R.V. Rao: Socio-Economic survey of Greater Delhi. Asia Publishing Bombay.  
V.L.S. Prakash Rao: T Gowns of Mysore state. Statistical Publishing House, Calcutta.

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## Paper VII (b): Geography of Crimes

### Section A

Meaning, scope and nature of geography of crimes, approaches to the study of geography of crime, causes of crimes: physical, economic, social, spatial dimension of crimes and crime mapping, source of data on crimes and reliability of crime data.

### Section B

Crimes in developing countries with special reference to India, seasonality of crimes, crime and poverty, crime and illiteracy, urban and rural crimes: crime towards women, children and weaker section of the society; crime as social pollution and role of police and legal system in prevention and mitigation of crimes at varying spatial scale.

### Section C

Role of illegal migration and its impact on crime scenario, problem of naxalites and its social implications, international links of terrorism, role of religion in terrorism in India, controlling crimes and terrorism: international and national efforts and strategy; measures of rehabilitation and socialization of criminals.

### Recommended Readings:

- Ahuja, Ram 1996: Youth and Crime, Rawat Publications, Jaipur.  
Ahuja, Ram 1987: Crime Against Women. Rawat Publications, Jaipur.  
Boggs, S.L.: Urban Crime Pattern, Hontel and Row, New York.  
Chandel, R.S.: Aparadh Samasya Aur Samadhan: Kitabghar, Delhi.  
Gupta, A.S.: Crime and Police in India, Sahitya Bhawan, Agra.  
Harries, K.D.: The Geography of Crime and Justice, McGraw Hill, New York.

## Paper VII (c): Climatology and Oceanography

### Section A

The basis of modern climatology, composition and layered structure of atmosphere, atmospheric energy: air temperature, the energy balance, atmospheric pressure and pressure belts, the planetary wind system, moisture in the Atmosphere: humidity and its expression, adiabatic non-adiabatic processes, stability and instability, evaporation: factors affecting evaporation, precipitation types, world precipitation pattern.

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## Section B

Air masses, fronts and synoptic climatology, the nature and hazard of atmospheric extreme events: cyclones (tropical and extra tropical) and anticyclones. Koppen and Thonhwaite classification of world climates; major climatic types – equatorial, monsoon, Mediterranean and savanna types.

## Section C

Scope of oceanography, horizontal and vertical distribution of temperature, salinity, factors and distribution patterns, dynamics of oceanic water: currents, sea waves, tides and tidal theories currents of Atlantic ocean, Pacific ocean, Indian ocean and other seas, oceanic bottom relief, (Atlantic, Pacific and Indian oceans) oceanics deposits; coral reef formation, atolls and coral islands, theories of coral reef formations, Man and oceans, marine resources- biotic and abiotic, (mineral and energy resources) and their utilization.

### Recommended Readings:

- Critchfield, H.J. 1983: General Climatology. Prentice-Hall of India, New Delhi.
- Glantz, M.H., 2001: Currents of Change: Impacts of El Nina and La Nina on Climate and Society. Cambridge University Press, Cambridge.
- गौतम, अल्का 2010: जलवायु एवं समुद्र विज्ञान। रस्तोगी पब्लिकेशनस, मेरठ, द्वितीय संस्करण।
- गुप्ता, एस.एल. 2000: जलवायु विज्ञान। हिन्दी माध्यम कार्यालय निदेशालय, दिल्ली विश्वविद्यालय, दिल्ली।
- Oliver, J.E. and Hidore, J.J. 2011: Climatology : An Atmospheric Science, Dorling Kindersky. India Pvt. Ltd., Licensees of Pearson education in South Asia, New Delhi.
- Sharma, R.C. and Vatal, M. 1999: Oceanography for Geographers. Chaitanya Publishing House, Allahabad.
- Singh, S., 2007: Climatology. Prayag Pustak Bhawan, Allahabad.
- Singh, S., 2008: Oceanography. Prayag Pustak Bhawan, Allahabad.
- Siddartha, K. 2000: Oceanography. A Brief Introduction, Kisalaye Publications, New Delhi.
- सिंह, एस. 2006: जलवायु विज्ञान। प्रयाग पुस्तक भवन, इलाहाबाद।
- Trewartha, G. T. and Horn, L.H. 1980: An Introduction to Climate. McGraw-Hill, New Delhi.

## Paper VII (d) : Applied Geography

### Section A

Meaning, nature and scope, principles and approaches, application of geographical methods of survey and geospatial tools in analysis of resource base, its appraisal, micre regional planning and demographic attributes.

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## Section B

Delineation of resource regions, regional divisions according to variations in levels of socio-economic development, special purpose regions-river valley regions, national capital region, problem regions- hilly regions, tribal regions, regions of drought and floods.

## Section C

Planning for a region's development, state capital region (Jaipur), indicators of development and their data sources, measuring levels of regional development and disparities-case study of Rajasthan. land use policy implications with special reference to India, review of policies related to decentralized planning, formulation of plans at national, state, district, block and grass root level.

### Recommended Readings:

- Bhat, L.S. et al 1976: Micro-Level planning: A Case Study of Karnal Area, Haryana, K.B. Publications, New Delhi
- Blair, J. P. and Carroll, M. C. 2009. Local Economic Development - Analysis, Practices, and Globalization. SECOND EDITION, SAGE PUBLICATIONS, INC
- Chandna, R. C. 2008. Regional Planning and Development. Third Edition, Kalyani Publishers, Ludhina.
- Dutta, A.K., Mishra, H.N. and Chatterjee, M. 2008 (eds.): Explorations in Applied Geography, Printice-Hall of India Private Limited, New Delhi.
- Friedmann, J. 1992: Empowerment: The Politics of Alternative Development. Blackwell, Oxford.
- Gosal, G.S. and Krishan, G. 1984: Regional Disparities in Levels of Socio-Economic Development in Punjab, Vishal Publications, Kurukshetra.
- Gupta, P., and Sdasyuk, G. 1968: Economic Regionalization of India: Problems and Prospects. Census of India, New Delhi
- Johnson, E.A.J. 1970: The Origanisation of Space in Developing Countries, Harvard University Press, Cambridge.
- Kundu, A. and Raza, M. 1982: Indian Economy, The Regional Dimension, Spectrum Publishers, New Delhi.
- Misra, R. P. (ed.) 1992: Regional Planning: Concepts, Techniques, Policies and Case Studies. 2<sup>nd</sup> edition. Concept Publishing Company., New Delhi.
- Nangia, S. 1976: Delhi Metropolitan Region, Rajesh Publication, Delhi.
- Pacione, M. 2009 (ed.): Applied Geography: Principles and Practice, Routledge, London.
- Pathak, C. R. 2003: Spatial Structure and Processes of Development in India. Regional Science Association., Kolkata.
- Raza, M. 1988: Contributions to Indian Geography, Volume X, Regional Development, Heritage Publishers, New Delhi.
- श्रीवास्तव, वी.के. 1997: प्रादेशिक नियोजन और सन्तुलित विकास, वसुन्धरा प्रकाशन, गोरखपुर।
- Sundaram, K. V. 2004: The Trodden Path: Essays on Regional and Micro Level Planning. Anaunya Publications., New Delhi.

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## Paper VII (e): Pedology

### Section A

Modern pedological principles underlying soil formations: soil genesis and factors influencing it, characterization and classification of soil groups of the world and their distribution, soils: of Indian soils, soil nutrients in relation to agriculture and problems.

### Section B

Methods of soil survey, soil analysis, soil mapping, soil profiles, their description, analysis and interpretation of results, soil erosion, soil exhaustion, soil conservation mechanical and biological measures 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 utilization, detailed study of soils of Rajasthan, soil productivity and fertility status, management of sandy, loamy and clay soils.

### Recommended Readings:

- Jeffe, J.S.: Pedology.  
Comber: Scientific Study of Soils Soil Survey Staff Bureau.  
U.S. Deptt. of Agriculture: Soil Survey Manual.  
Moghe, B.: Soils of Rajasthan, Hindi Academy.  
Wright: Soil Analysis.  
Sygmont: Principles of Soil Science.  
Robinson, W.C.: Soil-Their Origin, Classification and Constitution.  
Ray-Choudhary: Soils of India.  
Russel, F.I.: The World of Soil.  
Agarwal, R.R.: Soil Fertility in India.  
De. S.K.: Methods of Soil Analysis: Soil-Geographical Zoning of the USSR (Published by the Academy Sciences of the USSR, Moscow).  
Volebuey, V.R.: Ecology of Soil.  
Clarke: The Study of Soil in the Field.  
Bunting, B.T.: The Geography of Soil.  
Proceeding of the Symposium of Fertility of India Soil Bulletin No. 26 of 1964. National Institute of Science of India, New Delhi.

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## Paper VII (f) : Medical Geography

### Section A

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, history and development of medical geography in the West and India, concept of health and disease, major disease and their geomedical classification.

### Section B

Geomedical data: source, methods of representation, analysis limitations and problems, conceptual and cartographic models, pathogenic and geogenic aspects of medical geography studies in disease environment association disease diffusion, spatial and temporal variations in the physical, cultural and the biotic environment and its influence upon human health, nutritional levels in India, disease of under-nutrition and malnutrition.

### Section C

Disease of civilization: Cancer, blood vascular the smoking disease accidents, drug abuse and drug abdications, distribution of major diseases in Rajasthan, community health: distribution of medical facilities and population, healthcare 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, survey of common epidemic and endemic diseases in a small area on the basis of field study, standard of living: housing, diet, clothing, income and sanitation

### Recommended Readings:

Learmon, A.T.A. 1976: "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.

Learmonth, A.T.A. 1976: "Models and Medical Geography" in Mishra, V.C. (Ed) Essays in Applied Geography, Saugar, University of Saugar.

Lenian, J. and Fletcher, W.W. (Eds.) 1976: Health and the Environment, Chapter 2, Glasgow, Blackie.

May, J.M. 1950: "Medical Geography : Its Methods and Objectives", Geographical Reviews : Vol. 40, pp. 10-40.

May, J.M. 1961: "Studies in Disease Ecology", New York Hafner.

May, J.M. 1958: Ecology of Human Diseases", New York, American Geographical Society.

Mc Glashan, N.D. (Ed) 1972 : "Medical Geography Techniques and Field Studies", London Methuen.

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- Mishra, R.P. 1981 : "The Medical Geography of Common Diseases in Rajasthan", Unpublished Ph.D. Thesis Jaipur University of Rajasthan.
- Mishra, R.P. 1969 : "The Medical Geography of India", New Delhi National Book Trust.
- Park J.E. Park K. Preventive and Social Medicine.
- Patwardhan, V.N. 1961 : "Notification of India", Bombay. India Journal of Medical Sciences.
- Prothero, B.N. 1965 : Migrants and Malaria, London, Longmans.
- Pyle, G.W. and Alan Dever, G.E., Health Care Delivery : Spatial Perspectives, New York, McGraw.
- Shannon, G.W. and Alan Dever, G.E. Health Care Delivery : Spatial Perspectives, New York, McGraw.
- Singh, Amar : 1978 "The Lower Chambal Basin : A Study in Medical Geography", unpublished Ph.D. Thesis, Gwalior, Jiwaji University.
- Stamp, L.D. 1964 : "Some Aspects of Medical Geography", Oxford University Press.
- Stamp, L.D. 1964 : "The Geography of Life and Death", London, Fontana.
- Stevenson-Introduction of Food and Nutrition.
- Wilson and Evad-Principles of Nutrition.

## Paper VII (g) : Fundamentals of Remote Sensing and Geographical Information System

### Section A

Definition and scope of remote sensing, remote sensing as an established field, elements of remote sensing: Electro-magnetic radiation and interaction with Earth surface features, data products and users, atmospheric windows, remote sensing systems: platforms, sensors, resolution and radiometric characteristics, elements of image interpretation and keys, types of aerial photographs, aerial cameras types of mosaics, relief displacement and parallax, satellites: LANDSAT- MSS & TM, SPOT, NOAA-AVHRR, IRS, MODIS, RADARSAT, IKONOS, QUICKBIRD & CARTOSAT.

### Section B

Digital image processing and classification: pre-processing and image enhancement techniques- rectification and restoration, contrast manipulation, density slicing, spatial filtering and band ratio, classification- supervised and unsupervised, post-classification analysis and accuracy assessment. microwave remote sensing, advantages over optical, unique capabilities of microwave (SAR & SLAR).

### Section C

RS applications: mapping and monitoring of land use and land cover, forestry and desertification, soil and water resources, remote sensing and hazard mapping and

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environmental monitoring. introduction to GIS as an automated geography, fundamentals of GIS- geospatial databases, data structure and formats, projections and coordinate system. raster and vector data infrastructure and analysis, implication of integration of remote sensing and GIS.

### Recommended Readings:

American society of Photogrammetry 1983: Manual of Remote sensing. ASP, Falls Church, V.a..

Barrett E.C. and L.F. Curtis, 1992: Fundamentals of Remote sensing and Air photo Interpretation. Mcmillan, New York.

Campbell J. 1989: Introduction to Remote Sensing. Guilford, New York.

Curran, Paul J. 1985: Principles of Remote Sensing. Longman, London.

Hord R.M. 1989: Digital Image Processing of Remotely Sensed Data. Academic, New York.

Jalan, Seema 2010: Image Processing. Sahityagar, Jaipur

Lillesand, T., Kiefer, R.W. and Chipman, J. 2007: Remote Sensing and Image Interpretation. John Wiley & Sons, New York.

Luder D. 1959: Aerial photography Interpretation: Principles and Application. McGraw Hill, New York.

Pratt W.K. 1978: Digital Image Processing. John Wiley & Sons, New York.

Rao D.P.(ed.) 1988: Remote Sensing for Earth Resources. Association of Exploration Geophysicist, Hyderabad.

Thomas M. Lillesand and Ralph W. Kefer 1994: Remote Sensing and image interpretation. John Wiley & Sons, New York.

## Paper VIII (a) : Political Geography

### Section A

Definition, scope nature and importance of political geography: its relation with other social sciences, history and development of political geography : pre-modern phase (before 19<sup>th</sup> Century), geopolitics and German school of thought. global strategic views : views of Mackinder, Spykman, Meining, Hooson and De Seversky, world's geostrategic regions, critical.

### Section B

State and nation, the idea of state: the elements of the state: territory, population, organization and power concept of nation, nationalism. heart of the state: core areas, the focus: capital city, frontiers and boundaries: definitions, classification and concepts, boundaries as economic barriers, buffer zones, concept of territorial sea and maritime boundaries, landlocked states;

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prob access, growth of nations and disintegration of empires: unitary and federal states, dying colonialism and resurgent nationalism, supernationalism.

### Section C

Politics and transportation, geography of foreign aid and economic development, emergence of third world block, politico-geographical study of india, political geography of administration, politico-geographical implications of space research. function, methods and trends of electrol geography: voter's participation before voting predection, conceptual model of the voting decision, operationalisation of conceptual decision, garrymending in relation to india.

### Recommended Readings:

- Adhikari, S. 2004: Political Geography. Rawat Publications, Jaipur.
- Alexander I.M. 1966: World Political Patterns. John Murray and Co., London.
- De Blij, H.J. and Glassner, Martin 1968: Systematic Political Geography. John Willey, New York.
- Deshpande, C.D. 1992: India- A Regional Interpretation. Northern Book Centre, New Delhi.
- Dikshit, R.D. 1982: Political Geography: A Contemporary Perspective. Tata McGraw-Hill Publishing Co., New Delhi.
- East, W.G. and Spate, O.H.K. 1966: The Changing Map of Asia. Methuen, London.
- Fellmann, J., Getis, A. and Getis, J. 1995: Human Geography: Landscapes of Human Settlements. WCB Brown Publishers, Dubuque.
- Guha, J.L. and Chatteraj, P.R.: A New Approach to Economic Geography. World Press, Kolkatta.
- Pounds, N.J.G. 1972: Political Geography. McGraw Hill, New York.
- Short, J.R. 1982: Political Geography of the 20<sup>th</sup> Centaury: A Global Analysis. New York.
- सक्सेना, एच.एम.: राजनैतिक भूगोल के सिद्धान्त। रस्तोगी पब्लिकेशन्स।
- Taylor, P. 1985: Political Geography. Longman, London.

## Paper VIII (b): Cultural Geography

### Section A

Definition, nature and scope of cultural geography, the evolutionary approaches and conceptual framework, evolution of man and human society from pleistocene to palaeolithic period, rise and dominance of homo sapiens and their deployment over the continents, spatial distribution and characteristics of primary races of the world.

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## Section B

Beginning of plant domestication, animal domestication and their regions, evolution of civilization: Mesopotamian, Nile, Indus and Hwang Ho Valley with respect to racial, ethnic, religious, linguistic, demographic, and organizational characteristics. School of cultural determinism, cultural adaptation, assimilation, integration diffusion and Environmental perception. Major cultural hearths, realms and regions of the world, basic similarities and differences.

## Section C

Major linguistic families and their distribution in the world. bases of cultural diversity: race, religion, language and nationalism, culture and environment, human settlements: origin, types, pattern and distribution, westernization, sanskritization and cultural urbanization and cosmopolitization.

### Readings Recommended:

- Anderson, J. 2009: Understanding Cultural Geography-Places and traces. Routledge, USA.
- Anderson, K., Domosh, M., Pile, S. and Thrift, N. (eds.) 2003: Handbook of Cultural Geography. Sage Publications, London.
- Ahmad, Aijazuddin 1999: Social Geography. Rawat Publication, New Delhi.
- Crang, Mike 1999: Cultural Geography. Routledge, London.
- Chapman, K. 1979: People, Pattern and Process-An Introduction to Human Geography. Edward Arnold Ltd., London.
- Dreze Jean, Sen Amartya 1996: Economic Development and Social Opportunity. Oxford University press, New Delhi.
- Dubey, S.C. 1991: Indian Society. National Book Trust, New Delhi.
- Haq, Mahbul: Reflection on Human Development. Oxford University Press. New Delhi.
- Mitchell, D. 2000: Cultural Geography: A Critical Introduction. Blackwell Publishers, Inc. USA.
- Norton, W. 2006: Cultural Geography. Environments. Landscapes. Identities. Inequalities. Oxford University Press, Toronto. 2<sup>nd</sup> edition.
- Robertson, Iain, and Penny Richards 2003: Introduction in Studying cultural landscapes, ed. Iain Robertson and Richards, 1-18.
- रिजवी, मुनीरुद्दीन 2001: सांस्कृतिक भूगोल। राजस्थान हिन्दी ग्रन्थ अकादमी, जयपुर।
- Rubenstein, J. M. and Becon, J. M. 1990: Cultural Geography, John Wiley and Sons Inc., New York.
- Scott, A. J. 1997: The Cultural Economy of Cities. International Journal of Urban and Regional Research, 21(2), 323-339.
- Saberwal, Vasant K. 1996: Pastoral Politics: Gaddi Grazing, Degradation and biodiversity conservation in Himachal Pradesh, India. Conservation Biology 10, no. 3: 741-749.
- Sen, Amartya and Dreze Jean 1996: Indian Development Selected Regional Perspectives. Oxford University Press.

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Sopher, D. 1980: An Exploration of India: Geographical Perspectives on Society and Culture. Cornell University Press, Ithaca, New York.

Smith, D.M. 1977: Human Geography: A Welfare Approach. Edward Arnold Publication, London.

Spencer, J. E. and Thomas, W. L. 1969: Cultural Geography. John Wiley and Sons Inc., New York.

Subba Rao. personality of India 1958: Pre and Proto Historic Foundation of India and Pakistan. M.S. University, Baroda, Vadodara.

Wagner, P.L. & Mikesell, H.W. (eds.) Readings in Cultural Geography.

Mukherjee, A.B. and Aijazuddin, A. 1985: India- Culture, society and economy. Inter India publications, New Delhi.

Broke, J.C. and Webb, J.W. 1978: A geography of Mankind, McGraw Hill, New York.

## Paper VIII (c): Biogeography

### Section A

Definition, scope and significance nature, approaches, history, recent trends and developments, plant and animal ecology forms and functions of eco system, ecosystem with special reference to mountain and desert factors influencing distribution of flora, taxonomical and ecological classification of plant, ecological succession, ecotone and community, patterns of distribution of world vegetation.

### Section B

Nature and classification of animals, dispersal and migration of animals: type and causes – case studies, geographical isolation. the zoo-geographical region, biogeography of the seas: island biogeography.

### Section C

Conservation and management of forest and wild life with reference to India, process of desertification, its consequences and management principals, projecting into the future: climate change: biogeographical consequences of global change : changing communities and biomes, effect of climate change on biological diversity, environmental hazards and problems of pollutions.

### Recommended Readings:

Anjuneyulu, Y. 2002: Environmental Impact Assessment Methodologies. B.S. Publications, Hyderabad.

Anjuneyulu, Y. 2004: Introduction to Environmental Science. B.S. Publications, Hyderabad.

Beaikie, P. Cannon, T. and Davis, I. (eds.) 2004: At Risk: Natural Hazards Peoples Vulnerability and Disasters. Routledge, London.

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- Clarke, J.I. Curson, P. Kayastha, S.L. and Nag, P. (eds.) 1991: Population and Disaster. Basil Blackwell, U.S.A.
- Cox, C.B. Moore, P.D. 2010: Biogeography- An Ecological and Evolutionary Approach. Johnwiley and Sous, U.S.A.
- Huggett, R.J. 1998: Fundamental of Biogeography. Routledge, London.
- Ladle, R.J. and Whittaker, R.J. 2011: Conservation Biology. Blackwell Publications Co., U.S.A.
- Mathur, H.S. 1988: Essentials of Biogeography. Pointer Publishers, Jaipur.
- Macdonald, Geen, 2002: Biogeography: Introduction to Space-Time and Life. John Wiley, New York.
- Odum, E.P. 1975: Ecology, Rowman and Littlefield. Lanhan U.S.A.
- Robinson, H. 1982: Biogeography. Eles, Mc. Donald and Evans London.
- Singh, A.K., Kamra, V.K. and Singh, J. 1986: Forest Resource: Economy and Environment. Concept Publishing Company, New Delhi.
- सिंह, एस. 2013: जैव भूगोल। प्रयाग पुस्तक भवन, इलाहाबाद।

## Paper VIII (d) : Regional Planning and Development

### Section A

Conceptual and theoretical framework of regional planning, principles and determinants of regional planning, multi-level planning and inter-regional stresses, regional hierarchy, role of geography in preparation of a regional plan, significance of the term integration (political, economic and spatial) for regional planning.

### Section B

The process of regional development: indicators of development; levels of regional development and disparities, strategies for development, regional planning in India: concept and indicators of development; regional imbalances.; type of regions and methods of regionalization, growth pole and growth centres, environmental issues in regional planning for sustainable development.

### Section C

Use of remote sensing, global positioning systems (GPS) and geographic information system (GIS) in modern regional planning, case studies from selected countries: Regional planning in USA (TVA) and regional planning in India (DVC and NCR), fundamentals of town and country planning.

### Recommended Readings:

Dube K. N. (ed) 1990: Planning and Development in India. Asia Publishing House, New Delhi.

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- Govt. of India 1986: Regional Plan 2001 - National Capital Region. NCRPB, Ministry of Urban Development, New Delhi.
- Bhat, L. S. 1973: Regional Planning in India. Statistical Publishing Society, Kolkata.
- Blair, J. P. and Carroll, M. C. 2009: Local Economic Development - Analysis, Practices, and Globalization. Second Edition, Sage Publications, Inc.
- Chandna, R. C. 2008: Regional Planning and Development. Kalyani Publishers, Ludhina.
- Journal of Geography and Regional Planning (JGRP) is an open access.
- Hufschmidt, M.M. 1969: Regional Planning: Challenges and Prospectus. Praeger and Company, New York.
- Mishra, R.P. 1978: Regional Planning and National Development. Vikas Publications, New Delhi.
- Mishra R.P. (ed) 1992: Regional Planning: Concepts, Techniques, Policies and Case Studies. Concept Publications, New Delhi.
- श्रीवास्तव, शर्मा एवं चौहान 2008: प्रादेशिक नियोजन और संतुलित विकास। वसुन्धरा प्रकाशन, गोरखपुर।
- [www.academia.edu/Papers/in/Economic\\_Geography](http://www.academia.edu/Papers/in/Economic_Geography)
- [www.jstor.org/stable/143805](http://www.jstor.org/stable/143805)

## Paper VIII (e): Meteorology

### Section A

Atmosphere: chemical composition and layered structure insolation, temperature distribution, temperature: heat budget of atmosphere, radiation, measurement, various lapse rates inversion, albedo, adiabatic processes in the atmosphere and greenhouse effects, pressure: definition, law and hydrostatic equilibrium. variation of pressure, Laplace formula, measurements of pressures, isobars and pressure systems, humidity: vapour pressure, humidity quantities. the dry bulb and dew point density of air, stability and instability, thermodynamic diagrams and instability, 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.

### Section B

Motion of air : byes ballot law, coriolis force, geostrophic and gradient winds, effect of friction, seas and land breeze, orographic winds, thermal wind, gust and squall, variation and wind the height, jet-streams, upper air observations : history, baloon observations, rediasound, uses of radar and satellites, upper observation in india.

synoptic meteorology :

structure of pressure systems: weather conditions associated with different types of pressure system, air masses fronts. frontogenesis and frontolysis world circulation of air and

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geographical distribution of fronts, intertropical convergence zones, tropical revolving storms, development and movement of simple pressure systems and fronts, Morgan's formula.

### Section C

Monsoon climate, genesis of the Indian summer monsoon, the energetics and physics of monsoon rain, distribution of rainfall in monsoon and associated pressure system, long range forecasts of monsoon rain, consideration of analogue charts, climate classification of World-Koppens classification, precipitation and temperature criteria, Thornthwaite climatic classification, seasons in India with special reference to western disturbance, north western monsoon depressions and dust storms, physical climatology, biometeorology: health and design of houses.

### Recommended Readings:

- Critchfield, H.J. 1983: General Climatology. Prentice-Hall of India, New Delhi.  
Glantz, M.H., 2001: Currents of Change: Impacts of El Niño and La Niña on Climate and Society. Cambridge University Press, Cambridge.  
गौतम, अल्का 2010: जलवायु एवं समुद्र विज्ञान। रस्तोगी पब्लिकेशनस, मेरठ, द्वितीय संस्करण।  
गुप्ता, एस.एल. 2000: जलवायु विज्ञान। हिन्दी माध्यम कार्यालय निदेशालय, दिल्ली विश्वविद्यालय, दिल्ली।  
Oliver, J.E. and Hidore, J.J. 2011: Climatology : An Atmospheric Science, Dorling Kindersky. India Pvt. Ltd., Licensees of Pearson education in South Asia, New Delhi.  
Singh, S., 2007: Climatology. Prayag Pustak Bhawan, Allahabad.  
सिंह, एस. 2006: जलवायु विज्ञान। प्रयाग पुस्तक भवन, इलाहाबाद।  
Trewartha, G. T. and Horn, L.H. 1980: An Introduction to Climate. McGraw-Hill, New Delhi.

## Paper VIII (f) : Research Methodology

### Section A

Research: meaning, objectives, significance, types of research, research approaches, problems of geographical research, relevant and applied research, hypothesis and its basic concepts, testing of hypothesis, models and paradigm, formulation of research proposal and research design, types of research projects and report writing.

### Section B

Sources of data, methods of data collection, processing, analysis and results, observation and interview questionnaire and field schedule, sampling theory, sample size, sampling techniques, selected techniques of spatial analysis, concentration and dispersal of economic activities, interaction theories, scaling techniques, measurements of disparities and

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inequalities, methods of delimitation of economic, industrial, agricultural and planning regions.

### Section C

Regional population analysis, population projections, network analysis, delimiting sphere of city influence, core and marginal area, morphometric analysis, drainage basin analysis and slope analysis, integrated, area development planning, introduction to remote sensing and geographical information system in landuse analysis.

### Recommended Readings:

- आहूजा, राम 2010: सामाजिक अनुसंधान। रावत पब्लिकेशन्स, नई दिल्ली।  
डी.डी. चौनियाल 2006: सुदूर संवेदन एवं भौगोलिक सूचना प्रणाली। शारदा पुस्तक भवन, इलाहाबाद।  
Guthrie, G. 2010: Basic Research Methods—An Entry to Social Science Research. SAGE Publications, India Pvt Ltd., New Delhi.  
Gupta, S.P. 1979: Statistical Methods. Sultan Chand & Sons, New Delhi.  
Harvey, D. 1969: Explanation in Geography. Arnold Heinemann, London.  
Har Prasad 1992: Research Methods and Techniques in Geography. Rawat Publication, Jaipur.  
K.R. Sharma 2004: Research Methodology. National Publishing House, Jaipur.  
Kothari, C.R. 1990: Research Methodology—Methods and Techniques. Wishwa Prakashan, New Delhi.  
Mishra, H.N. and Singh, V.P. 1998: Research Methodology in Geography. Rawat Publication, Jaipur.  
Mahmood, A. 1998: Statistical Methods in Geographical Studies. Rajesh Publication, New Delhi.  
Mishra, R.P. 1989: Research Methodology. Concept Publishing Company, New Delhi.  
Pal, S.K. 1998: Statistics for Geoscientists – Techniques and Applications. Concept Publishing Company, New Delhi.  
Sharma, P.R. and Yadav, R.S. 2011: Research Methodology: Concepts and Studies. R.K. Books, New Delhi.  
श्रीवास्तव एवं प्रसाद 2008: भूगोल की सांख्यिकी विधियाँ। वसुन्धरा प्रकाशन, गोरखपुर।  
वीरेन्द्र प्रकाश शर्मा 2001: रिसर्च मैथाडोलोजी। पंचशील प्रकाशन, फिल्म कॉलोनी, चौड़ा रास्ता, जयपुर।

## Paper VIII (g) : Geography of Water Resources, their Management and Utilization

### Section A

Definition and scope of water resource geography, inventory and distribution of world's water resources, water resources of India, Groundwater, hydrological cycle, demand and use of water, irrigation methods and conservation of water.

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## Section B

Salinity, alkalinity, overexploitation of groundwater and arsenic problem, water pollution, river water pollution, demand and water supply in industries, flood management, drought and dry farming projects in India and Rajasthan.

## Section C

Water conservation/participatory approach, traditional methods of water conservation in India and Rajasthan, integrated basin planning, watershed management, river water disputes, water management using remote sensing technology, environmental disasters and water crisis.

### Recommended Readings:

- Agarwal, Anil 2001: Drought: Try Capturing the Rain, Briefing paper, Down to Earth. Centre for Science and Environment, New Delhi.
- Agarwal, Anil and Narain Sunita, 1998, (eds.): Dying Wisdom: Rise, Fall and Potential of India's Traditional Water Harvesting System. Centre for Science and Environment, New Delhi.
- Black, Magie, 2005: The No-Nonsense Guide to Water. Rawat Publications, Jaipur.
- Black, Magie, 2004: A Matter of Life and Health. OUP, New Delhi.
- Barlow and Clark Tony, 2002: Blue Gold: The Battle Against Corporate Theft of the World's Water. Earthscan, London
- भारती, राधाकांत, 1998: भारत की नदियाँ। नेशनल बुक ट्रस्ट ऑफ इण्डिया, नई दिल्ली।
- Climate Change, 2001: International Panel on climate Change. Cambridge University Press.
- Clarke, Robin 1991: Water: The International Crisis. Earthscan, London.
- Dams and Development 2000: Report of the World Commission on Dams. November.
- Das, P.K. 1996: The Monsoon. National book Trust, India, New Delhi.
- Dhuruv Narain, V.V., Shastry, G. and Patnaik U.S. 1990: Watershed Management. ICAR, New Delhi.
- Dakshinamurti, C., Michael, A.M. and Mohan, S., 1972: Water Resources of India and their Utilization in Agriculture. IARI Monograph No. 3, New Delhi.
- गुर्जर, आर.के. एवं जाट, बी.सी. 2012: जल संसाधन भूगोल। रावत पब्लिकेशन, जयपुर।
- Gurjar R.K., Jat B.C., 2011: Geography of Water Resource. Rawat Publication.
- गुर्जर, आर.के. एवं जाट, बी.सी., 2001: जल प्रबंध विज्ञान। पोइंटर पब्लिशर्स, जयपुर।
- Gurjar, R.K. 1990: Geographical Perspectives on Irrigation. Rawat Publications, Jaipur.
- Goudie, A., 1997: The Nature of the Environment, Blackwell, London.
- जाट, बी.सी. 2007: जलग्रहण प्रबन्धन पोइंटर पब्लिशर्स। जयपुर।
- Jat. B.C., 1999: Watershed Prioritization and Rainfall Runoff Modelling Using Remote Sensing and GIS Approach. IIRS, Dehradun.
- Kirmerslay, David, 1988: Troubled Water: River, Politics and Pollution, Hillen Shipman, London.
- Mahnot, S.C. and Singh, P.C., 1993: Soil and Water Conservation. Intercooperation Coordination Office, Jaipur.
- Narain, Sunita, 2004: Down to Earth, Febuary 29, 2004.
- Park, C., 1997: The Environment: Principles and Application. Routledge, London.

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- Rao, K.L., 1975: India's Water Wealth. Orient Longman, New Delhi.  
 Singh, Gopal, 2004: A Geography of India. Atma Ram & Sons, New Delhi.  
 Shiva, Vandana, 2002: Water Wars: Privatization, Pollution and Profit. Pluto Prees, London.  
 Sata Water Resources Plan, 1998: Volume, I, II, III : Tahal consulting Engineer. Ltd. Tel Aviv, Israel.  
 Sidhartha, K., 1990: Flood in India: A Model for Generating Factors. Cender Patna.  
 Sidhartha, K., 1989: Drought in India: Spatio Temporal Variations. H.T. Patna.  
 Singh, R.L., 1971: India: A Regional Geography. NAGI, New Delhi.  
 World, C., 1997: Reflected in Water: A Crisis of Social Responsibility. Cassed London.

## DISSERTATION

The candidates can offer dissertation on any geographical problem in lieu of any elective paper in final year examination.

**N.B.:** The candidates will be required to submit dissertation four weeks after the theory examination which will be examined by a board of two examiners. Three copies of dissertation 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 secondary data 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.

## Practicals

### Scheme of examination

Min. Pass Marks: 36	Bifurcation of Marks		Max. Marks: 100 Time
	Non-collegiate candidates	Regular candidates	
Written test	60(4 questions)	40 (4 questions)	4 hrs.
Record work and viva voce	15+5	14+06	
Field survey and viva voce	15+5	14+06	4 hrs.
Camp work and viva voce	--	14+06	

**N.B.** In written test there shall be 2 questions from each section. Candidates have to answer 4 questions selecting at least one question from each section. All questions carry equal marks. Examination be conducted in batches of not more than 20 candidates in any case. 12 hours of teaching practicals be provided for a batch of 20 students per week.

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## SYLLABUS

### Section A

Methods and techniques of representation of relief:

Methods and techniques of depicting relief Profile, gradients and calculation of slope, Block diagrams, hypsographic curves. altimetric frequency graph.

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 topographical sheets which depict typical geomorphological and cultural landscapes.

### Section B

Scanning and digitization of maps, knowledge of stereoscopic vision and types of stereoscopes, identification of cultural and physical features on aerial photographs, calculation of scale on air photo, number of runs, air photographs in each run and total air photographs for a given area.

### Section C

Field surveying and camp work: resectioning using plane table: two and three point problems, use of dumpy level, practical on contouring and profiles.

Parts and use of theodolite in traverseing and angle computation.

Camp Work: A topographical survey of a settlement of about 200 hectares of land will be done by organizing a camp at least for a week away from the centre of the institution and maps and reports of the same will be prepared with help of computer technology (word programme & Autocard). (Students are expected to stay in the camp at night).

### Books Recommended

B.C. Punmia 1988: Surveying and Field Work. Vol. I, Laxmi Publications, New Delhi.

Breed. C.B. and Hosmer, G.L.: The Principle of Surveying. Vol.I and II, New York.

Devis, R.E. and Foot, F.S.: Surveying theory and practice. Mc-Graw Hill Book Co., New York.

Gautam, N.C.: Urban Land use studies through Airphoto Interpretation .

Monkhouse, F.J. and Wilkinson, H.R. 1971: Maps and Diagrams. Methuem, London.

Roorke Engineering College: Mannual of Surveying.

Robinson, A.H. et al. 2004: Elements of Cartography. John Wiley & Sons, Inc., New York.

Rampal, K.K. 1993: Mapping and Conflation: Methods and Techniques. Concept Publishing Company, New Delhi.

Singh, R.L. and Singh RPB 1991: Elements of Practical Geography. Kalyani Publishers, New Delhi.

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Sharma, J.P. 2011: Practical Geography. Rastogi Publications, Meerut.  
Tiwari, R.C. 2009: Practical Geography. Prayag Pustak Bhawan, Allahabad.  
T.R.Tracy: Surveying theory and practice. John Willey and Sons, Inc., New York.  
Thrilfall, H.S., A.: Text Book of surveying and Levelling. Charles Grafflin, London.  
Techniques: Pink Publishing House, Mathura.

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Indira → Sumitra