



# Maharaja Surajmal Brij University

Bharatpur (Raj.)

## SYLLABUS

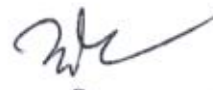
M.A. / M.Sc. Geography

(Annual Scheme)

(Session 2020 - 21)

Session 2021-22

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2020-21

  
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महाराजा सूरजमल बृज विश्वविद्यालय  
भरतपुर (राज.)

## PART-2

**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 talking of 4 Hours per week. For practical 4 Hours per batch 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:

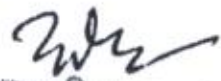
First Division	60%	} of the aggregate marks taken together of the Previous and the Final Examination.
Second Division	48%	

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

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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 ideas By weeks before Afer the commencement of the theory examinations. Only such candidates shall be permitted to offer Dissertation/Field Work/Survey. Report/Thesis (if provided in the scheme of examination) in lieu of a paper as have secured atleast 55% marks in the aggregate of all the papers prescribed for the previous examination in the case of annual scheme I and II semester 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, on-payment of fee fixed by the University from time to time. The candidate should contact the Head, Department of Geography 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**

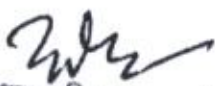
There will be four theory papers and a practical each in Previous and Final Examination. Each of the theory papers will be 100 marks. Each theory paper will be of three hours duration: Candidate will be required to pass both in theory and practicals separately.

#### **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,

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## 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
- (d) Transport Geography
- (e) Geography of Settlements
- (f) Advanced Geomorphology

Paper-VII Any one of the following:

- (a) Urban Geography
- (b) Climatology and Oceanography
- (c) 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 (1/6th 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 and emphasis should be laid on ink; and color maps.

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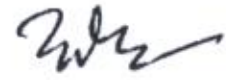
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2. The Viva-voce Exam. be held to judge the real knowledge of the student and to examine the authenticity of the record work. The marking on the record work

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## SYLLABUS

6.

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, Geography during the period of Renaissance: contributions of Sebastian Munster, Philip Cluverius, Varenus, Immanuel Kant.

#### Section B

Modern geography: geography in Germany-contributions of Humboldt and Ritter, Richthofen, Ratzel, Hettner geography as a chronological science, geography in France-Blache and Brunches, geography as science of distribution and relationship, geography as chronological science, geography as science of landscape morpholog geography as spatial science and human ecology.

#### Section C

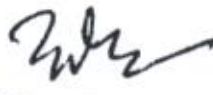
Dualism in geography: physical and human geography, systematic and regional geography; environmental determinism and possibilism; qualitative and quantitative, revolution; humanistic geography and structuralism. Approaches in geography-behavioural, radical, feministic, Post modern and critical geography, 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. 1983. Geography: History and Concepts - A Student's Guide. Sage, Los Angeles (Fourth Edition).
- जाट बी.सी. 2013 : भौगोलिक चिन्तन का इतिहास । मलिक एण्ड कम्पनी, जयपुर ।
- जैन एस.एम. 2005 : भौगोलिक चिन्तन एवं विधि तन्त्र । साहित्य भवन पब्लिकेशन्स, आगरा ।

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आणविक प्रशासकी  
कक्षा प्रमुख, भौगोलिक विभाग  
भारतीय विश्वविद्यालय  
अजमेर



- James, P.A.; 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 विचारधारायें। ए. 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, zoning of the earth's interior and thermal state; isostasy, endogenetic and exogenetic forces, mountain building theories (Kober, Holmes) plate tectonics, denudation: erosion and weathering types and processes, models of landscape evaluation: Davis and Penck. Erosional and depositional landform formed by running water, underground, wind, process of desertification.

### Section B

Atmosphere: composition and layers, air temperature, heat balance, adiabatic and non adiabatic processes, stability and instability;

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

### Section C

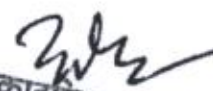
Oceanic bottom relief, oceanic deposits, horizontal and vertical distribution of temperature and salinity, oceanic water currents, tides and tidal theories, atolls and coral islands, theories of coral reef formation, marine resources, biotic mineral and energy resources and their utilization.

### Recommended Readings:

- Chorle R.J. 1972: Spatial Analysis in Geomorphology. Methuen, London,
- Cooke, R.U. and Doornkamp, J.C. 1974: Geomorphology in Environmental Management-An introduction. Clarendon Press, Oxford.
- Dury, G.H. 1959: The Face of the Earth. Penguin Harmondsworth.

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- 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.
- Gourdie, 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, J.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

#### **Section B**

Energy resources: conventional and non-conventional, spatial patterns and supply problems; manufacturing: factors of production, theories of industrial location: Weber, Smith; major industries: iron and steel, paper and pulp, cotton textile, world transport patterns, accessibility and connectivity.

#### **Section C**

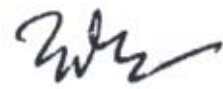
Decision making process: Location decision-behavioral view, Central place theory of Christaller, Von Thunen's Agriculture location theory, economic development, regional disparities in economic development, economic regionalization for area development and planning-economic regions of India.

#### **Recommended Readings:**

- Alexarnier, J. W. 2001. Economic Geography. Prentice Hall of India, New Delhi.
- Chapman, K. and Walker, D. 1991. Industrial Location: Principles and Policies. Blackwell, Oxford.

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- Grigg, D. 1995. An Introduction to Agricultural Geography. Second edition, Routeledge, 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. Metliuen, 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.

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**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, physiographic, region, drainage basins, climate regions, natural vegetation, mineral wealth, population and its characteristics, power resources, agricultural characteristic, natural rubber and its world trade, tea, coffee & spices, development of transportation and accessibility.

**Section B**

Singapore-problems of industrial expansion, port developments, human resource, Philippines-population and food problem and development programme, Thailand-problem of rbanization and regional devision and development programmes.

**Section C**

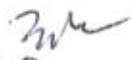
China state farms and people communes, population and food supply industrialization, changing pattern of industrial complex, Red Basin, the Hwango Ho, Yagize Kiang and Sikkiang basins, tea, ~~and~~ rice culture, fishing industry, steel industries, industrial belts.

**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 सतपंथी, डी.पी. 2002: एशिया की भौगोलिक समीक्षा। वसुन्धरा प्रकाशन, गोरखपुर।  
 सतपंथी, 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।  
 Tikka, R.N. 1997: World Regional Geography. New Academic Publishing Company, Jalandhar.  
 Wadia, D.N. 1919: Geology of India. Longman, London.

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**Section A**

Geography and rural development, agricultural geography and rural development, agricultural location theory, agricultural, pastoral, forestry, and land use competition, landuse and landscape, approaches to rural development, growth-center approach, rural settlement, population, rural transport service provision.

**Section B**

Rural planning and land management: resource development and integrated rural development: crop and soil management, live stock range and management:

**Section C**


Rural development in Rajasthan: major tools and techniques, rural development schemes- Irrigation, drought prone areas schemes, desert development programme, in Rajasthan, tribal areas development.

**Recommended Readings:**

- Association of 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, Ames. Lows State University Press.  
Andreas, 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.  
Lassey, 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.  
Menah, A 1984: Integrated Rural Development, Galucester Glancesser 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: Monloring and Control, Scientific Pubs, Jodhpur.

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- Morgan, W.B. and Richardson, A. 1961: *Human-Agricultural Geography*, London Methuen.  
 Newbury, Pa. 1980: *Geography of Agriculture*, Plymouth Macdonald and Evans.  
 Pacione, M. 1981: *Rural Geography*, London, Pappur Clark, (ed.) and Row 1984-  
 Register of Research in Rural Geography Leicester : 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**

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 development of agriculture-agricultural crop regions (Belts).

**Section C**

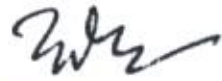
Important industries, their location and distribution, transportation networks (rail, road, air, water and pipelines).

**Recommended Readings:**

- Alexander: *The North Eastern United States* : (D. Van Nostrand Co., New York).  
 Barg, L.S.: *Natural Regions of U.S.S.R.* (MacMillan and Co., New York).  
 Balzak, S.S.: *Economic Geography of Soviet Union* (MacMillan 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. Lid., AB/9 Safdarganj Enclave, New Delhi.  
 Osttolenk, B.: *Economic Geography of the United States* (Thomas Y. Crowell Co., New York).

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महाराष्ट्र सूचनात्मक विज्ञान विश्वविद्यालय  
अहमदनगर (राज.)



- 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 (Jolin Willey and Co., New York).  
 Smith, J.B. and Philip, M.G.: North America: (Harcourt Brace, New York).  
 Shabad, T.: Geograph. 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, population and natural regions, political regions.

**Section B**

Study of Bangladesh under the following heads-geographical and political units, climate and climatic regions, vegetation, agriculture, livestock, population, natural regions, political relations.

**Section C**


Study of Nepal & Srilanka 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.  
 Johnson, B.L.C. 1975: Bangladesh, Heinemarin Education Books; London.  
 Johnson, B.L.C. 1970: Geography of South Asia.  
 Karan, P.P.: The Himachal 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. 1952: Asia East by South, John Wiley and Sons, London.

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14  
**Paper IV (e): Advanced Regional Geography of West Europe.**

**Section A**

Strategic importance, location, geological structure, physiographic divisions, Drainage Pattern and river basins, climatic controls, natural vegetation, demographic characteristics.

**Section B**

Natural resources mineral development of power resources, development of agriculture - major agricultural crop regions (belts)

**Section C**

Important industries: their location and distribution, International trade, detailed study of important regions-economic and industrial.

**Recommended Readings:**

- Houston, 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  
Tikka, R.N. 1997: World Regional Geography, Vew Academic Publishing Company, Jalandhar  
भल्ला, एल.आर. व अन्य 1999 : प्रादेशिक भूगोल। कुलदीप पब्लिकेशन्स, अजमेर।  
सक्सेना, एच.एम. 2011 : विश्व का प्रादेशिक भूगोल। रस्तोगी पब्लिकेशन्स, 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 a. ecological succession, types of ecosystems, energy flow in the ecosystem.

**Section B**

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

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Environmental quality, sustainable development, environmental management, forest resources management, water management, biodiversity and its conservation, environmental awareness and education, international efforts for 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 National Commission of Floods. Vol. I & II, New Delhi).
- Govt. 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

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- 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 एवं 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.
- Verghese, 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

Measures of central tendency-mean, mode quartiles, median; measures of dispersion. Range deviation, mean deviation, standard deviation, Lorenze curve, measures of skewness, correlation - Karl Pearson method and Spearman's Rank correlation.

#### Section - B

Regression method of fitting a regression line - construction of regression line. Interpolation and Extrapolation, probability, Theoretical frequency distribution, sampling. Theory and sampling distribution,

#### Section - C

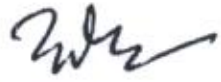
Statistical inference, estimation and Hypothesis testing, Chi-square test, Test of significance. Large sample test, Small sample test student's test, F-test, analysis of variance.

#### Recommended Readings:

- Gupta, S.P. 1979. Statistical Methods. Sultan Chand & Sons, New Delhi, (Twelfth thoroughly revised edition).
- Mahmood, A. 1991: Statistical Methods in Geographical Studies: Rajesh Publication, New Delhi (fourth revised edition).
- श्रीवास्तव एवं प्रसाद 2008 : भूगोल की सांख्यिकी विधियाँ, वसुन्धरा प्रकाशन, गोरखपुर।

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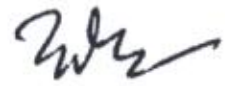
  
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- Kashinath nagar, sankhiki ke mool tatva, 1992; Meenakshi Prakashan, Meerut.
- David unwin, Introductory spatial Analysis Methuen, London, 1981
- Gregory, S. Statistical Methods and Geographer, Longman, London; 1978.
- Hammond R and P.S. McCullaghi 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	N/C StudentS	Max. Marks: 100%
	Regular candidates	
	Bifurcation of Marks	Time
Written test 4 (Question)	40	40 4 hrs.
Record work and viva voce	15+5 = 20	20+10 = 30
Project report and viva voce	15+5 = 20	NA
Survey & viva voce	15+5 = 20	20+10 = 30 3 hrs.
	Total 100	Total 100

**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: 8 hours of teaching practicals be provided for a batch of 20 students per week.

**SYLLABUS****Section A**

The art and science of cartography, enlargement, reduction and finding of area of maps, use of planimeter, interpretation of weather maps and weather forecast.

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

**I. Conical Projections:**

1. One standard parallel
2. Two standard parallels
3. Bonne's
4. Polyconic

**II. Cylindrical Projections:**

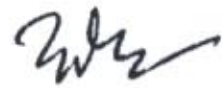
1. Cylindrical Equal Area
2. Mercator's
3. Gall's Stereographic

**III. Zenithal Projections:**

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

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5. Equidistance : (a) Polar Case

IV. Conventional Projections:

1. Sinusoidal
2. Mollweide

Choice of projections, used for maps produced in India.

**Section-B**

Geographical maps and diagrams: computation of data, preparation of frequency tables, representation of data by histograms and ogives, computation of mean, median and mode, deviation-standard deviations and mean deviations, theoretical basis of nearest neighbor analysis, 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.

Three dimensional diagrams of economic and social data, Transport Network analysis.

Diagrams: Polygraph trilinear chart, circular graph, climatograph, hythergraph, climograph, annual water deficiency and water surplus graph.

**Section C**

The Art of surveying, history of surveying-Chain & Tape survey, methods of chaining on sloping ground and chaining obstacles, prismatic compass survey, travers, bearings, closing errors, correction of bearings and calculation of included angles.

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 6 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:

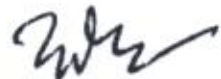
Ksullar, D.R. 2000: Essentials of Practical Geography, New Academic Publishing Co., Jalandhar

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

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

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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)

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

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## 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 practical separately.

### PREVIOUS

- Paper -I** Evolution of Geographical Thought  
**Paper -II** Physical Bases 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.

### Practical

### FINAL

- Paper-V** Advanced Geography of India  
**Paper-VI** Any one of the following
- (a) Population Geography
  - (b) Agricultural Geography (Elements & Applied)
  - (c) Industrial Geography
  - (d) Transport Geography
  - (e) Geography of Settlements
  - (f) Advanced Geomorphology

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Paper -VII Any one of the following

- (a) Urban Geography
- (b) Climatology and Oceanography
- (c) 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**

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**M.A/M.SC. Final****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 India monsoon, major climatic regions: drainage pattern, watersheds and river-systems.

**Section B**

Resource potential and evaluation, Water resources & Multi-purpose irrigational projects, Vegetational resources. Green revolution. Mineral resources. Human resources & Population policies.

**Section C**

Resources development and utilization: power, industries and transport, river basins of India, industrial regions and economic regions of India and regional economic disparities.

**Recommended Readings:**

Bansil, BC. 1975: Agricultural Problems in India, Delhi

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

Gopal Krishnan, R 2001: Geography of India, Jawahar Publishers & Distributors, 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

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

Mitra A 1967: Level of Regional Development India Census of India Vol I Part 1A (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, Varansi.

Tripathi, R 2000 Geography of India, Rawat Publications, Jaipur

Weedia.D.N 1967 Geology of India McMillan & Co., London.

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*M.K.*  
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Paper VI Any of the following

Paper VII(a) : Population Geography

#### Section A

Population geography: definition, nature and scope and interdisciplinary study, theories of population growth, 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, 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; contemporary issues – ageing of population; declining sex ratio.

#### Readings Recommended

- hinde Ashia A and Kanither 2002: principles of population studies. Himalaya Publishing house, Mumbai.
- handna, R.C 2013; Population Geography, Kalyani Publishers, Delhi.
- handna, RC 2006; Jansankhya Bhugol, Kalyani Publishers, Delhi
- assan, M.I 2005; Population geography, Rawat Publication, Jaipur.
- \_\_\_ M.K 1991; India's Population Heading Towards a Billion. B.R Publisher New Delhi.
- Kundu, A 2006 Trends and Patterns of Urbanization and their Economic Implications, India Infrastructure Report, pp 28-41.
- Grnier, J.B 1978; Geography of Population, Langman, London.
- Woods, R 1997 Theoretical Pupulation 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 Millemium Development Goals: Global Monitoring Report.

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**Paper V (b) : Agricultural Geography (elements & Applied)**

**Section A**

Agriculture geography : nature and development, Origin Dispersal and Development of Agriculture. Determinations of Agriculture Land Use: Relief and Climate. Soils. Human Determinations of Agriculture.

**Section B**

Agriculture typology, shifting agriculture, tropical plantation agriculture, Mediterranean agriculture, Models in Agricultural Geography. 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 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, Concepts Publishing Co., Delhi.  
 Ali Mohammad: Dynamics 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.  
 CAR (1956-71): Soil and Water Conservation Research.  
 CAR : Soil Conservation of Inida.  
 at B.C 2013: Arthik Bhagol. Panchsheel Prakashan, Jaipur.  
 ostowickie, Z. Agricultural Typology. Polish Academy, Warsaw.  
 Mohammad, N 1992: New Dimensions in Agricultural Geography: Landuse an 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 Gography. BHU Press, Varanasi.  
 Publication Pvt Ltd, New Delhi  
 Singh, Jasbir : Agricultural Atlas of India, Vishal Publishers.  
 Singh, Jasbir: Agricultural Geography of Haryana.

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**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, New trends in industrial geography 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 regionalization. Industrial regions in India: Hooghly side industrial regions, Damodar valley industrial regions, Industrial policies of India: liberalization, privatization and globalization (special reference of India),;

**Section C**

Industries: cotton, jute, textile, iron and steel, aluminum, fertilizer, paper and pulp, copper chemical and tourism industry.

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

**Recommended Readings:**

Lioyed 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.

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

Riley, R.C 1973: Industrial Geography, Chalto and windus, London.

Alexanderson 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 Delhi).

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

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


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

Ghose, BC : 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.

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**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, issues and challenges in transport geography.

**Section B**

Transportation and spatial structure, transportation models, model accessibility and hinterlands, 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.

**Recommended Readings**

- Bery, 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.
- Kauesty, K.J 1963 : Structure of Transportation Networks. University of Chicago, Chicago
- Rodrigue, J.P et al 2013: The Geography of GTransport Systems, Routledge, New York.
- Faffe, 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.

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**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.

**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 evaluation of field boundaries and the field patterns,.

**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 settlements, theories of structure of urban centres: grid, concentric zone, sector, multiple nuclei and irregular pattern models.

**Recommended Readings :**

- Bogue, D.J 1969: Principles in Demography, John, Wiley, New York.  
 Bhende, Asha, A and Kanitkar, 2002 :Principles of Population Studies, 14<sup>th</sup> 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, UK.  
 Hassam, M.I 2005 : Population Geography, Rawat Publication, Jaipur  
 Kundu, A Lopamudra, R.S 2012: "Migration and Exclusionary Urbanisation in India, Economic & Political Weekly, XL VII (26/27):219-227.  
 Kundu, A 2006:Trends & Patterns of urbanization and their economic implications, India Infrastructure Report, pp. 28-41.  
 Newbold, K.L.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 Coporation, New Delhi.  
 Rural Urban Dynamics and the Millennium Development Goals 2013: Global Monitoring Report.

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**Paper VI(f) : Advanced Geomorphology**

**Section A**

Fundamental concepts of geomorphology, schools in geomorphology, recent trends in geomorphology, earth movements: epeirogenic, orogenic types and classification of weathering, mass movement erosion. Plate tectonics, seismicity, volcanicity, orogenic structures with reference to the evolution of Himalaya, various models of landscape evolution of (Davis and Penck).

**Section B**

Geomorphic processes, dynamics of fluvial, Aeolian and karst processes and Resultant landforms, polycyclic landforms, various models of slope development (wood, Davis, Penck), concept of morphogenetic region, systems in geomorphology.


**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, 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.K Schumm S A and Sugden D E 1984 Geomorphology, Methuen and Company Ltd, London.  
 Cooke, R.U and Doornkamp, J.C 1974: 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 of Geomorphology Orient Longman, Hyderabad  
 Mitchell, C.W 1973: Terrain Evaluation Longman, London.  
 Ollier, C.D 1979 Weathering Longman, London.  
 Pitty A.F 1971: Introduction of Geomorphology, Methuen, London.

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- Singh S 2004 : Geomorphology, Prayag Pustak Bhawan Allahabad.  
Stoddart, D.R (ed) 1996 :Process and Form inn 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.

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## 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 patterns and trends of urbanization in the world, 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.

### 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 areas, and other functional areas central place theory (Christaller and Losch) and models of urban structure.

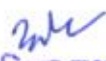
### Section C

Centrifugal and centripetal forces in urban geography, development of suburbs, rural, urban fringe, satellite towns, ring towns, sphere of urban influence (umland) and its delimitation control of urban problems urban poverty, slums, transportation, housing, preparation of a master plan, 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.  
 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.  
 Herrold M. Mayer:Readings in Urban Geography, Central Book Depot Allahabad.  
 N.V Sovani:Survey of Bhopal City and Bairagarh (Asia publishing Bombay).  
 R.L Singh:Bangalore as Urban Survey, National Geographical Society of Indian. 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.  
 Tolyor G:Urban Geography, Kuthuen 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) : 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.

### Section B

Air masses, fronts, cyclones (tropical and extra tropical) and anticyclones, Koppen and thonthwaite classification of world climates, major climatic types-equatorial, monsoon, Mediterranean.

### 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 formation.

### 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.  
 Oliver, J.E and Hidore, J.J 2011: Climatology : An Atmospheric Science, Dorling Kinder sky. India Pvt Ltd. Licenses of Pearson education in South Asia, New Delhi.  
 Sharma, RC and Vatal M 1999 Oceanography for Geography for Geography Chaitanyua publishing House, Allahabad.  
 Singh, S 2007 Chimatology. Prayag Pustak Bhawan, Allahabad.  
 Siddartha, K 2000 Oceanography, A Brief Introduction, Kisalaye Publications, New Delhi.  
 Trewarth G.T and Hom L.H 1980 Introduction to Climate, McGraw-Hill, New Delhi.

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

### **Section A**

Definition and scope of remote sensing, remote sensing as a 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.

### **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.


### **Section C**

RS application mapping and monitoring of land use and land cover, forestry and desertification, soil and water resources, remote sensing and hazard mapping and environmental monitoring introduction of GIS as an automated geography, fundamentals of GIS geospatial databases, data structure and formats, projections and coordinate system. 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 Memillan, New York.  
Campbell J. 1989 Introduction to Remote Sensing Guilford, New York.  
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.

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## 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. 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, classifications and concepts, boundaries as economic barriers, buffer zones. problem of access, growth of nations and disintegration of empires : unitary and federal states, dying colonialism and resurgent nationalism, supernationalism.

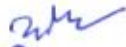
### Section C

Politics and transportation, geography of foreign and economic development, emergence of third world block, politico-geographical study of India, political geography of administration, function, methods and trends of electoral geography. voters participation before voting prediction, conceptual model of the voting decision, operationalisation of conceptual decision, gerrymandering in relation of India.

### Recommended Readings

- Adhikari, S 2004 Political Geography. Rewat Publication, 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 Wiley, 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 of 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 Chattoraj, 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> Century A Global Analysis. New York.  
 Taylor, P 1985 : Political Geography, Longman, London.

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## 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 Paleolithic period, rise and dominance of homo sapiens and their deployment over the continents, spatial distribution and characteristics of primary races of the world.

### Section B

Beginning of plant domestication, animal domestication and their regions, evolution of civilization : Mesopotamian, Nile, Indus valley with respect of to racial, ethnic, religious, linguistic, demographic and organization 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 difference.


### 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.

### Reading 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 of Human Geography Edward Arnold Ltd London.  
 Dreze Jean, Son Amartya 1996 :Economic Development and Social Opportunity Oxford University press, New Delhi.  
 Dubey, S.C 1991 Indian Society. National Book Trust, New Delhi.  
 Haq, Mahbubul: Reflection of 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 Oxrod University Press, Toronto, 2<sup>nd</sup> edition.  
 Robertson, Jain and Penny Richards 2003 : Introduction in studying cultural landscapes, ed Jain Robertson and Richards 1-18.  
 Rubenstein, J.M and Becon, J.M 1990: Cultural Geography, John Wiley and Sons Inc New York.  
 Soctt, A.J 1997: The Cultural Economy of Cities, International Journal of Urban and Regional Research 21(2) 323-339.  
 Saberwal, Fasant K 1996: Pastoral Politics : Gaddi Grazing, Degradation and Biodiversity conservation in Himachal Pradesh, India, Conservation Biology 10 no 3:741-749.

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- Ten Amartya and Dreze Jean 1996: Indian Development Selected Regional Perspectives Oxford University preSopher D 1980: An Exploration of India: Geographical Perspectives on Society and Culture Concel 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 Universiyt, Baroda, Vadodara.
- Wagner, P.L & Maikesell, H.W (ecs) Readings in Cultural Geography.
- Mukherjee A.D and Aijazuddin, A 1985: India Culture, society and economy inter India publication, New Delhi.
- Broke, JC and Webb, JW 1978: A geography of mankind McGraw Hill, New York.

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

**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 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. geographical isolation. the zoo-geographical region, biogeography of the seas.

**Section C**

Conservation and management of forest and wild life, process of desertification, its consequences and management principals, projecting into the future climate change: biogeographically 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 : Intoduction of Environmental Science. B.S Publications, Hyderabad.
- Beaikie, P Cannon, T and Davis, I (eds) 2004: At Risk:Natural Hazards Peoples Aulerability and D Seasters Routtedge London.
- Clarks J.I Curson, P.K Kayastha, S.L and Nag, P (eds) 1991 : Population and Disaster Basil Blokwell U.S.A
- Cox C.B Moore, R.D 2010 : Biogeography-An Ecological and Evolutionary Approach Johnwrey 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. USA.
- Mathur, HS 1988 Essential 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 USA.
- Robinson, H 1982 Biogeography Eles, Mc Donald and Evans London.
- Singh, AK Kamra, VK and Singh J 1986 Forest Resource Economy and Environment Concept Publishing Company, New Delhi.

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## 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, 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 centers 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, Regional planning in USA (TVA) and regional planning in India (DVC and NCR), fundamentals of town and country planning.

### Recommended Reading:

- Rube K.N (ed) 1990: Planning and Development in India Asia Publishing House New Delhi.  
 Govt of India 1986 Regional Plan 2001 - National Capital Region NCRPB, Ministry of Urban Development New Delhi.  
 Bhat S 1973 Regional Planning in India Statistical Publishing Society, Kolkata.  
 Blair S.P and Carroll, KC 2009 : Local Economic Development- Analysis, Practices and Globalization, Second Edition, Sage Publications, Inc.  
 Chandna, R.C 2008 Regional Planning and Development Kalyani Publishers, Ludhiana, Journal of Geography and Regional Planning (JGRP) is an open access.  
 Hufschmidt, MM 1969 Regional Planning Challenges and Prospectus Praeger and Company, New York.  
 Mistra RP 1978: Regional Planning and National Development, Vikas Publication New Delhi.  
 Mishra RP (ed) 1992 : Regional Planning: Concepts Techniques, policies and Case studies Concept Publications, New Delhi.

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## Paper VIII (e) : Meteorology

### Section A

Atmosphere: chemical composition and layered structure insulation, temperature distribution, temperature: heat budget of atmosphere, various lapse rate inversion, albedo, adiabatic processes in the atmosphere and greenhouse effects, 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 cloud and their description, formation of clouds, clouds, convection, 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 observation : history, balloon observations, ediasound, 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 geographical distribution of fronts, intertropical convergence zones. tropical revolving storm, development and movement of simple pressure systems and fronts, morgale formula.

### Section C

Monsoon climate, genesis of the Indian summer monsoon, the energetic and physics of monsoon rain, distribution of rainfall in monsoon and associated pressure system, long range forecasts of monsoon rain, consideration of analogues charts, climate classification of World. Koppens classification, precipitation and temperature criteria, Thornthwaite climate classification, seasons in India with special reference to western disturbance, north western monsoon depressions and dust storms.

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**Recommended Readings:**

Critchfield, H.J 1983: General Comatology. 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.

Oliver J.E and Hidore JJ 2011 : Climatology : An atmospheric Science, Dorling Kindersky India Pvt Ltd , Liencsees of Pearson education in South Asia, New Delhi.

Singh, S 2007 Climatology Prayag Pustak Bhawan, Allahabad.

Trewartha, G.T and Horn, L.H 1980 An Introduction to Cimate McGraw-Hill, New Delhi.

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

### Section C

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

#### Recommended Reading

- Guthrie G 2010 Basic Research Methods - An Entry to Social Science Research, SAGE Publications, India Pvt Ltd New Delhi.  
 Gupta, SP 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 Prakashna New Delhi.  
 Misra H,N and Singh VP 1998 : Research Methodology in Geography Rawat Publication Jaipur.  
 Mahmood A 1998 Statistical methods in Geographical Studies Rajesh Publication New Delhi.  
 Mishra RP 1989 : Research Methodology, Concept Publication Company, new Delhi  
 Pal SK 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 RK Books New Delhi.

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

### Section A

Definition and scope of water resources 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.

### 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

- Agrawal, Anil 2001 : Drought: Try Capturing the Rain Beefing Paper Down to Earch Centre for Science and Environment, New Delhi.
- Agrawal, Anil 2001 and Narain Sunita 1998 (eds) Dying Wisdom: Rise Fall and Potential of Indians Traditional Water Harvesting System Centre for Science and Environment, New Delhi.
- Black Magie 2005 : The No-Non scense Guide to water Rawat Publications Jaipur
- Black Magie 2004 : A Matter of Life and Health OUP, New Delhi
- Barlow and clark Tony 2002 : Bule Gold: The Battle Against Corporate Theft of the Worlds Water Earthscan, London
- Climate Change 2001 International Pannel on climate change Cambridge University Press
- Clarke, Robin 1991 Water: The International Crisis Earthscan, London
- Dams and Development 2000 : Report of the Wrold Commission on Carms, November.
- Das PK 1996 The Monson National Book Trust India, New Delhi.
- Dhuruv Narain VV Shastry G and Patnaik US 1990 Watershed management ICAR New Delhi.
- Dakshinamurti C Michael, AM and Mohan S 1972 Water Resources of India and Their utilization in Agriculture IARI Monograph No 3 New Delhi.
- Gurjar RK Jat BC 2011 : Geography of Water Resources Rawat Publication Jaipur
- Girakr RL 1990 Geographical Perspectives on Irrigation Rawat Publications Jaipur.
- Goudie A 1997 The Nature of the Environment Blackwell London.
- JAT BC 1999 : Watershed Prioritization and Fainfall Runoff Modelling Using Remote Sensing and GISS App[roach IIRS Delhradun.

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- Kirmerslay, David 1988 Trobled Water River Politics and Pollution, Hillen Shipmen London.  
 Mahnot SC and Singh PC 1993 Soil and Water Conservation Inter cooperation Coordination office Jaipur.  
 Narain Sunita 2004 : Down to Earth Feburary 29, 2004.  
 Park C 1997 : The Environment : Principles and Application Routledge London.  
 Rao K.L 1975 Indias waster Wealth Orient Longman, New Delhi.  
 Singh Gopal 2004, A Geography of India Atma Ram & Sons, New Delhi.  
 Shri Vandana 2002 Water Wars: Privatization, Pollution and Projit Pluto Press London.  
 Sata Water Resources Plan 1998, Volume I, II, III Tahal consulting Enginer Ltd Tel Aviv Israel.  
 Sidhartha K 1990: Flood in India A Model for Generating Factors Cender Patna.  
 Sidharth K 1989: Drought in India, Spatio Temporal Variations HT Patna.  
 Singh R.L 1971 India : A Regiional Geography NAGI, new Delhi.  
 World C 1997 : Reflected in wAter : A Crisis of Social Responsibility, Cassed London.

### DISSERTATION

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

N.B : The candidate 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.

### Practical's

Min : Pass Marks : 36 Non-collegiate candidates Regular candidates Max Marks 100

	Bifurcation of Marks		Time
Written test	60(6 questions)	40 (4 questions)	4hrs
Record work and viva voce	14+6 = 20	14+6 = 20	
Field Survey and viva voce	14+6 = 20	14+6 = 20	4hrs.
Camp work and viva voce	-----	14+6 = 20	
<b>Total</b>	<b>100</b>	<b>100</b>	

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**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. 8 hours of teaching practical be provided for a batch of 20 students per week.

For Non collegiate students in written test there shall be 3 questions from each section. Candidate have to attempt 6 questions selecting at least one question from each section.

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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 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 geomorphologic and cultural landscapes.

**Section B**

Identification of cultural and physical features on aerial photographs, calculation of scale on air photo, number of funds, air photographs in each run and total air photographs for a given areas.

**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 heclares 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 held of computer technology (word programmed & autocard). (Students are expected to stay in the camp at night).

**Books Recommended**


- B.C Punimia 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, RE 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 Digagrams, Methuem, London.  
 Roorke Engineering College: Mannual of Surveying.

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- Robinson. AH et al 2004: Elements of Cartography. J. John wiley & sons, Inc , New York.
- ampal, K . K. 1993: Mapping and Conflation: Methods and Techniques, Concept pulishing company, New Delhi.
- ingh, R. L. and Singh 1991: Elements of practical Geography. Kalvani Publishers, New Delhi.
- Sharma J. P. 2011: Practical Geography. Rastogi Publication, 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.
- Thrillfall H.S. , A: Text book of surveying and leveling. Charles Graffillin, London
- Techniques: Pink publishing House, Mathura.

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