

**BHARATI VIDYAPEETH
(DEEMED TO BE UNIVERSITY), PUNE, INDIA**

PhD Entrance Test – 2020

SECTION-II: Geoinformatics - 50 Marks

The syllabus for the entrance test for Ph.d. in Geoinformatics is based on the syllabus for the Masters in Geoinformatics course conducted by BharatiVidyapeeth University. The Entrance exam will be based on the following topics.

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| Unit -1 | Biosciences and Natural Resources Basic ecological concepts and ecosystems: types, functions and structure; Biodiversity-levels, values, threats, conservation measures; Natural resources and associated problems; Planning conservation areas-criteria for conservation, approaches for conservation, tools for conservation and design criteria; Integrated watershed management-watershed management strategy, ecological assessment | One five mark question |
| Unit -2 | Urban Planning Introduction; Urbanization and its impacts; Urban climatology; Disasters and urbanization; Housing; Slums; Urban traffic; Urban utility planning; Open space provisions; Planning laws and environment; Planning Agencies | One five mark question |
| Unit- 3 | Fundamentals of Remote Sensing Introduction- Components, platforms, applications; Remote sensing of the environment- the remote sensing process; Principles of electro-magnetic radiations-atmospheric windows, energy matter interactions; Fundamentals of aerial photography- classification of aerial photography, scale, resolution, geometric characteristics of aerial photographs, photo recognition elements; Elements of visual interpretation; Sensors; Remote Sensing Data Products; Multi-spectral remote sensing; Thermal infrared remote sensing; Applications of passive, microwave and lidar remote sensing | One five mark question |
| Unit- 4 | Fundamentals of Geographic Information Systems Introduction to GIS; Geographic data and data measurement map basics, basic geographic concepts; data models, data structures and data input; Global Positioning Systems; Database management; Data Analysis; GIS Project Design and Management | One five mark question |
| Unit-5 | Photogrammetry and Digital image processing Photogrammetric sensing systems; Introduction to digital image processing- data formats, errors; Image rectification and restoration; Image enhancement techniques; Image classification; Data merging and GIS integration; Hyperspectral Image analysis; Digital change detection | One five mark question |
| Unit-6 | Geodatabase management | One five |

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| | Overview of database; Database models and modeling; Spatial data and database systems; Introduction to oracle; Simple queries; PostGRE SQL and PostGIS | mark question |
| Unit-7 | <p>Applications of geospatial technologies</p> <p>Remote sensing and GIS applications in ecosystem studies and conservation, agricultural applications, urban applications, water resources and related applications, health studies, Remote sensing and GIS applications in forest studies, marine sciences, urban mapping, disaster management.</p> | One five mark question |
| Unit-8 | <p>Spatial Statistics</p> <p>Data in ecology and environmental sciences; Statistical techniques; Basic elements and tools of statistical analysis; Concepts of probability ; Distribution; Contingency tables and χ^2 ; χ^2 - test of goodness – of – fit and homogeneity ; Correlation of measurement; Regression analysis; Introductory multivariate statistics and Partial correlation; geostatistics</p> | One five mark question |
| Unit-9 | <p>Spatial analysis</p> <p>Introduction to Spatial analysis; Vector and raster based spatial analysis; Network analysis; Point pattern analysis; Surface analysis; Spatial modeling</p> | One five mark question |
| Unit-10 | <p>Trends in Geoinformatics</p> <p>Web GIS; 3D GIS and visualization; Object oriented GIS; Mobile GIS; Spatial data warehousing and mining; Open GIS consortium; Customization and automation in GIS</p> | One five mark question |

Reference Books

1. Bawa, Kamaljit S., Richard B. Primack, and Meera Anna Oommen. *Conservation Biology: A Primer for South Asia*. Universities Press (India), 2011.
2. Lo. C. P., A.W. Yeung, *Concepts and Techniques of Geographical Information Systems*, Prentice- Hall of India Pr. Ltd., 2002.
3. Kang-stung-Chang, *Introduction to Geographical Information System*, Tata McGraw Hill Pub. Comp, 2002.
4. *Web GIS: Principles and Applications* Paperback – Import, 15 Mar 2011, by Pinde Fu (Author), Jiulin Sun (Author)
5. Allard, Denis. *J.-P. Chilès, P. Delfiner: Geostatistics: Modeling Spatial Uncertainty*. Springer, 2013.
6. Gelfand, Alan E., et al. *Handbook of Spatial Statistics*. CRC press, 2010.
7. Jensen, John R. *Remote Sensing of the Environment: An Earth Resource Perspective 2/E*. Pearson Education India, 2009.
8. Jensen, John R., and Ryan R. Jensen. *Introductory Geographic Information Systems*. Pearson Higher Ed, 2012.