Vijayanagara Sri Krishnadevaraya University

Ph.D. Entrance Test Syllabus (Applied Geology) – 2021-22

PART – A: Research Methodology

Unit-1. Introduction to Research Methodology: Definition, problem, objectives and scope. Nature of research, motivation and creativity in research. Research plan and design. Different types and styles of research in Sciences. Scientific temperament. Critical and positive thinking.

Unit-2. Research Method in Geoscience: Types of research methods – quantitative and qualitative. Research techniques and tools – questionnaire, interview, observation, schedule, check-list, records and reports. Collection of literature-print, electronic and selection sources of information in Geoscience INSDOC service. Classification systems used in libraries.

Unit-3. Data Analysis and Interpretation: Data analysis in statistical methods, data analysis in computer processing. Interpretation and presentation of results.

Unit-4. Recent trends of report writing: Preparation and presentation of research report for various publications. Presentation of illustrations, reprography services and thesis writing. Recent trends – e-patashala, INFLIBNET, INTERNET. Use of computers in research. Online citation tools- EasyLib, Biblio, Endnote etc, Impact factors and Citation index, i10 index, h-index. IPR, plagiarism tools- Turnitin, Authenticat, Urkund and ethical values in research.

PART - B: Core Subject

Unit-5. Introduction of Earth System: Origin of the Earth, age of the Earth, Earth's interior. Composition of the Earth. Earth's geological process. Exogenous processes and endogenous processes. Weathering and mass-wasting. Geological action of rivers, glaciers, wind, waves, currents, volcanoes, earthquake and groundwater. Its mode of occurrence, prospecting and Landforms of various origins.

Unit-6. Mineralogy: Basics of mineralogy- physical properties, characters defending upon elasticity, cohesion, light, electricity, magnetism. Chemical bonding – ionic, covalent, metallic, vander walls. Classification of minerals based on chemical composition and structure. Rock forming minerals. Ore minerals. Oxides, carbonates, phosphates, sulphates, sulphides, and hydrocarbon. Silicates-quartz, feldspar, olivine, garnet, pyroxene, amphibole.

Unit-7. Petrology: Classificaton of rocks, igneous, sedimentary and metamorphic rocks. Forms, structures and textures of igneous rocks. Lithification and diagenesis. Structures of sedimentary rocks. Classification of sedimentary rocks based on grain size, and mode of formation. Agents and structures of metamorphic rocks. Grades and facies of metamorphism. Petrographic properties of all kinds of rocks.

Unit-8. Mineral Exploration and Economic Geology: Ore geology in relation to industry, economic minerals. Principles and processes of ore formation; magmatic and hydrothermal processes, migration, deposition and replacement of ore deposits, metallogenic epochs and provinces with respect to India, and Karnataka. Methods of prospecting and exploration of ore deposits, guides and criterias for mineral exploration, geophysical exploration gravity, magnetic methods of exploration. Ore minerals, gangue minerals, processes of ore information : magmatic processes, contact metasomatism, hydrothermal processes, weathering processes, sedimentation (Fe & Mn cycles) oxidation and supergene enrichment, metamorpition and classification of ore deposits.

Unit-9. Hydrogeology and Environmental Geology: Global water distribution, hydrological cycle, origin of water. Vertical distribution of water. Occurrences, movement and storage of water. Aquifers and types of aquifers. Hydrological properties of aquifers. Darcy's law, water table fluctuation. Ground water quality, Artificial recharge of ground water. Salt water infrusion in coastal aquifers, hydeogeomorphic units, radio isotopes in hydrogeological studies. Hydrostratiraphic units. Earth's natural resources and their distribution. Energy resources and crisis. Natural hazards, earthquakes, floods, landslides and avalanches, drought anthropogenic activities. Soil, water, air pollution, causes and effects of mining on environment. Noise pollution. Global warming, climate change and acid rain. Impacts of global warming. Solid wastes. Municipal effluents. Radioactive wastes.

Unit-10. Remote Sensing and GIS: Elements of photogrammetry, elements of photo-interpretation, electromagnetic spectrum, emission range, film and imagery, sensors, geological interpretations of air photos and imageries. Global positioning systems. GIS- data structure, attribute data, thematic layers and query analysis.

BoS Chairman

BoS Member

Reference Books

- 1. Physical Geology by Arthur Holmes
- 2. Structural Geology by Billings
- 3. General Geology By P.K. Mukerjee
- 4. Physical Geology By Strahler
- 5. The geology of ore deposits John M. Guilbert and charles. F.Park, Jr.W.H.Freeman and Co., New York. 1986.
- 6. Interpretation of ore textures Bastin, E.S.
- 7. Economic Mineral deposits by Jenson and Bateman, A.M.
- 8. Ore microscopy -Cameraon, E.N.
- 9. Textures of the ore minerals Edwards, A.B.
- 10. India's mineral resources Sinha and Krishnaswamy, S.
- 11. Metallic and Industrial minerals Lamey Carl, A.
- 12. Introduction to India's economic minerals Sharma, N.L. & Ram . K.S.
- 13. A treatise on industrial minerals of India-Sinha, R.L.
- 14. Mineral deposits of India, Mukerjee 1999: Allied publications.
- 15. Groundwater-C.F.Tolman
- 16. Groundwater Hydrology-D.K.Todd
- 17. Hydrology-S.N.Davis and R.J.M Dewiest
- 18. Groundwater studies-R.H.Brown and others
- 19. Groundwater Hydrology-Herman Bouver
- 20. Hydrology-C.W.Fetter
- 21. Environmental Geology Peter TP Flawn
- 22. Environmental geosciences Arthur H Strahler & Alan Strauler
- 23. Geology in Environmental planning- A.D. Howard & I.Ramson
- 24. Focus on Environmental Geology R Turk
- 25. Text book of Remote sensing and geographical Information system, 1st & 2nd Ed. By M. Anjireddy, BS Publications, Hyderabad.
- 26. Remote sensing principles and Interpertations, 3rd edition, Floyd. F. Sabins
- 27. Applications of Remote sensing and GIS by H T Basavarajappa, Et. Al
- 28. Mannual of colour aerial photography -Ed. Smith, J.T.Jr.
- 29. Manual of photogrammetry Ed: Morrie M.Thompson.
- 30. Manual of Remote sensing Ed: Robert G Reeves.
- 31. Theory of pattern recognition and modern forecasting V.Karpin and Wright Pattern.
- 32. Remote sensing in Geology Parry S. Siegal & Alan. R.Gillespie
- 33. Manual of photographic interpretation Ed: Colwell, R.N.
- 34. Principles of Remote Sensing Patel Singh; SP publication
- 35. Digital Remote Sensing Pritivish Nag M Kudrat ; Concept publication
- 36. Principles of GIS for land and resources assessment, Burrough, P.A., 1986, Oxford.
- 37. Introductory cartography, Campbell, 1984, Prentice Hall
- 38. Map data processing, Freeman and Pieroni, 1980, Academic Press.
- 39. An introduction to Geographical information systems: Ian Heywood et. al.
- 40. Research methodology: Methods & Techniques (Rev. Ed.), KOTHARI (C R), (2006) New Age International. New Delhi.
- 41. Avoiding plagiarism, self-plagiarism, and other questionable writing practices: ROIG (M). A guide to ethical writing, (2006).
- 42. Statistical methods for the information professional: VAUGHAN (L). A practical, painless approach to understanding, using and interpreting statistics (Ed. 2), (2004) Information Today, Medord.
- 43. Statistical methods and calculation skills (Ed. 3), WILLEMESE (I). (2009) Juta. Cape Town.
- 44. Web services research for emerging applications: Discoveries and Trends, ZHANG (LIANG-JIE). (2010) Information Science Reference, Hiershe
- 45. Basic research methods, CONNAWAY (L S) & POWELL (R R). (2010) Libraries unlimited. California.
- 46. Research methodology, GLOOTENBERG (A). (2013) Uxbridge: Koros.
- 47. Design and Analysis of Experiments Montgomary, Douglas C. (2007) 5/e, (Wiley India).
- 48. Applied Statistics & probability for Engineers Montgomary, Douglas C. & Runger, George C. (2007) 3/e, (Wiley India).

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