

**BHARATI VIDYAPEETH**  
**(DEEMED TO BE UNIVERSITY), PUNE, INDIA**  
**PhD Entrance Test – 2023**  
**SECTION-II: Civil Engineering - 50 Marks**

| <b>Topics covered</b> |  |
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| <b>UNIT-I</b>         | <p><b>Hydraulics Engineering :</b><br/> <b>Hydraulics:</b> Types of fluid flows, Laminar and Turbulent fluid flow, Continuity, Momentum and Energy equations and their applications; Flow measurement in channels, Flow in pipes, Pipe networks.<br/> <b>Hydrology:</b> Hydrologic cycle, Rainfall, Evaporation, Infiltration, Unit Hydrographs; Irrigation, Duty, Delta, Crop water requirements; Gravity and Earth dams.</p>   |
| <b>UNIT-II</b>        | <p><b>Structural Engineering:</b><br/> <b>Concrete:</b> Concrete making materials and its properties; Mix design.<br/> <b>Structural Mechanics:</b> Analysis of flexure, Torsion, Shear, Compression and Tension; Shear force and Bending moment diagram, combined and direct bending stresses.<br/> <b>Concrete Structures:</b> Working stress and Limit state design concepts.<br/> <b>Steel Structures:</b> Plastic analysis and Limit state design concepts.</p>   |
| <b>UNIT-III</b>       | <p><b>Environmental Engineering:</b><br/> <b>Water and Waste Water:</b> Water standards, Surface water treatment, Distribution of water; Sewage and Sewerage treatment; Primary, secondary and tertiary treatment of waste water, characteristics of wastewater; Effluent discharge standards.<br/> <b>Air Pollution:</b> Types of pollutants, their sources and impacts, air pollution meteorology, air pollution control, air quality standards and limits.<br/> <b>Municipal Solid Waste Management:</b> Characteristics, generation, collection and transportation of solid wastes, engineered systems for solid waste management (reuse/ recycle, energy recovery, treatment and disposal).</p> |
| <b>UNIT-IV</b>        | <p><b>Geotechnical Engineering :</b><br/> <b>Geotechnical:</b> Index properties of soil, soil structure, Permeability, Seepage analysis, Compaction and Consolidation and shear strength.<br/> <b>Foundation:</b> Site explorations &amp; investigations, Methods of soil exploration, Terzaghi's bearing capacity analysis, Pile foundations, Pile group and its efficiency.</p>  |
| <b>UNIT-V</b>         | <p><b>Surveying, Remote Sensing and Geographical Information System</b><br/> <b>Surveying:</b> Principles of surveying.<br/> <b>Remote Sensing:</b> Definition of RS, Benefits of RS over conventional method of surveying, Components of RS system.<br/> <b>Geographical Information System:</b> Fundamentals and components of GIS, Application of RS and GIS in Civil engineering.</p>  |

**Text/References Books:**

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| 1. | Fluid Mechanics, Frank M. White, McGraw Hill publications                          |
| 2. | Open Channel Flow, Hanif Chowdhary, Springer publications                          |
| 3. | Mechanics of Solids, S. Crandall, N. Dahl and T. Lardner, McGraw-Hill publications |
| 4. | Structural Analysis, Hibbeler R. C., Prentice Hall publications                    |
| 5. | Wastewater Treatment and Reuse, Metcalf and Eddy, McGraw Hill publications         |
| 6. | Foundation Analysis and Design, Bowles JE(1996), McGraw Hill publications          |
| 7. | Advanced Soil Mechanics, Das. B. M(1997), Taylor and Francis publications          |
| 8. | Basics of Remote Sensing and GIS, Dr. S Kumar, Laxmi publications                  |

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