QPC: R262M004 AR 24 Reg. No | | | | | | | | | | |

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET UNIVERSITY)

Ph.D. (Second Semester-Summer) Examinations, April – 2026

23PPECV2012 – Water Resources Systems Planning & Management

(Civil Engineering)

Time: 3 hrs Maximum: 70 Marks

The figures in the right hand margin indicate marks.

	Answer *ANY FIVE* Questions. (14 x 5 = 70 Marks)	**Marks**
1.a.	Explain the principles of engineering economy and their relevance in water resources project evaluation.	7
b.	Explain the time value of money concept with suitable numerical illustrations.	7
2.a.	Formulate a Linear Programming (LP) model for optimal allocation of water resources and explain the assumptions involved.	7
b.	Explain the Simplex Method in detail with a flow chart and numerical example.	7
3.a.	Explain Dual Programming and state its economic interpretation in water allocation problems.	7
b.	Describe different discounting techniques and compare economic and financial evaluation methods.	7
4.a.	Describe the functional and hydraulic design considerations of reservoirs.	7
b.	Explain the concept of conjunctive use of surface and groundwater and its advantages.	7
5.a.	Explain different methods of irrigation scheduling and crop water requirement estimation.	7
b.	Explain the concept of Simulation and Multi-objective Optimization in water resources systems.	7
6.a.	Describe the planning and design steps involved in an irrigation system.	7
b.	Explain the fundamentals of water quality modeling.	7
7.a	Explain the theory and application of river water quality models.	7
b.	Discuss point and non-point source pollution and their management.	7
8.a.	Discuss the role of environmental impact assessment (EIA) in water resources projects.	7
b.	Discuss groundwater regulation laws and their enforcement challenges.	7

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