



ANDHRA UNIVERSITY

TRANS-DISCIPLINARY RESEARCH HUB

ENVIRONMENTAL ENGINEERING AND MANAGEMENT

Water Treatment: Principles of Water Treatment: sedimentation - coagulation- air flotation and dissolved air flotation - theory of filtration – filter kinetics - disinfection – softening - principles of aeration - theories of adsorption –membrane processes - reverse osmosis practical uses - water conditioning

Wastewater Management: Wastewater characteristics - primary treatment: principles and designs - operation and maintenance - Secondary treatment: aerobic, anaerobic processes, principles and design of activated sludge process, trickling filters, rotating biological contactors, UASB, IFAC, MBR- removal of nutrients.

Solid waste Management: Types and sources of solid wastes - waste characteristics– source reduction of wastes – recycling and reuse -handling and segregation of wastes at source – storage and collection of municipal solid wastes – analysis of collection systems – Transfer stations – waste processing: biological and chemical conversion technologies- Energy recovery – disposal in landfills- leachate and landfill gas management

Water quality modeling: Modelling and monitoring, evolution of water quality models, types of water quality models, Oxygen sag curve - Streeter Phelps formulations - transformation and transport processes, Oxygen transfer, Turbulent mixing, Non-Point Source Pollution, Modelling approaches for modeling Non-point Sources.

Air Pollution: Sources, classification and effects of air pollutants on plants, animals, human health – automobile pollution- atmospheric transport of pollutant – dispersion and diffusion of air pollutants– air sampling and analysis – air pollution control and management

Text and Reference Books:

1. Environmental Engineering – Howard S. Peavy, Donald R. Rowe, Teorge George Tchobanoglus – Mc-Graw-Hill Book Company, New Delhi, 1985.
2. Bharucha, Erach (2004). Textbook for Environmental Studies for Undergraduate Courses of all Branches of Higher Education, University Grants Commission, New Delhi
3. Basu, M., Xavier, S. (2016). Fundamentals of Environmental Studies, Cambridge University Press, India
4. Masters, G. M., & Ela, W. P. (1991). Introduction to environmental engineering and science. Englewood Cliffs, NJ: Prentice Hall.
5. Wastewater Engineering Treatment and Reuse by Metcalf & Eddy, Tata McGraw-Hill 5th edition.
6. Fundamentals of Air Pollution Engineering by Richard C. Flagan John H. Seinfeld California Institute of Technology, PRENTICE HALL Englewood Cliffs, New Jersey
7. Air Pollution by M.N.Rao & H.V.N.Rao
8. Integrated Solid Waste Management, George Tchobanoglus and Frank Kreith, McGraw Hill Publication
9. Hazardous Waste Management, Charles A. Wentz; McGraw Hill Publication
10. Chapra, S.C. Surface Water-Quality Modelling, McGraw-Hill, 2008.



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MODEL QUESTION PAPER

ENVIRONMENTAL ENGINEERING AND MANAGEMENT

Answer any 5 questions

Each question carry equal marks

1. a) What is flocculent particle settling? Describe the settling column analysis used for the analysis of sedimentation process
- b) Explain the principle mechanisms and phenomena contributing to the removal of material within a granular medium depth filter.
2. a) What is membrane filtration? Explain the reverse osmosis process used for separation of dissolved solids in water.
- b) How the dosage of Cl_2 for a given percentage of kill of pathogens will be estimated at different pH values of water to be treated.
3. a) What is activated sludge used in activated sludge process? Explain the activated sludge process with a schematic diagram showing the elements of a conventional activated sludge process used in secondary treatment of wastewater.
- b) What are the elements of up flow anaerobic sludge blanket (UASB)? Describe the working of an UASB along with a schematic diagram of it.
4. a) Explain the process of removal of organic nitrogen from the wastewater as part of nutrient removal from wastewater.
- b) Explain the chemical characteristics of solid wastes along with their importance in the solid waste management
5. a) What are the important factors to be considered in the collection of solid waste? Discuss the analysis of collection system for hauled container systems in collection of solid waste
- b) Describe briefly about the basic fundamental processing techniques involved in solid waste management
6. a) What you mean by oxygen sag curve? Explain the Streeter-Phelps equations for modeling the dissolved oxygen sag curve in a stream

b) Define the advection and dispersion in transport of the solute in streams. What will be the fate of pollutants in lakes if wastewater is disposed off into it? Explain the pollutant diffusion and dispersion mechanism in lakes

7. a) What is model in water quality modeling? Discuss the basic principles or concepts of modeling.

b) What is the effective stack height and inversion of atmosphere? Describe with sketches how different atmospheric conditions give rise to different kinds of plumes.

8. a) What is dispersion of pollutants in ambient air? How the ground level concentration of the emissions from a stack will be computed?

b) List the methods of control of gaseous pollutants. Explain the principle and the working of the electro static precipitator for the control of air pollution along with the limitations or disadvantages in adopting it.
