AMSV02 WATER & WASTE WATER ENGINEERING

UNIT-1 WATER SUPPLY ENGINEERING

Importance and Necessity of Water Supply Schemes, Water Treatment, Importance and Reliability Of Water Works, Essentials Of Water Supply Engineering, Duties Of Water Works Engineers, Historical

UNIT-2 QUANTITY OF WATER

General, Types Of Demands, Domestic Water Demand, Commercial And Industrial Demand, Fire Demand, Demands For Public Use, Compensate Losses Demand, Per Capita Demand, Design Period, Forecasting Population, Arithmetical Increase Method, Geometrical Increase Method, Incremental Increase Method, Decrease Rate Of Growth Method Or Decreasing Rate Method, Simple Graphical Method, Comparative Graphical Method, The Master Plan Method Or Zoning Method, Logistic Curve Method, The Apportionment Method, Fluctuation In Demand Of Water, Factors Affecting The Water Demand

UNIT-3 COLLECTION & CONVEYANCE

Intakes, Design Of Intakes, Types Of Intakes, Lake Intakes, River Intake, Reservoir Intake, Canal Intake, Conveyance Of Water, Open Channels, Aqueducts, Tunnels, Flumes, Pipes, Cast-Iron Pipes, Wrought Iron Pipes, Steel Pipes, Concrete Pipes, Cement-Lined Cast-Iron Pipe, Asbestos Cement Pipe, Copper And Lead Pipes, Wooden Pipes, Plastic Pipes, Vitrified Clay Pipes, Pipe-Joints, Spigot And Socket Joint, Expansion Joint, Flanged Joint, Mechanical Joints, Flexible Joint, Crewed Joint, Collar Joint, Joint For A.C Pipes, Laying Of Water Supply Pipes, Specifications For Laying And Jointing Of Pipes, Hydrostatic Test, Disinfection Of Pipe Lines Before Use

UNIT-4 WATER TREATMENT PROCESSES

General, Standards For Quality Of Treated Water, Objects Of Treatment, Considerations For Public Water Supply, Location Of Treatment Plants, Treatment Processes, Layout Of Treatment Plant, Laboratory

UNIT-5 DISTRIBUTION SYSTEM

General, distribution system, gravity system, pumping system, dual system, layout of distribution system, dead end or tree system, grid-iron system, circular or ring system, radial system, methods of supplying water, pressure in the distribution system, distribution reservoirs, capacity of the reservoirs, determination of storage capacity, types of reservoirs, earth reservoirs, masonry and r.c.c. Reservoirs, elevated reservoirs, stand pipes, elevated tanks, accessories of reservoirs

UNIT-6 SANITARY ENGINEERING

General, Definitions of Some Common Terms, Used In Sanitary Engineering, Sanitary Works, Aims and Objects of Sewage-Disposal

UNIT-7 SYSTEMS OF SANITATION

General, Methods Of Collection, Conservancy System, Merits And Demerits Of Conservancy Systems, Merits And Demerits Of Water Carriage System, Sewerage System, Merits And Demerits Of Separate System, Merits And Demerits Of Combined System, Comparison Of Separate And Combined Systems, Merits And Demerits Of Partially Separate System, Patterns Of Collection Systems

UNIT-8 QUANTITY OF SANITARY SEWAGE

General, Sources Of Sanitary Sewage, Factors Affecting Sanitary Sewage, Additions Due To Infiltration, Subtractions Allowance, Rate Of Water Supply, Population, Type Of Area Served, Effect Of Growth Of Population, Determination Of Quantity Of Sanitary Sewage, Variation In The Quantity Of Sewage, Seasonal And Daily Variation, Peak Rates Of Flow, Minimum Flow

UNIT-9 DRAINS AND SEWERS

Open Drains, Drain Sections, Classification Of Drains, Sewer, Sewer Sections, Sewer Materials, Brick Sewers, Vitrified Clays Or Stoneware Pipes, Cement Concrete Pipes, Asbestos Cement Pipes, Cast Iron Pipes, Steel Pipes, Plastic Pipes, Miscellaneous Materials Used For Sewer Construction, Sewer Joints, Bandage Joint, Spigot And Socket Joint, Collar Joint, Flush-Joint, Filled And Poured Type Joints, Method Of Making Poured-Joints With Sulphur And Sand, Method Of Making A Filled Joint, Other Types Of Joints, Corrosion Prevention In Sewers, Protective Barriers, Modification Of Materials, Other Preventive Measures

UNIT-10 SEWER APPURTENANCES

General, Manholes, Drop Manholes, Lamp-Holes, Street Inlets, Flushing Tanks, Catch Basins Or Pits, Sand, Grease And Oil Traps, Inverted Siphon, Storm Water Relief Works, Ventilation Of Sewers, Design Of Overflows And Regulators, Design Of Inverted Syphon, Float Actuated Gates And Valves, Flap Gates And Flood Gates, Measuring Devices.

UNIT-11 CHARACTERISTICS AND EXAMINATION OF SEWAGE

General, characteristics of sewage, physical characteristics, chemical characteristics, biological characteristics, decomposition of sewage, examination of sewage, sampling of sewage, sampling of sewage, physical examination, chemical examination, solids, procedure of determining total and volatile solids, dissolved oxygen determination, biochemical oxygen demand (b.o.d.), b.o.d. Rates, chemical oxygen demand (c.o.d), stability and relative stability, chlorides and sulphides, method for determination of chlorides, chlorine demand, nitrogen, ph.- value, grease, oil and fat, biological tests.

UNIT-12 SEWAGE TREATMENT PROCESSES

General, Object of Treatment, Degree of Treatment, Period of Design, Effluent Disposal and Utilization, Types of Treatments, Location of Treatment Plants, Treatment Processes, Sewage Treatment Plants, Layout of Treatment Plants, Points To Be Considered In Design, Laboratory.

UNIT-13 SCREENING AND SKIMMING

General, Purpose Of Screening, Types Of Screens, Bar-Screens, Fine Screens, Communities, Other Types Of Screens, Design Factors, Disposal Of Screenings, Removal Of Oil, Grease Etc., Floatation, Skimming Tanks, Disposal Of Skimming's

UNIT-14 SEDIMENTATION

General, Characteristics Of Settle able Solids, Theory Of Sewage Sedimentation, Classification Of Sedimentation Tanks, Design Of Sedimentation Tanks, Standard Design Loading, Detention Period, Settling Efficiency Of Particles, Sedimentation Tanks, Sludge Removal, Method Of Obtaining Uniform Flow In Sedimentation Tanks, Grit Chambers, design Of Grit Chambers, Disposal Of Grit, Detritus Tanks

UNIT-15 BIOLOGICAL TREATMENT

General, Principle Of Biological Treatment, Classification Of Sewage Filters, Intermittent Sand Filters, Contact Beds, Trickling Filters, Types Of Trickling Filters, Construction Features Of Trickling Filters, Trickling Filter Operation And Loading, High Rate Filters, Design Of Trickling Filters, Galler And Goat's Equation, Recirculation, Recirculation Factor, Bio filters, Humus Tanks, Comparison Of Low Rate And High Rate Trickling Filters, Filter Site Troubles And Remedies

UNIT-16 QUALITY OF WATER

Wholesome Water, Impurities In Water, Examination Of Water, Collection Of Water Samples, Water Analysis, Physical Tests, Chemical Tests, Living Organism In Water, Biological Tests, Standards Of Water Quality

UNIT-17 CHEMICAL PRECIPITATOIN

General, Situations When Used, Chemical Used, Handling And Storing Of Coagulants, Dosage Of Coagulants, Determination Of Optimum Coagulant Dose, Feeding Devices, Mixing And Flocculation, Sedimentation, Clarifiers, Efficiency Of Chemical Precipitation

Reference Books

1. S.K.Banerjee, Environmental Chemistry, 2nd edition. Prentice Hall of India (1999), New Delhi.
2. A.Mackenzie, A.S. Ball & S.R. Virde- Instant notes in Ecology, Viva Books Pvt. Ltd. (1999) New Delhi.