



WATER SUPPLY AND SANITARY ENGINEERING

[INCLUDING ENVIRONMENTAL ENGINEERING]

By
Rangwala

Edition : 29th Edition : 2016
ISBN : 9789385039201
Size : 170 mm × 235 mm
Binding : Paperback
Pages : 784 + 16 = 800



₹ 350.00 **BUY**

ABOUT THE BOOK

The entire subject of *Water Supply and Sanitary Engineering including Environmental Engineering* also known as *Public Health Engineering* is divided in to three parts:

- (1) Water Supply Engineering
- (2) Sanitary Engineering
- (3) Environmental Engineering.

The **first part** deals with the fundamentals of Water Supply Engineering. It discusses the whole science of water supply engineering relating to the quantity and quality of water, sources of water supply, pumps for water supply projects, treatment of water, coagulation of water, filtration of water, disinfection of water, water softening, collection and conveyance of water, distribution system of water, pipe appurtenances, water pollution control, water management, radioactivity and water supplies, etc.

The **second part** of the book deals with the fundamentals of Sanitary Engineering. It discusses the topics such as collection and conveyance of refuse, waste water, quantity and quality of sewage, construction and design of sewers, sewer appurtenances, sewage pumps, house drainage, natural methods of sewage disposal, primary treatment of sewage, filtration of sewage (secondary treatment), activated sludge process, sludge treatment and disposal, miscellaneous methods of sewage treatment, miscellaneous topics of sanitary engineering, etc.

The **third part** deals with the fundamentals of Environmental Engineering. It discusses the topics such as environment, ecology and ecosystem, air pollution, noise pollution, natural resources and population, miscellaneous topics of environmental engineering and environmental legislation.

The **Appendix A** demonstrates the Typical Design of a Sewage Treatment Plant and **Appendix B** describes some of the Terminology of the subject.

The book in its 40 chapters and two appendices includes:

- * 278 Self explanatory and neat diagrams
- * 152 Illustrative problems
- * 68 Useful tables
- * 690 Questions at the end of chapters.

The book should prove to be extremely useful to the Civil Engineering and also Environmental Engineering students preparing for the Degree Examinations of all the Indian Universities, Diploma Examinations conducted by various Boards of Technical Education, Certificate Courses as well as for the A.M.I.E., U.P.S.C., G.A.T.E., I.E.S. and other similar competitive and professional examinations. It should also prove of interest to the practising professionals.

CONTENT

PART I : WATER SUPPLY ENGINEERING

- 1: INTRODUCTION
- 2: QUANTITY OF WATER
- 3: SOURCES OF WATER SUPPLY
- 4: PUMPS FOR WATER SUPPLY PROJECT
- 5: QUALITY OF WATER
- 6: TREATMENT OF WATER (SCREENS, PRE-SEDIMENTATION AND SEDIMENTATION TANKS)
- 7: COAGULATION OF WATER
- 8: FILTRATION OF WATER
- 9: DISINFECTION OF WATER
- 10: WATER SOFTENING
- 11: MISCELLANEOUS METHODS OF WATER TREATMENT
- 12: COLLECTION AND CONVEYANCE OF WATER
- 13: DISTRIBUTION SYSTEM OF WATER
- 14: PIPE APPURTENANCES
- 15: WATER POLLUTION CONTROL AND WATER MANAGEMENT
- 16: RADIOACTIVITY AND WATER SUPPLIES

PART II : SANITARY ENGINEERING

- 17: SANITARY ENGINEERING – AN INTRODUCTION
- 18: COLLECTION AND CONVEYANCE OF REFUSE (WASTE WATER)
- 19: WASTE WATER
- 20: QUANTITY OF SEWAGE
- 21: CONSTRUCTION OF SEWERS
- 22: DESIGN OF SEWERS
- 23: SEWER APPURTENANCES
- 24: SEWAGE PUMPS
- 25: HOUSE DRAINAGE
- 26: QUALITY OF SEWAGE
- 27: NATURAL METHODS OF SEWAGE DISPOSAL
- 28: PRIMARY TREATMENT OF SEWAGE
- 29: FILTRATION OF SEWAGE (SECONDARY TREATMENT)
- 30: ACTIVATED SLUDGE PROCESS
- 31: SLUDGE TREATMENT AND DISPOSAL
- 32: MISCELLANEOUS METHODS OF SEWAGE TREATMENT
- 33: MISCELLANEOUS TOPICS OF SANITARY ENGINEERING

PART III : ENVIRONMENTAL ENGINEERING

- 34: ENVIRONMENTAL
- 35: ECOLOGY AND ECOSYSTEM
- 36: AIR POLLUTION
- 37: NOISE POLLUTION
- 38: NATURAL RESOURCES AND POPULATION
- 39: MISCELLANEOUS TOPICS OF ENVIRONMENTAL ENGINEERING
- 40: ENVIRONMENTAL LEGISLATION
- APPENDIX A : TYPICAL DESIGN OF SEWAGE TREATMENT PLANT
- APPENDIX B : TERMINOLOGY
- BIBLIOGRAPHY
- INDEX

Checklist

WATER SUPPLY AND SANITARY ENGINEERING
DETAILED CONTENTS

PART I : WATER SUPPLY ENGINEERING

Chapter 1 INTRODUCTION

- 1-1. General
- 1-2. Need to protect water supplies
- 1-3. Water supply schemes
- 1-4. Project drawings
- 1-5. Report of water supply scheme/project
- 1-6. Importance of water supply project
- 1-7. Layout of water supply project

QUESTIONS 1

Chapter 2 QUANTITY OF WATER

- 2-1. Data to be collected
- 2-2. Rate of demand
- 2-3. Factors affecting rate of demand
- 2-4. Measurement of water
- 2-5. Variations in rate of demand
- 2-6. Effects of variations on design
- 2-7. Water requirements for buildings other than residences
- 2-8. Design period
- 2-9. Summary

QUESTIONS 2

Chapter 3 SOURCES OF WATER SUPPLY

- 3-1. General
- 3-2. Surface runoff
- 3-3. Precipitation
- 3-4. Measurement of rainfall
- 3-5. Rainfall
- 3-6. Choice of source of water supply scheme
- 3-7. Types of sources for water supply schemes
- 3-8. Surface sources for water supply schemes
- 3-9. Salient features of reservoir design
- 3-10. Underground sources for water supply schemes
- 3-11. Forms of underground sources
- 3-12. Classification of wells
- 3-13. Types of well construction
- 3-14. Yield of a well
- 3-15. Specific capacity of a well
- 3-16. Tests for yield of a well
- 3-17. Spacing of wells
- 3-18. Sanitary protection of wells
- 3-19. Summary
- 3-20. Typical problems

QUESTIONS 3

Chapter 4 PUMPS FOR WATER SUPPLY PROJECT

- 4-1. Necessity of pumps
- 4-2. Choice of type of pumps
- 4-3. Types of pumps
- 4-4. Power for pumps
- 4-5. Design of pumps
- 4-6. Rising main
- 4-7. Typical Problems

QUESTIONS 4

Chapter 5 QUALITY OF WATER

- 5-1. Meaning of pure water
- 5-2. Reasons for the analysis of water
- 5-3. Impurities in water
- 5-4. Analysis of water
- 5-5. Physical tests
- 5-6. Chemical tests
- 5-7. Bacteriological tests
- 5-8. Maintenance of purity of waters
- 5-9. Water-borne diseases
- 5-10. Suitability of water for trade purposes:
- 5-11. Water for swimming pools
- 5-12. Drinking water standards

QUESTIONS 5

Chapter 6 TREATMENT OF WATER (SCREENS, PRE-SEDIMENTATION AND SEDIMENTATION TANKS)

- 6-1. General
- 6-2. Screens
- 6-3. Pre-sedimentation
- 6-4. Sedimentation tanks
- 6-4-1. Purpose and location
- 6-4-2. Theory of sedimentation
- 6-4-3. Types of sedimentation tanks
- 6-4-4. Design aspects of continuous

QUESTIONS 6

Chapter 7 COAGULATION OF WATER

- 7-1. Purpose
- 7-2. Principle of coagulation
- 7-3. Flocculation
- 7-4. Usual coagulants
- 7-5. Feeding the coagulants
- 7-6. Mixing devices
- 7-7. Jar test

QUESTIONS 7

Chapter 8 FILTRATION OF WATER

- 8-1. General
- 8-2. Theory of filtration
- 8-3. Filter sand
- 8-4. Classification of filters
- 8-4-1. Slow sand filters
- 8-4-2. Gravity type rapid sand filters
- 8-4-3. Pressure type rapid sand filters
- 8-5. Comparison between slow sand filters and gravity type rapid sand filters
- 8-6. Double filtration

QUESTIONS 8

Chapter 9 DISINFECTION OF WATER

- 9-1. Necessity for disinfection of water
- 9-2. Theory of disinfection
- 9-3. Minor methods of disinfection
- 9-4. Uses of ULTRA VIOLET-UV system
- 9-5. Chlorination
- 9-6. Properties of chlorine
- 9-7. Action of chlorine
- 9-8. Application of chlorine
- 9-9. Forms of chlorination
- 9-10. Tests for chlorine
- 9-11. Chlorine dioxide

Questions 9

Chapter 10 WATER SOFTENING

- 10-1. Purpose of water softening
- 10-2. Types of hardness
- 10-3. Removal of temporary hardness
- 10-4. Removal of permanent hardness
- 10-5. Lime-soda process
- 10-6. Zeolite process
- 10-7. Demineralisation process
- 10-8. Reverse osmosis

QUESTIONS 10

Chapter 11 MISCELLANEOUS METHODS OF WATER TREATMENT

- 11-1. General
- 11-2. Colour, odour and taste removal
- 11-3. Iron and manganese removal
- 11-4. Fluoridation

QUESTIONS 11

Chapter 12 COLLECTION AND CONVEYANCE OF WATER

- 12-1. Meaning
COLLECTION OF WATER
- 12-2. Intakes

WATER SUPPLY AND SANITARY ENGINEERING
DETAILED CONTENTS

- 12-3. Design of intakes
- 12-4. Design procedure for intakes
- 12-5. Types of intakes
- 12-6. Intake towers
- CONVEYANCE OF WATER
- 12-7. Conveyance of water
- 12-8. Pipes
- 12-9. Types of Pipes according to material used
- 12-10. Pipe corrosion
- 12-11. Effects of pipe corrosion
- 12-12. Theories of pipe corrosion
- 12-13. Prevention of pipe corrosion
- 12-14. Laying of water supply pipes
- 12-15. Hydrostatic testing of pipes
- QUESTIONS 12

Chapter 13 DISTRIBUTION SYSTEM OF WATER

- 13-1. General considerations
- 13-2. Methods of distribution of water
- 13-3. Service reservoirs
- 13-4. Systems of supply of water
- 13-5. Methods of layout of distribution pipes
- 13-6. Wastage of water
- 13-7. Water waste surveys
- 13-8. Permissible wastage of water
- 13-9. Preventive measures
- 13-10. Water waste tests
- 13-11. Maintenance of distribution system
- QUESTIONS 13

Chapter 14 PIPE APPURTENANCES

- 14-1. Necessity
- 14-2. Air valves
- 14-3. Bib cocks
- 14-4. Fire hydrants
- 14-5. Reflux valves
- 14-6. Relief valves
- 14-7. Sluice valves
- 14-8. Scour valves
- 14-9. Stop cocks
- 14-10. Water meters
- QUESTIONS 14

Chapter 15 WATER POLLUTION CONTROL AND WATER MANAGEMENT

- 15-1. Meaning of the term
- 15-2. Sources of water pollution
- 15-3. Types of water pollution
- 15-4. Preventive measures
- 15-5. Conclusion
- 15-6. Water management
- 15-7. Measures for re-shaping local water balance
- 15-8. Use and conservation of water resources
- QUESTIONS 15

Chapter 16 RADIOACTIVITY AND WATER SUPPLIES

- 16-1. Radioactivity
- 16-2. Effects of radiation
- 16-3. Radioactive sources
- 16-4. Disposal of radioactive wastes
- 16-5. Radioactivity of water
- 16-6. Measurement of radioactivity
- 16-7. Effect of treatments on water
- 16-8. Recommended methods
- 16-9. Conclusion
- QUESTIONS 16

PART II : SANITARY ENGINEERING

Chapter 17 SANITARY ENGINEERING – AN INTRODUCTION

- 17-1. General
- 17-2. Purpose of sanitation
- 17-3. Principles of sanitation
- 17-4. Sanitary projects

- 17-5. Sanitary project drawings
- 17-6. Report for sanitary project
- 17-7. Site for sewage treatment works
- 17-8. Design aspects for sewage treatment plant 298
- 17-9. Some definitions
- QUESTIONS 17

Chapter 18 COLLECTION AND CONVEYANCE OF REFUSE (WASTE WATER)

- 18-1. General
- 18-2. Methods of carrying refuse
- 18-3. Systems of sewerage
- 18-4. Favourable Conditions for sewerage
- 18-5. Patterns of refuse collection
- QUESTIONS 18

Chapter 19 WASTE WATER

- 19-1. General
- 19-2. Standards for disposal of waste water
- 19-3. Waste water treatment
- 19-4. Primary waste water treatment
- 19-5. Secondary waste water treatment
- 19-5-1. Biological treatment units
- 19-5-2. Secondary clarifier
- 19-5-3. Sludge digester
- 19-5-4. Sludge drying beds
- 19-6. Oxidation ponds
- 19-7. Tertiary waste water treatment
- 19-8. Disposal of waste water
- 19-9. Reuses of waste water
- QUESTIONS 19

Chapter 20 QUANTITY OF SEWAGE

- 20-1. General
- 20-2. Dry weather flow
- 20-3. Storm water
- QUESTIONS 20

Chapter 21 CONSTRUCTION OF SEWERS

- 21-1. General
- 21-2. Materials for sewers
- 21-3. Materials used for sewers
- 21-4. Shapes of sewers
- 21-5. Joints in sewers
- 21-6. Laying and testing of sewers
- 21-7. Ventilation of sewers
- 21-8. Methods of ventilation of sewers
- 21-9. Cleaning and maintenance of sewers
- 21-10. Surface drains
- QUESTIONS 21

Chapter 22 DESIGN OF SEWERS

- 22-1. General approach
- 22-2. Minimum and maximum velocities (Self-cleansing and non-scouring velocities)
- 22-3. Hydraulic formulas for design of sewers
- 22-4. Sizes of sewers
- 22-5. Time of concentration
- 22-6. Design procedure
- 22-7. Variation in flow and velocities
- 22-8. Typical Problems of design of sewers
- QUESTIONS 22

Chapter 23 SEWER APPURTENANCES

- 23-1. Meaning of the term
- 23-2. Catch basins or catch pits
- 23-3. Clean-outs
- 23-4. Drop manholes
- 23-5. Flushing tanks
- 23-6. Grease and oil traps
- 23-7. Inlets
- 23-8. Inverted siphons
- 23-9. Lampholes
- 23-10. Manholes
- 23-11. Storm water regulators
- QUESTIONS 23

WATER SUPPLY AND SANITARY ENGINEERING
DETAILED CONTENTS

Chapter 24 SEWAGE PUMPS

- 24-1. Necessity of pumps
 - 24-2. Pumping of sewage
 - 24-3. Pumping stations
 - 24-4. Requirements of a pumping station
 - 24-5. Types of sewage pumps
 - 24-6. Power for pumps
 - 24-7. Horse-power of pumps
- QUESTIONS 24

Chapter 25 HOUSE DRAINAGE

- 25-1. Meaning of the term
 - 25-2. Principles of house drainage
 - 25-3. Traps
 - 25-4. Some definitions
 - 25-5. Sanitary fittings
 - 25-6. Systems of plumbing
 - 25-7. Drainage plans of buildings
 - 25-8. Testing of drains and pipes
 - 25-9. Maintenance of house drainage system
- QUESTIONS 25

Chapter 26 QUALITY OF SEWAGE

- 26-1. General
 - 26-2. Properties of sewage
 - 26-2-1. Physical properties
 - 26-2-2. Chemical properties
 - 26-2-3. Biological properties
 - 26-3. Cycles of decomposition
 - 26-4. Analysis of sewage
 - 26-5. Physical tests
 - 26-6. Chemical tests
 - 26-6-1. Chlorine
 - 26-6-2. Fats, greases and oils
 - 26-6-3. Nitrogen
 - 26-6-4. Oxygen
 - 26-6-5. pH value
 - 26-6-6. Total solids
 - 26-7. Bacteriological tests
 - 26-8. Relative stability
 - 26-9. Population equivalent
- QUESTIONS 26

Chapter 27 NATURAL METHODS OF SEWAGE DISPOSAL

- 27-1. General
 - 27-2. Disposal by dilution
 - 27-3. Self-purification of natural waters
 - 27-4. Disposal by land treatment
 - 27-5. Sewage sickness
- QUESTIONS 27

Chapter 28 PRIMARY TREATMENT OF SEWAGE

- 28-1. General
 - 28-2. Screens
 - 28-3. Grit chambers
 - 28-4. Detritus tanks
 - 28-5. Skimming tanks
 - 28-6. Plain sedimentation tanks
 - 28-7. Primary clarifiers
 - 28-8. Secondary clarifiers
 - 28-9. Coagulation of sewage
- QUESTIONS 28

Chapter 29 FILTRATION OF SEWAGE (SECONDARY TREATMENT)

- 29-1. Secondary treatment
 - 29-2. Filters
 - 29-3. Contact beds
 - 29-4. Intermittent sand filters
 - 29-5. Trickling filters
 - 29-5-1. Standard rate trickling filters
 - 29-5-2. High rate or high capacity trickling filters
 - 29-6. Miscellaneous filters
- QUESTIONS 29

Chapter 30 ACTIVATED SLUDGE PROCESS

- 30-1. Meaning of the term
 - 30-2. Action of activated sludge
 - 30-3. Flow diagram
 - 30-4. Methods of aeration
 - 30-5. Diffused air aeration
 - 30-6. Mechanical aeration
 - 30-7. Combination of diffused air aeration and mechanical aeration
 - 30-8. Sludge bulking
 - 30-9. Accumulation of volatile suspended solids
 - 30-10. Sludge volume index
 - 30-11. Sludge density index
 - 30-12. Step aeration
 - 30-13. Tapered aeration
 - 30-14. Extended aeration
 - 30-15. Contact stabilization
 - 30-16. Complete mix process
 - 30-17. Oxidation ditch
 - 30-18. Advantages of activated sludge process
 - 30-19. Disadvantages of activated sludge process
 - 30-20. Activated sludge process versus trickling filters
- QUESTIONS 30

Chapter 31 SLUDGE TREATMENT AND DISPOSAL

- 31-1. Necessity
 - 31-2. Quantity of sludge
 - 31-3. Sludge treatment
 - 31-3-1. Sludge thickening
 - 31-3-2. Sludge digestion
 - 31-3-3. Sludge conditioning
 - 31-3-4. Sludge dewatering
 - 31-3-5. Sludge disposal
 - 31-4. Sludge gas
 - 31-5. Sludge digestion tanks
 - 31-6. Capacity of sludge digestion tank
 - 31-7. Standard rate digestion
 - 31-8. High rate digestion
 - 31-9. Two-stage digestion
- QUESTIONS 31

Chapter 32 MISCELLANEOUS METHODS OF SEWAGE TREATMENT

- 32-1. General
 - 32-2. Cesspools
 - 32-3. Chlorination of sewage
 - 32-4. Imhoff tanks
 - 32-5. Oxidation ponds
 - 32-6. Septic tanks
 - 32-7. Treatment of industrial wastes
 - 32-8. Wastes from fertiliser factories
- QUESTIONS 32

Chapter 33 MISCELLANEOUS TOPICS OF SANITARY ENGINEERING

- 33-1. General
 - 33-2. Bio-gas
 - 33-3. Elutriation
 - 33-4. Garbage collection and removal
 - 33-5. Garbage disposal
 - 33-6. Micro-organisms
 - 33-7. Types of metabolism
 - 33-8. Divisions of micro-organisms
 - 33-9. Night soil disposal without water carriage
 - 33-10. Rural sanitation
 - 33-11. Rotating biocontactor (RBC)
- QUESTIONS 33

WATER SUPPLY AND SANITARY ENGINEERING
DETAILED CONTENTS

PART III : ENVIRONMENTAL ENGINEERING

Chapter 34 ENVIRONMENT

- 34-1. Definition
 - 34-2. Components of environment
 - 34-3. Man-environment relationship
 - 34-4. Impact of technology on the environment
 - 34-5. Environmental degradation
 - 34-6. Principle of payment by polluter
 - 34-7. Biological amplification
 - 34-8. Environmental health hazard
 - 34-9. Incipient lethal level
 - 34-10. Monitoring programme
 - 34-11. World environment day (WED)
 - 34-12. environmental impact assessment (EIA)
 - 34-13. Sustainable development
 - 34-14. Environmental ethics
 - 34-15. Code of ethics
 - 34-16. Some terms
- QUESTIONS 34

Chapter 35 ECOLOGY AND ECOSYSTEM

- 35-1. Introduction
 - 35-2. Ecosystem
 - 35-3. Classification of ecosystem
 - 35-3-1. Artificial ecosystems
 - 35-3-2. Natural ecosystems
 - 35-4. Aspects of ecosystem
 - 35-5. Components of ecosystem
 - 35-6. Energy flow in ecosystem
 - 35-7. Food chains and food webs
 - 35-8. Ecological or eltonian pyramid
 - 35-9. Endangered species
 - 35-10. Biogeochemical cycles
 - 35-11. Acclimatization
- QUESTIONS 35

Chapter 36 AIR POLLUTION

- 36-1. General
 - 36-2. Air pollution
 - 36-3. Importance of air pollution
 - 36-4. Composition of air
 - 36-5. Necessity of ventilation
 - 36-6. Quantity of air required
 - 36-7. Aerosols
 - 36-8. Smoke and fog
 - 36-9. Dust, gas and vapour
 - 36-10. Coning and fanning
 - 36-11. Acid soot
 - 36-12. Downwash
 - 36-13. Green-house effect
 - 36-14. Ozone layer
 - 36-15. Consequences of green-house effect and ozone layer
 - 36-16. Sources of air pollution
 - 36-17. Air pollutants
 - 36-18. Urban air pollution
 - 36-19. Self-cleansing of atmosphere
 - 36-20. Effects of air pollution
 - 36-21. Acid rains
 - 36-22. Control of air pollution
 - 36-23. Some tragic incidences
- QUESTIONS 36

Chapter 37 NOISE POLLUTION

- 37-1. General
 - 37-2. Effects of noise
 - 37-3. Threshold of hearing
 - 37-4. Measurement of sound
 - 37-5. Acoustic reflex
 - 37-6. Acceptable noise levels
 - 37-7. Types of noises
 - 37-8. Control of noise pollution
 - 37-9. Air pollution and noise pollution
- QUESTIONS 37

Chapter 38 NATURAL RESOURCES AND POPULATION

- 38-1. Natural resources
 - 38-2. Exploitation of natural resources
 - 38-3. Major natural resources
 - 38-3-1. Agricultural resources
 - 38-3-2. Animal resources
 - 38-3-3. Food resources
 - 38-3-4. Forest resources
 - 38-3-5. Land resources
 - 38-3-6. Marine resources
 - 38-3-7. Mineral resources
 - 38-3-8. Soil resources
 - 38-3-9. Wild life resources
 - 38-3-10. Water resources
 - 38-3-11. Energy resources
 - 38-4. Renewable or non-conventional energy resources
 - 38-4-1. Sun energy
 - 38-4-2. Wind energy
 - 38-4-3. Bio-energy
 - 38-4-4. Geothermal energy
 - 38-4-5. Oceanic energy
 - 38-4-6. Tidal energy
 - 38-4-7. Chemical energy
 - 38-4-8. Hydrogen energy
 - 38-4-9. Hydro energy
 - 38-5. Conservation of natural resources
 - 38-6. Population
 - 38-7. Theories of population
 - 38-8. Methods of population forecasts
 - 38-9. Factors affecting estimated population
 - 38-10. Population explosion
 - 38-11. Population growth rate
- QUESTIONS 38

Chapter 39 MISCELLANEOUS TOPICS OF ENVIRONMENTAL ENGINEERING

- 39-1. General
 - 39-2. Bioremediation
 - 39-3. Biodiversity
 - 39-4. Gross domestic product and quality of life
 - 39-5. Cadmium poisoning
 - 39-6. Mercury poisoning
 - 39-7. Trace metal poisoning
 - 39-8. Eutrophication (water pollution)
 - 39-9. Land pollution
 - 39-10. Oil pollution
 - 39-11. Thermal pollution and cooling tower
 - 39-12. Half-life (radioactive pollution)
 - 39-13. Fertilizers
 - 39-14. Pesticides
 - 39-15. Tragedy of commons
- QUESTIONS 39

Chapter 40 ENVIRONMENTAL LEGISLATION

- 40-1. General
 - 40-2. Prevalent environmental acts
 - 40-3. Pollution Control Policy
 - 40-4. Forests and Environment Department
 - 40-5. Gujarat Pollution Control Board (GPCB)
 - 40-6. Gujarat Environmental Management Institute (GEMI)
 - 40-7. Gujarat Ecology Commission (GEC)
 - 40-8. Gujarat Institute of Desert Ecology (GUIDE)
- QUESTIONS 40

Appendix A TYPICAL DESIGN OF A SEWAGE TREATMENT PLANT

Appendix B TERMINOLOGY

BIBLIOGRAPHY

Index