

# WATER SUPPLY & WASTE WATER

## ENGINEERING

### SECTION A

#### WATER SUPPLY

##### **1) INTRODUCTION TO WATER SUPPLY , QUANTITY AND QUALITY OF WATER :-**

1. Explain the necessity of water supply scheme. ( 5 )
2. Enumerate the salient features of water supply scheme. ( 5 )
3. Explain the need to protect water. ( 5 )
4. Give a flow chart of water supply scheme. ( 5 )
5. State the duties of water works engineers. ( 5 )
6. What are the various types of water demand? ( 5 )
7. What do you mean by per capita demand and fluctuation of demand? ( 5 )
8. State the factors that affect the rate of water demand. ( 5 )
9. State the methods of population forecast. ( 10 )

##### **2) SOURCES AND CONVEYANCE OF WATER :-**

1. State the various surface sources of water. ( 10 )
2. State the various under grounds of water. ( 10 )
3. What are the various methods of sinking an open well? Describe one with sketch. (5)
4. What are the various methods of sinking the tube well? Describe one with sketch.(5)
5. How yield of an open well be determined? Describe the recuperation test for finding yield of open well. ( 5 )
6. Deduce the expression for finding the yield from an unconfined aquifer. ( 5 )
7. Describe the methods of development of well. ( 5 )
8. What is shrouding? How is shrouding done? ( 5 )
9. State the method of maintenance of tube well. ( 5 )
- 10.What step should be taken to avoid the failure of tube well? ( 5 )
- 11.Enumerate the points to be considered while selecting the intake points. ( 5 )
- 12.Describe the different types of intakes with neat sketch. ( 10 )
- 13.Name the different types of pipes used in water supply schemes. Briefly describe their characteristics. ( 5 )
- 14.Describe with sketches, the different types of pipes joints. ( 10 )
- 15.What pipe corrosion? What are the effects of corrosion? ( 5 )
- 16.State how corrosion can be prevented. ( 5 )

### **3) TREATEMENT OF WATER: -**

1. State the necessity of water treatment. ( 10 )
2. Give a flow diagram of a treatment plant. ( 10 )
3. State the function of each unit. ( 5 )
4. Write the notes from the theory and purpose of sedimentation. ( 5 )
5. Describe a rectangular type of sedimentation tank with sketch. ( 5 )
6. Enumerate the theory of coagulation and flocculation. ( 5 )
7. Describe a coagulation tank with sketch. ( 5 )
8. What are then common coagulants used in a treatment plants? Describe the functions of the coagulants. ( 5 )
9. Describe the feeding devices of coagulants. ( 5 )
10. Describe the mixing devices of the coagulants. ( 5 )
11. Explain the theory of filtration. ( 5 )
12. Describe, with a sketch, the construction, working, cleaning, rate of filtration and efficacy of a slow sand filter. ( 5 )
13. Describe, with sketch, the construction , working, cleaning , rate of filtration and efficacy of a rapid sand filter. ( 5 )
14. Enumerate the troubles that occur during the operation of rapid sand filter. ( 5 )
15. Describe the sketch the working and cleaning of pressure filter . ( 5 )
16. Give a comparative details between slow sand filter and rapid sand filter. ( 5 )
17. Distinguish between the following: ( 5 )
18. Central drain and lateral drain
19. Loss of head and negative head
20. Gravity filter and pressure filter
21. Why is disinfection necessary ? ( 5 )
22. What are the methods of disinfection. ( 5 )
23. Write short notes on : ( 10 )
  - a) Ozone treatment
  - b) Ultra violet ray treatment
  - c) Boiling treatment
  - d) Silver treatment
  - e) Iodine and bromine treatment
  - f) Excess lime treatment
  - g) Potassium permanganate treatment
  - h) Chlorination
24. Explain the action of chlorine , when mixed with water . ( 5 )
25. How is chlorine applied in water ? ( 5 )
26. Explain the different forms of chlorination . ( 5 )
27. How is orthotolidin test carried out ? ( 5 )
28. State the procedure of starch iodide test . ( 5 )
29. Distinguish between the following : ( 5 )
  - a) Pre-chlorination and post- chlorination
  - b) Super-chlorination and DE chlorination
  - c) Plain – chlorination and break – point chlorination .
30. What is hardness of water ? ( 5 )

31. What is the necessity of water softening ? ( 5 )
32. What are the effects of hardness? ( 5 )
33. What do you mean by temporary hardness and permanent hardness? ( 5 )
34. How is temporary hardness removed? ( 5 )
35. Explain in detailed the lime- soda process for the removal of permanent hardness in water . ( 5 )
36. State the advantages and disadvantages of lime soda process. ( 5 )
37. Describe in detail the zeolite process for the removal of permanent hardness from water. ( 5 )
38. State the advantages and disadvantages of zeolite process . ( 5 )
39. Explain the demineralization process for the removal of permanent hardness in water . ( 5 )
40. Distinguish between the following : ( 5 )
  - a) Temporary hardness and permanent hardness
  - b) Permutit and green sand
  - c) Zeolite process and demineralisation process.

#### **4) DISTRIBUTION SYSTEM AND APPURTENANCE IN DISTRIBUTION SYASTEM :-**

1. Describe, with sketches, the methods of distribution system. ( 5 )
2. Describe the systems of water supply with their merits and demerits. ( 5 )
3. Describe, with sketches, the layout of distribution system. ( 5 )
4. What are the causes of wastage of water? ( 5 )
5. How can leakage of water be detected and prevented? ( 5 )
6. Why is it necessary to remove the air from the water pipe? Describe a suitable device to remove the air from the pipe time. ( 5 )
7. What is the function of fire -hydrant? Describe he fire-hydrant with a neat sketch. ( 10 )
8. How is the water consumed by a consumer measured? Describe the device meant for it. ( 5 )
9. Write short notes on the following with neat sketch: ( 5 )
  - a) Air valve
  - b) Reflux valve
  - c) Relief valve
  - d) Sluice valve
- 10 . Distinguish between the following: ( 5 )
  - a) Stop cock and bib cock
  - b) Sluice valve and scour valve

- c) Reflux valve and relief valve
- d) Flush hydrant and post hydrant

**5) W/S PLIMBING IN BUILDING : -**

1. What are the different types of methods of connection from water mains to building supply? ( 5 )
2. What is plumbing system in building? ( 5 )

## **SECTION B**

# **WASTE WATER ENGINEERING**

**1) INTRODUCTION: -**

1. State the features of the sanitary works . ( 10 )
2. Define the following: ( 5 )
  - a) Refuse
  - b) Sewage
  - c) Sullage
  - d) Dry weather flow
  - e) Wet weather flow
3. Distinguish between the following: ( 10 )
  - a) Sewage and sullage
  - b) Dry weather flow & Wet weather flow
  - c) Sanitary sewage and industrial sewage
  - d) Raw sewage and septic sewage
  - e) Lateral sewer and intercepting sewer

**2) QUANTITY OF QUALITY SEWAGE : -**

1. What are the factors which are considered in determining the quantity of dry weather flow? ( 5 )
2. Describe the procedure of determining the quantity of dry weather flow. ( 5 )
3. Explain the rational method of determining storm water. ( 5 )
4. State some empirical formulae for calculating the intensity of rainfall. ( 5 )
5. State some empirical formulae which are adopted for calculating the quantity of storm water. ( 5 )
6. How is impermeability factor determined? ( 5 )

**3) Sewerage system : -**

1. What are the components of the sewers system? ( 5 )
2. Which pipe is used in a sewerage system? ( 5 )
3. What are the 3 types of sewerage system? ( 5 )

#### **4) Sewer appurtenance and swage disposal :-**

1. Describe the components parts of a manhole. ( 5 )
2. What is drop manhole? What are its objects ?How it is constructed? ( 5 )
3. What is a flushing tank? Describe with a sketch. ( 5 )
4. Describe a grease and oil tarp with sketch. ( 5 )
5. What is a inverted siphon? Describe its function with sketch. ( 5 )
6. What is lamp hole? Mention its objects. Describe a lamp hole with sketch. ( 5 )
7. Mention the objects of storm regulator. Name the types of storm regulators. ( 5 )
8. Explain the working of leaping weir with a neat sketch. ( 5 )
9. Describe an overflow weir with sketch. ( 5 )
10. Explain the working of siphon spillway with sketch. ( 5 )
11. Write short notes on: ( 10 )
  - a) Street inlets
  - b) Automatic flushing tank
  - c) Inverted siphon
  - d) Leaping weir
  - e) Drop manhole
  - f) Grease and oil trap

#### **5) Sewage treatment :-**

1. Why are screens provided in primary treatment? Describe the method of screening with sketch. ( 5 )
2. Describe a grit chamber with sketch. ( 5 )
3. Describe a detritus tank with sketch. ( 5 )
4. Describe a skimming tank with sketch. ( 5 )
5. State the functions of each unit provided in primary treatment. ( 5 )
6. What is the theory of oxidation pond? Describe the construction and working of oxidation pond. ( 5 )
7. Describe a cesspool with sketch. ( 5 )
8. What is theory of septic tanks? Describe a septic tank with Sketch. ( 5 )
9. Describe a soak pit with sketch. ( 5 )
10. What is the theory of oxidization pond? Describe the construction and working of oxidization pond. ( 5 )
11. Describe a chess pool with sketch. ( 5 )
12. What is the theory of septic tank? Describe a septic tank with sketch. ( 5 )
13. Describe a soak pit with sketch. ( 5 )
14. What is meant by swage disposal by dilution? State the conditions to be remembered while applying this method? ( 5 )

15. Discuss the process of self purification of natural water. So the graphical representation of this process. ( 5 )
16. What are the advantages and disadvantages of swage farming? ( 5 )
17. What is meant by swage sickness? State the measures to be taken to percent swage sickness. ( 5 )
18. Describe the methods of applying swage to agricultural land. ( 5 )
19. What is meant by digestion of sludge? State the necessity of digestion of sludge. ( 5 )
20. Describe the method of digestion by digestion tank with a sketch . ( 5 )
21. Describe the method of digestion by imhoff tank with a sketch . ( 5 )