Study Guide for Grade 1A, 1 & 2
Wastewater Treatment Plant Operators

The study guide is for wastewater treatment operator practices involving primary skill and knowledge levels. The outline topics are the general subjects which are the basis for the examination questions. The applicant should be knowledgeable of the subject matter outlined and contained in the reference material list.

I. SEWAGE AND CHARACTERISTICS

- A. Sources and types
- B. Solids in sewage
- C. Composition of sewage
- D. Biological composition

II. SEWAGE DISPOSAL

- A. Treatment
- B. Biochemical oxygen demand
- C. Methods of treatment

III. WASTE STABILIZATION PONDS

- A. Biochemical process
- B. Types of ponds
- C. Algae and photosynthesis
- D. Pond loadings
- E. Operation and maintenance
- F. Problems and solutions
- G. Sample taking procedure
- H. Effluent standards

IV. COLLECTION SYSTEMS

- A. Lift stations
  - 1. Types, operation, and maintenance
- B. Joints and infiltration
- C. Design and installation

V. SAFETY

- A. Good housekeeping practices
- B. Trenching and shoring
- C. Electrical hazards

D. Protective clothing
E. Protective equipment
F. Manholes and lift station hazards
G. Protection against hydrogen sulfide, methane, and other hazardous gases

VI. RECORDKEEPING

A. Card index system for equipment
B. Card index system for maintenance
C. Budgeting
D. Lagoon records
E. Public relations

REFERENCES

1. "Manual for Instruction for Sewage Treatment Plant Operators," Chapters 1, 2, 3, 4, 5, 9, 12, 13, and 14, Appendix I, II, and IV.

2. "Environmental Data Sheets for Municipal Utilities"

3. "Stabilization Ponds Operating Manual"

4. "Recommended Standards for Sewage Works"

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TYPICAL SAMPLE QUESTIONS
Grade 1 Wastewater Treatment Plant Operators

1. Coliform are not always present in sewage T F

2. Methane gas is toxic, corrosive, and poisonous. T F

3. In wastewater, the solids that are subject to decomposition are:
   a. Organic
   a. Inorganic
   b. Domestic
   c. Dissolved

4. Any one of the following may be present in a manhole or similar structure. Which is most toxic when it is inhaled?
   a. Carbon dioxide
   b. Nitrogen
   c. Hydrogen sulfide
   d. Methane

5. Which of the following diseases is not considered to be waterborne?
   a. Smallpox
   b. Typhoid
   c. Bacillary dysentery
   d. Cholera

6. Bacteria perform a vital role in wastewater treatment. Those that require free oxygen for their life process are called:
   a. Anaerobic bacteria
   b. Protozoic bacteria
   c. Hypertonic bacteria
   d. Aerobic bacteria
   e. Amoebic bacteria

7. A lagoon whose average dimensions are 220 feet x 170 feet has reached a depth of 8 feet. If you discharge down to the 5-foot level, how many gallons have been discharged? (1 cubic foot = 7.5 gallons)

8. Regulations require 30 complete air changes per hour in the dry well of a lift station. If the dimensions of the dry well are 11 feet, 6 inches deep; 7 feet, 6 inches long; and 6 feet, 3 inches wide, what capacity (cubic feet per minute) ventilation system would be required?

9. Assume the average organic BOD per capita per day to the 0.2 lb. What is the equivalent

population if the total pounds of BOD being discharged into a lagoon is 448 lb. per day?

ANSWERS:

1. False

2. False

3. a.

4. c.

5. a.

6. d.

7. V = lwh
8 feet - 5 feet = 3 feet which is depth being discharged
220 feet x 170 feet x 3 feet = 112,200 cubic feet discharged
112,200 cubic feet x 7.5 gallons/cubic foot = 841,500 gallons discharged

8. V = lwh
11 feet, 6 inches = 11 6/12 feet or 11.5 feet
7 feet, 6 inches = 7 6/12 feet or 7.5 feet
6 feet, 3 inches = 6 3/12 feet or 6.25 feet
60 minutes ÷ 30 = 2 minutes = complete change
11.5 feet x 7.5 feet x 6.25 feet = 539 cubic feet ÷ 2 minutes = 269.5 cubic feet per minute system required

9. 448 pounds/day ÷ 0.20 BOD/cap/day = 2240 population