AMERICAN ACADEMY OF ENVIRONMENTAL ENGINEERS

GUIDANCE FOR CANDIDATES

WRITTEN EXAMINATION FOR SPECIALTY CERTIFICATION IN WATER SUPPLY/WASTEWATER MANAGEMENT

GENERAL

The principal goal of the examination is to test the candidate's knowledge and experience by posing test items requiring both the application of basic knowledge and the exercise of judgment. For such test items the correct answer is the one most universally-accepted within the profession.

The test items are designed to test the applicant's knowledge of engineering principles and not the applicant's memory of data typically found in handbooks. Those test items requiring the candidate to perform calculations contain all the necessary data for the solution. Some of the test items are stated in the negative (i.e., "which of the following statements is not correct"). All questions should be carefully read to avoid confusion and create unnecessary errors.

Candidates are allowed 3 hours to answer 100 multiple choice test items. No reference materials are allowed in the examination room.

EXAMINATION SCOPE

The Water Supply/Wastewater Management Examination consists of 100 multiple choice test items which principally cover municipal water supply and treatment, and wastewater collection and treatment. In the water supply category, questions relate to water supply development, water quality, water treatment, and water distribution. In the wastewater category, questions relate to wastewater collection and transport, wastewater characteristics, wastewater treatment, sludge handling, effluent discharge, and stream dynamics. Some ten percent of the questions relate to toxics as they pertain to the water/wastewater field. Test items involving hydraulics and hydrology relating to the water/wastewater field are also included. A few questions are designed to test the candidate's rudimentary knowledge of water chemistry and microbiology.

43% Water Supply

0% Water quality development
12% Water quality
19% Water treatment
12% Water distribution

29% Wastewater

8% Industrial wastewater
21% Treatment

28% General

0% Related toxic & hazardous materials arrangement
13% Hydraulics and hy6drology
15% Chemistry and microbiology
0% Miscellaneous

SAMPLE QUESTIONS

Sample questions of the type to be expected on the exam are as follows:

1. The hindered settling phenomena
    1. is caused by high flows through the settling tank.
    2. removes most soluble contaminants from the water.
    3. occurs at high solids concentration.
    4. follows Stokes law for the full settling depth.
    5. results in floating solids.

Correct answer is 3.

2. Cavitation results when
    1. the pump is operating at or near shutoff head.
    2. the total dynamic head in the pump exceeds 200 psi.
    3. the pump speed exceeds 1800 rpm.
    4. the net positive suction head drops below that required by the pump design.
    5. the pump operates at maximum discharge.

Correct answer is 4.

3. A high COD to BOD_5 ratio (i.e. over 5 to 1) may be an indication of
    1. a high percentage of soluble BOD in the sample.
    2. a high percentage of insoluble BOD in the sample.
    3. possible toxic constituents in the wastewater sample.
    4. a high level of inorganics (salts) in the wastewater sample.
    5. a high level of biodegradable constituents in the wastewater sample.

Correct answer is 3.

4. Polychlorinated biphenyls (PCBs) most probably will be found around a water treatment plant in
    1. chlorine cylinders as impurities.
    2. lubricating oils and greases.
    3. laboratory chemical reagents.
    4. pesticides.
    5. electric transformers.

Correct answer is 5.

REFERENCES

The following references are suggested information sources for the examination:

1. *Standard Handbook of Hazardous Waste Treatment and Disposal*, Harry M. Freeman, Editor-in-Chief. McGraw-Hill, 1988.

2. *Water Quality: Characteristics, Modeling, Modification*, George Tchobanoglous and Edward D. Schroeder. Addison-Wesley, 1985.
3. *Water Treatment, Principles & Design*, James M. Montgomery Consulting Engineers, Inc., Wiley-Interscience, 1985.
4. *Wastewater Engineering: Treatment, Disposal, Reuse*, 3rd Edition, Metcalf & Eddy, Inc., Edited by George Tchobanoglous, McGraw-Hill Book Co., 1991.
5. *Water Clarification Processes, Practical Design and Evaluation*, Herbert E. Hudson, Jr., Van Nostrand-Reinhold Co., 1981.
6. *Unit Operations and Processes in Environmental Engineering*, T.D. Reynolds, Brooks Cole Publishers, 1982.
7. *Water Supply and Sewerage*, 6th Ed., Terence J. McGee, McGraw-Hill, Inc. 1991.
8. *Chemistry for Environmental Engineering*, 3rd Ed., Clair N. Sawyer, Perry L. McCarty, McGraw-Hill Book Co., 1978.

9. *Water Chemistry*, Vernon L. Snoeyink and David Jenkins, John Wiley and Sons, 1980.