

# **WASTEWATER OPERATOR EXAMINATION STUDY KEY**

## **CLASS II**

Manuals used for examination questions are prepared by and available through California State University, Sacramento College of Engineering and Computer Science, Office of Water Programs (Referred to hereafter as the Sacramento manuals).

Web site: <http://www.owp.csus.edu/> Email: <mailto:wateroffice@csus.edu/>

Categories of test questions which will be covered by the Sacramento manuals and the percentage of the examination questions comprised from that area are listed below:

***Activated Sludge*** 15-20%

***Clarifiers*** 5%

***Disinfection*** 7-8%

***Fixed Film/RBC*** 2-3%

***Laboratory*** 10%

***Maintenance*** 5%

***Preliminary treatment*** 5%

***Safety*** 6%

***Solids Handling*** 10%

(NOTE: These percentages are approximate)

### **Operation of Wastewater Treatment Plants – Volume I**

Questions on the Class II examination are taken from the following chapters:

***Chapter 2*** Why Treat Wastes?

***Chapter 3*** Wastewater Treatment Facilities

***Chapter 4*** Racks, Screens, Comminutors, and Grit Removal

***Chapter 5*** Sedimentation and Flotation

***Chapter 6*** Trickling Filters

***Chapter 8*** Activated Sludge

***Chapter 10*** Disinfection and Chlorination

### **Operation of Wastewater Treatment Plants – Volume II**

***Chapter 11*** Activated Sludge (Operation of Conventional Activated Sludge Plants)

***Chapter 12*** Sludge Digestion and Solids Handling

***Chapter 14*** Plant Safety

***Chapter 15*** Maintenance

***Chapter 16*** Laboratory Procedures and Chemistry

---

***Mathematics*** 10 – 15 %

Web site for the Class II Formula Sheet:

[https://www.in.gov/idem/cleanwater/files/wastewater\\_cert\\_study\\_guide\\_formula\\_sheet.pdf](https://www.in.gov/idem/cleanwater/files/wastewater_cert_study_guide_formula_sheet.pdf)

# WASTEWATER OPERATOR EXAMINATION STUDY KEY

## CLASS II

Any mathematics problem given on the examination will have the appropriate formula listed on the Formula Sheet furnished with the exam on that day. It is recommended that you look over the formula sheets and work the problems in the Appendices in the Sacramento manuals. Specifically in the *Operation of Wastewater Treatment Plants Volumes I and II* entitled “How to Solve Wastewater Treatment Plant Arithmetic Problems”

Solving these problems involve plugging the numbers given in the problem into the correct formula and calculating the answer.

There are a few basic rules that apply to solving formulas:

1. Work from left to right
2. Do all of the multiplication and division above the line (in the numerator) and below the line (in the denominator); then do the addition and subtraction above and below the line.
3. Perform the division (divide the numerator by the denominator).
4. Parentheses ( ) are used in formulas to identify separate parts of a problem.

Work the arithmetic within the parentheses before working outside the parentheses. Use the same order stated in rules 1, 2, and 3 above when working inside of parentheses.

---

### ***Pretreatment*** 3-4%

Questions are taken from the **Introduction to the National Pretreatment Program** manual, available on-line from US EPA at:

[http://www.epa.gov/npdes/pubs/pretreatment\\_program\\_intro\\_2011.pdf](http://www.epa.gov/npdes/pubs/pretreatment_program_intro_2011.pdf)

---

### ***Rules/Regulations/Completing reports*** 20 – 25%

The remainder of the examination questions will cover Rules and Regulations located in **Part II, Section One**, of the Wastewater Certification Manual.

There will also be questions related to completion of the Discharge Monitoring Report (DMR) and the Monthly Report of Operation (MRO). A worksheet and necessary additional documents are incorporated into the Certification Manual as Appendices A, B, C, and D.

Link to the Certification Manual:

[https://www.in.gov/idem/cleanwater/files/wastewater\\_cert\\_booklist\\_10\\_manual.pdf](https://www.in.gov/idem/cleanwater/files/wastewater_cert_booklist_10_manual.pdf).