Registration form

WATER TREATMENT 101

48 HOUR RUSH ORDER PROCESSING FEE ADDITIONAL $50.00

Start and Finish Dates: _____
You will have 90 days from this date in order to complete this course

List number of hours worked on assignment must match State Requirement. _____

Name_____Signature_____
I have read and understood the disclaimer notice on page 2. Digitally sign XXX

Address_____

City_____State_____Zip_____

Email_____ Fax (_____) _____

Phone:
Home (_____) _____ Work (_____) _____

Operator ID #_____Exp. Date_____

Class/Grade_____

Please circle/check which certification you are applying the course CEU's.
Water Treatment ___ Water Distribution ___ Other _____

Technical Learning College TLC PO Box 3060, Chino Valley, AZ 86323
Toll Free (866) 557-1746 Fax (928) 272-0747 info@tlch2o.com

If you've paid on the Internet, please write your Customer#_____

Please invoice me, my PO#_____

We will stop mailing the certificate of completion so we need either your fax number or e-mail address. We will e-mail the certificate to you, if no e-mail address; we will fax it to you.

DISCLAIMER NOTICE
I understand that it is my responsibility to ensure that this CEU course is either approved or accepted in my State for CEU credit. I understand State laws and rules change on a frequent basis and I believe this course is currently accepted in my State for CEU or contact hour credit, if it is not, I will not hold Technical Learning College responsible. I also understand that this type of study program deals with dangerous conditions and that I will not hold Technical Learning College, Technical Learning Consultants, Inc. (TLC) liable for any errors or omissions or advice contained in this CEU education training course or for any violation or injury or neglect or damage caused by this CEU education training or course material suggestion or error. I will call or contact TLC if I need help or assistance and double-check to ensure my registration page and assignment has been received and graded.

State Approval Listing Link, check to see if your State accepts or has pre-approved this course. Not all States are listed. Not all courses are listed. If the course is not accepted for CEU credit, we will give you the course free if you ask your State to accept it for credit.

Professional Engineers; Most states will accept our courses for credit but we do not officially list the States or Agencies. Please check your State for approval.

State Approval Listing URL…
http://www.abctlc.com/downloads/PDF/CEU%20State%20Approvals.pdf

You can obtain a printed version of the course manual from TLC for an additional $169.95 plus shipping charges.

AFFIDAVIT OF EXAM COMPLETION
I affirm that I personally completed the entire text of the course. I also affirm that I completed the exam without assistance from any outside source. I understand that it is my responsibility to file or maintain my certificate of completion as required by the state or by the designation organization.

Grading Information
In order to maintain the integrity of our courses we do not distribute test scores, percentages or questions missed. Our exams are based upon pass/fail criteria with the benchmark for successful completion set at 70%. Once you pass the exam, your record will reflect a successful completion and a certificate will be issued to you.

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If you need this assignment graded and the results mailed to you within a 48-hour period, prepare to pay an additional rush service handling fee of $50.00. This fee may not cover postage costs. If you need this service, simply write RUSH on the top of your Registration Form. We will place you in the front of the grading and processing line.

For security purposes, please fax or e-mail a copy of your driver's license and always call us to confirm we've received your assignment and to confirm your identity.

CERTIFICATION OF COURSE PROCTOR

Technical Learning College requires that our students who takes a correspondence or home study program course must pass a proctored course reading, quiz and final examination. The proctor must complete and provide to the school a certification form approved by the commission for each examination administered by the proctor.

Instructions. When a student completes the course work, fill out the blanks in this section and provide the form to the proctor with the examination.

Name of Course:_____

Name of Licensee:_____

Instructions to Proctor. After an examination is administered, complete and return this certification and examination to the school in a sealed exam packet or in pdf format.

I certify that:

1. I am a disinterested third party in the administration of this examination. I am not related by blood, marriage or any other relationship to the licensee which would influence me from properly administering the examination.
2. The licensee showed me positive photo identification prior to completing the examination.
3. The enclosed examination was administered under my supervision on _____. The licensee received no assistance and had no access to books, notes or reference material.
4. I have not permitted the examination to be compromised, copied, or recorded in any way or by any method.
5. Provide an estimate of the amount of time the student took to complete the assignment.

Time to complete the entire course and final exam. _____

Notation of any problem or concerns:

Name and Telephone of Proctor (please print):

_____

_____

Signature of Proctor

WT 101 Answer Key

Name_____

Phone _____

Did you check with your State agency to ensure this course is accepted for credit?

You are responsible to ensure this course is accepted for credit. No refunds.
Method of Course acceptance confirmation. Please fill this section

Website __ Telephone Call___ Email____ Spoke to_____

Did you receive the approval number, if applicable? _____

What is the course approval number, if applicable? _____

You can electronically complete this assignment in Adobe Acrobat DC.

Please Circle, Bold, Underline or X, one answer per question. A **felt tipped pen** works best.

1. A B C D	18. A B C D	35. A B C D	52. A B C D
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4. A B C D	21. A B C D	38. A B C D	55. A B C D
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6. A B C D	23. A B C D	40. A B C D	57. A B C D
7. A B C D	24. A B C D	41. A B C D	58. A B C D
8. A B C D	25. A B	42. A B C D	59. A B C D
9. A B C D	26. A B C D	43. A B C D	60. A B C D
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Please e-mail or fax this survey along with your final exam

WATER TREATMENT 101 CEU COURSE
CUSTOMER SERVICE RESPONSE CARD

NAME: _____

E-MAIL_____PHONE_____

PLEASE COMPLETE THIS FORM BY CIRCLING THE NUMBER OF THE APPROPRIATE ANSWER IN THE AREA BELOW.

Please rate the difficulty of your course.
Very Easy 0 1 2 3 4 5 Very Difficult

Please rate the difficulty of the testing process.
Very Easy 0 1 2 3 4 5 Very Difficult

Please rate the subject matter on the exam to your actual field or work.
Very Similar 0 1 2 3 4 5 Very Different

How did you hear about this Course? _____

What would you do to improve the Course?

_____

_____

Any other concerns or comments.

_____

_____

Please write down any questions you were not able to find the answers or that have errors.

Disclaimer Notice

Amount of Time for Course Completion – How many hours you spent on course?

Must match State Hour Requirement _____ (Hours)

I understand that I am 100 percent responsible to ensure that TLC receives the Assignment and Registration Key. I understand that TLC has a zero tolerance towards not following their rules, cheating or hostility towards staff or instructors. I need to complete the entire assignment for credit. There is no credit for partial assignment completion. My exam was proctored.

I will contact TLC if I do not hear back from them within 2 days of assignment submission. I will not hold TLC liable for any errors, injury, death or non-compliance with rules. I will abide with all federal and state rules and rules found on page 2. I will forfeit my purchase costs and will not receive credit or a refund if I do not abide with TLC's rules.

Please Sign that you understand and will abide with TLC's Rules.

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Signature

When Finished with Your Assignment...

REQUIRED DOCUMENTS
Please scan the **Registration Page, Answer Key, Proctoring report, Survey and Driver's License** and email these documents to info@TLCH2O.com.

IPhone Scanning Instructions
If you are unable to scan, take a photo of these documents with your **iPhone** and send these photos to TLC, info@TLCH2O.com.

FAX
If you are unable to scan and email, please fax these documents to TLC, if you fax, call to confirm that we received your paperwork. **(928) 468-0675**

Rush Grading Service
If you need this assignment graded and the results mailed to you within a 48-hour period, prepare to pay an additional rush service handling fee of $50.00.

Water Treatment 101 CEU Training Course Assignment

The Water Treatment 101 CEU course assignment is available in Word on the Internet for your convenience, please visit www.ABCTLC.com and download the assignment and e-mail it back to TLC.

You will have 90 days from receipt of this manual to complete it in order to receive your Professional Development Hours (PDHs) or Continuing Education Unit (CEU). A score of 70 % or better is necessary to pass this course. If you should need any assistance, please email or fax all concerns and the completed ANSWER KEY to info@tlch2o.com.

Select one answer per question. Please utilize the answer key. (s) on the answer will indicate either plural and singular tenses.

Please write down any questions you were not able to find the answers or that have errors.

Hyperlink to the Glossary and Appendix
http://www.abctlc.com/downloads/PDF/WTGlossary.pdf

Three Types of Public Water Systems
1. Approximately 85,000 systems
A. TNCWS C. NTNCWSs
B. CWSs D. None of the above

Water Quality Section
Surface (Raw) Water Introduction
2. Operators need to appropriately treat surface water is never pure of_____, it. Most of the earth's water sources obtain their water supplies through precipitation.
A. Excess nutrients C. Pollution
B. Biological actions D. None of the above

3. Raw water generally contains varying amounts of dissolved minerals including calcium, magnesium, sodium, chlorides, sulfates and bicarbonates, depending on its source.
A. True B. False

Surface Water Properties
4. Adjustments in the dissolved oxygen, algae, temperature, suspended solids, turbidity, and carbon dioxide will change because of _____.
A. Excess nutrients C. Discharge
B. Biological activities D. None of the above

5. Water is accepted as the _____ because will dissolve most substances that comes in contact.
A. Universal solvent C. Surface water
B. Water quality D. None of the above

Managing Water Quality at the Source

6. Contingent upon the region, source water may have several restrictions of use as part of a Water Shed Management Plan. In some areas, it may be restricted from recreational use, discharge or runoff from agriculture, or_____ .

A. Excess nutrients C. Industrial and wastewater discharge
B. Biological actions D. None of the above

Physical Characteristics of Water

7. Physical characteristics are the elements found that are considered alkali, metals, and non-metals such as carbonates, fluoride,_____. The consumer relates it to scaling of faucets or staining.

A. pH and alkalinity C. Powdered activated carbon and chlorine
B. Sulfides or acids D. None of the above

8. Total Dissolved Solids (TDS) is not a primary pollutant; it is a gauge of appealing water characteristics such as hardness and an indication of an assortment of chemical contaminants that might be present, such as?

A. Turbidity C. Arsenic
B. Colloids D. None of the above

9. pH is the negative logarithm of the hydrogen ion concentration, $[H^+]$, a measure of the degree to which a solution is_____ .

A. Alkalinity C. Hydrogen ion (H^+)
B. Acidic or alkaline D. None of the above

10. _____ is a substance that can give up a hydrogen ion (H^+); a base is a substance that can accept H^+.

A. Acid C. Acidic or alkaline
B. Base D. None of the above

11. The more acidic a solution the greater the hydrogen ion concentration and the lower the pH; a pH of 7.0 indicates neutrality, a pH of less than 7 indicates acidity, and a pH of more than 7 indicates _____.

A. Acid C. Alkalinity
B. Base D. None of the above

Turbidity Introduction

12. Generally, higher turbidity levels require higher coagulant dosages. However, seldom is the relationship between turbidity level and _____linear.

A. Coagulant dosage C. Temperature
B. Total Dissolved Solids (TDS) D. None of the above

13. Usually, the extra coagulant required is relatively small when turbidities are much higher than normal due to higher collision probabilities of the _____ during high turbidities.

A. Turbidity C. Total Dissolved Solids (TDS)
B. Colloids D. None of the above

14. Low _____waters can be very difficult to coagulate due to the difficulty in inducing collision between the colloids.

A. Turbidity C. Total Dissolved Solids (TDS)
B. Colloids D. None of the above

15. _____may be existing in a water supply due to pollution, and these colloids can be difficult to remove in the coagulation process. In this situation, higher coagulant dosages are generally required.
A. Turbidity C. Total Dissolved Solids (TDS)
B. Organic colloids D. None of the above

Turbidity MCL
16. An MCL for turbidity established by the EPA because _____interferes with disinfection. This characteristic of water changes the most rapidly after a heavy rainfall.
A. Conductivity C. Temperature
B. Turbidity D. None of the above

17. The temperature variation of a sample, a scratched or unclean sample tube in the nephelometer and selecting an incorrect wavelength of a light path may be conditions caused by an inaccurate _____ measurement.
A. Conductivity C. Temperature
B. Turbidity D. None of the above

Dissolved Oxygen
18. The level of dissolved oxygen in natural waters is often a direct indication of quality, since aquatic plants produce oxygen, while microorganisms generally consume it as they feed on _____.
A. Pollutants C. E. coli bacteria
B. Organic matter D. None of the above

19. Thermal stratification is possible as water becomes less dense when heated; meaning water weighs less per unit volume. Therefore, warmer water will be lighter and colder water will be heavier. Due to this, there will always be a level of "self-induced" _____ in a water storage.
A. Saturation level(s) C. Permanent hardness
B. Thermal stratification D. None of the above

Objections to Hard Water
Scale Formation
20. Hard water forms scale, usually_____, which causes a variety of problems. Left to dry on the surface of glassware and plumbing fixtures, including showers doors, faucets, and sink tops; hard water leaves unsightly white scale known as water spots.
A. Magnesium carbonate C. Calcite
B. Calcium carbonate D. None of the above

Secondary Standard
21. TDS is most often measured in parts per million (ppm) or milligrams per liter of water (mg/L). The normal TDS level ranges from _____
A. 50 ppm to 1,000 ppm C. 50 ppm to 100 ppm
B. 5 ppm to 10 ppm D. None of the above

Langelier Saturation Index

22. The Langelier Saturation index (LSI) is an evenness scale derived from the theoretical concept of saturation and provides an indicator of the degree of saturation of water with respect to calcium carbonate. It can be shown that the Langelier saturation index (LSI) approximates the base 10 logarithm of the _____saturation level.

A. Magnesium carbonate C. Calcite
B. Calcium carbonate D. None of the above

23. The Langelier saturation level approaches the concept of saturation using pH as a main variable. The LSI can be interpreted as the pH change required to bring water to_____.

A. Saturation level(s) C. Equilibrium
B. Stratification D. None of the above

More on the Stage 2 DBP Rule

24. Which of the following rules focuses on public health protection by limiting exposure to DBPs, specifically total trihalomethanes and five haloacetic acids, that form in water through disinfectants used to control microbial pathogens?

A. Stage 2 DBP rule C. Long Term 2 Enhanced Surface Water Treatment Rule
B. Stage 1 DBPR D. None of the above

Are THMs and HAAs the only disinfection byproducts?

25. The presence of TTHM and HAA5 is representative of the occurrence of many other chlorination DBPs; thus, an increase of TTHM and HAA5 generally indicates an increase of DBPs from chlorination.

A. True B. False

Disinfection Byproduct Research and Regulations Summary

26. _____is unquestionably the most important step in the treatment of water for drinking water supplies.

A. DBP(s) C. Disinfection
B. Turbidity (particle) D. None of the above

Controlling Disinfection Byproducts

27. Treatment techniques are available that provide water suppliers the opportunity to maximize potable water safety and quality while minimizing the risk of _____.

A. DBP risks C. Disinfectants and DBPs
B. Turbidity (particle) D. None of the above

28. Generally, the best approach to reduce _____is to remove natural organic matter precursors prior to disinfection.

A. DBP(s) C. DBP formation
B. Turbidity (particle) D. None of the above

Absorption

29. Activated carbon can be used to absorb _____ that react with disinfectants to form byproducts.

A. Inorganic coagulants C. Soluble organics
B. Most contaminants D. None of the above

Membrane Technology

30. Membranes, used historically to desalinate brackish waters, have also demonstrated excellent removal of _____.

A. THMs and HAAs C. Natural organic matter
B. Optimization of pH D. None of the above

31. EPA predicted that most water systems will be able to achieve compliance with new DBP regulations through the use of one or more of these relatively low cost methods (EPA, 1998). Water system managers may also consider switching from chlorine to alternative disinfectants to reduce formation of _____.

A. THMs and HAAs C. Natural organic matter
B. Optimization of pH D. None of the above

Organisms Descriptors and Meanings

32. Photo means...

A. Feed or nourish C. Light
B. Other (Organic carbon) D. None of the above

33. Aerobic means...

A. Without air C. Self (Inorganic carbon)
B. With air D. None of the above

Contaminants that may be present in sources of drinking water include:

34. Which of the following like salts and metals, which can be naturally occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming?

A. Radioactive contaminants C. Inorganic contaminants
B. Pesticides and herbicides D. Microbial contaminants

35. Which of the following may come from a variety of sources such as agriculture, urban stormwater run-off, and residential uses?

A. Radioactive contaminants C. Inorganic contaminants
B. Pesticides and herbicides D. Microbial contaminants

36. Which of the following, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife?

A. Microbial contaminants C. Inorganic contaminants
B. Pesticides and herbicides D. All of the above

Dangerous Waterborne Microbes

37. Which of the following is a parasite that enters lakes and rivers through sewage and animal waste. It causes cryptosporidiosis, a mild gastrointestinal disease. The disease can be severe or fatal for people with severely weakened immune systems.

A. Coliform Bacteria C. Giardia lamblia
B. Cryptosporidium D. None of the above

38. Which of the following are not necessarily agents of disease, these may indicate the presence of disease-carrying organisms?

A. Fecal coliform bacteria C. Shigella dysenteriae
B. Cryptosporidium D. None of the above

39. Which of the following is a parasite that enters lakes and rivers through sewage and animal waste. It causes gastrointestinal illness (e.g. diarrhea, vomiting, and cramps)?
A. Coliform Bacteria C. Protozoa
B. Cryptosporidium D. None of the above

40. Which of the following is a species of the rod-shaped bacterial genus Shigella?
A. Fecal coliform bacteria C. Shigella dysenteriae
B. Cryptosporidium D. None of the above

41. Which of the following are common in the environment and are generally not harmful? However, the presence of these bacteria in drinking water are usually a result of a problem with the treatment system or the pipes which distribute water, and indicates that the water may be contaminated with germs that can cause disease.
A. Coliform Bacteria C. Giardia lamblia
B. Cryptosporidium D. None of the above

42. Which of the following are bacteria whose presence indicates that the water may be contaminated with human or animal wastes? Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms.
A. Fecal Coliform and E. coli C. Shigella dysenteriae
B. Cryptosporidium D. None of the above

Bacteriological Monitoring Introduction
43. Which of the following are usually harmless, occur in high densities in their natural environment and are easily cultured in relatively simple bacteriological media?
A. Indicator bacteria C. Viruses
B. Amoebas D. None of the above

44. Indicators in common use today for routine monitoring of drinking water include total coliforms, fecal coliforms, and?
A. Cryptosporidium C. Escherichia coli (E. coli)
B. Protozoa D. None of the above

45. According to the text, the routine microbiological analysis of your water is for?
A. Contamination C. Coliform bacteria
B. Colloids D. None of the above

Bacteria Sampling
46. Water samples for _____must always be collected in a sterile container.
A. Amoebas C. Viruses
B. Bacteria tests D. None of the above

Methods
47. The MMO-MUG test, a product marketed as _____, is the most common. The sample results will be reported by the laboratories as simply coliforms present or absent.
A. Colilert C. Total coliform analysis
B. Coliform D. None of the above

The three (3) types of samples are:

48. Samples collected following a coliform present routine sample. The number of repeat samples to be collected is based on the number of _____ samples you normally collect.

A. Repeat C. Routine
B. Special D. None of the above

49. A PWS has a second Level 1 Assessment within a rolling 12-month period.

A. Trigger: Level 1 Assessment C. All of the above
B. Trigger: Level 2 Assessment D. None of the above

50. A PWS on state-approved annual monitoring has a Level 1 Assessment trigger in 2 consecutive years.

A. Trigger: Level 1 Assessment C. All of the above
B. Trigger: Level 2 Assessment D. None of the above

Positive or Coliform Present Results

51. With a positive total coliform sample and after you have contacted an agency for assistance, you will be instructed as to the proper repeat sampling procedures and possible corrective measures for solving the problem. It is very important to initiate the _____as the corrective measures will be based on those results.

A. Perform routine procedures C. Corrective measures
B. Repeat sampling immediately D. None of the above

Heterotrophic Plate Count (Spread Plate Method)

52. Which of the following provides a technique to quantify the bacteriological activity of a sample?

A. Colonies C. Heterotrophic Plate Count
B. Agar D. None of the above

The following are acute violations:

53. Which determines a violation of nitrate?

A. Presence C. MCLG
B. MCL D. None of the above

Revised Total Coliform Rule (RTCR) Summary

54. The water provider shall develop and follow a sample-siting plan that designates the PWS's collection schedule. This includes location of_____.

A. Routine and repeat water samples C. Microbial contamination
B. Reduced monitoring D. Repeat water samples

55. The water provider shall collect _____on a regular basis (monthly, quarterly, annually). Have samples tested for the presence of total coliforms by a state certified laboratory.

A. Routine water samples C. Microbial contamination
B. Reduced monitoring D. Repeat water samples

56. PWSs incur violations if they do not comply with the requirements of the RTCR. The violation types are essentially the same as under the TCR with few changes. The biggest change is no acute or monthly MCL violation for _____only.
A. CCR(s) C. Total coliform positive samples
B. PN D. TC+ routine or repeat sample

57. Community water systems (CWSs) must use specific language in their CCRs when they must conduct an assessment or if they incur_____.
A. CCR(s) C. An E. coli MCL violation
B. PN D. TC+ routine or repeat sample

58. The water provider shall analyze all _____ that are total coliform positive (TC+) for E. coli.
A. Routine or repeat water samples C. Microbial contamination
B. Reduced monitoring D. None of the above

Disinfection Key
59. The RTCR requires 99.99% or 4 log inactivation of _____ .
A. Enteric viruses C. Giardia lamblia cysts
B. Crypto D. None of the above

60. The RTCR requires 99% or 2 log inactivation of _____ .
A. Enteric viruses C. Giardia lamblia cysts
B. Crypto D. None of the above

Waterborne Pathogen Section - Introduction
Pathogen Section
61. Most pathogens are generally associated with diseases that _____and affect people in a relatively short amount of time, generally a few days to two weeks.
A. Cause intestinal illness C. Will cause fatalities
B. Are mild in nature D. None of the above

How Diseases are Transmitted.
62. Waterborne pathogens are primarily spread by the?
A. Fecal-oral, or feces-to-mouth route C. Oral to fecal route
B. Dermal to fecal route D. None of the above

Protozoan Caused Diseases
63. Which of the following bugs is larger than bacteria and viruses but still microscopic; they invade and inhabit the gastrointestinal tract?
A. Hepatitis A C. Protozoan pathogens
B. E.coli D. None of the above

64. Some of the parasites enter the environment in a dormant form, with a protective cell wall, called a?
A. Lamblia C. Cyst
B. Shell D. None of the above

Giardia lamblia

65. Which of the following bugs has been responsible for more community-wide outbreaks of disease in the U.S. than any other, and drug treatment are not 100% effective?

A. Giardia lamblia C. Giardiasis
B. Cryptosporidiosis D. None of the above

66. All of these diseases, with the exception of _____, have one symptom in common: diarrhea. They also have the same mode of transmission, fecal-oral, whether through person-to-person or animal-to-person contact.

A. HIV infection C. Hepatitis A
B. Giardiasis D. None of the above

Primary Waterborne Diseases Section

67. Humans are the reservoir for the Salmonella typhi pathogen, which causes diarrheal illness, and also known as?

A. Campylobacter C. Typhoid fever
B. Shigella dysenteriae D. None of the above

68. Legionnaire's disease, which causes a severe pneumonia, and the second, _____, which is a non-pneumonia illness; it's typically an influenza-like illness, and it's less severe.

A. Pontiac fever C. Typhoid fever
B. Yellow fever D. None of the above

69. Humans are the reservoir for the Norovirus. Prevention strategies for this pathogen include?

A. Internal protection C. Containment protection
B. Source protection D. None of the above

70. Giardia prevention strategies for this pathogen include _____; filtration, coagulation, and halogenation of drinking water.

A. Internal protection C. Containment protection
B. Source protection D. None of the above

Chain of Custody Procedures

71. If both parties involved in the transfer must sign, date and note the time on the chain of custody record, this is known as?

A. TC Plan C. Samples transfer possession
B. Sample siting plan D. None of the above

72. The recipient will then attach the _____showing the transfer dates and times to the custody sheets. If the samples are split and sent to more than one laboratory, prepare a separate chain of custody record for each sample.

A. Shipping invoices C. Sample siting plan
B. Chain of custody release D. None of the above

Factors in Chlorine Disinfection: Concentration and Contact Time

73. Based on the work of several researchers, CXT values [final free chlorine concentration (mg/L) multiplied by minimum contact time (minutes)], offer water operators guidance in computing an effective combination of chlorine concentration and _____required to achieve disinfection of water at a given temperature.

A. Chlorine concentration C. Higher strength chlorine solutions
B. Chlorine contact time D. None of the above

74. The CXT formula demonstrates that if an operator chooses to decrease the chlorine concentration, the required _____must be lengthened.

A. Chlorine concentration C. Contact time
B. Temperature D. None of the above

75. As _____ are used, contact times may be reduced.

A. Chlorine concentration C. Higher strength chlorine solutions
B. Temperature D. None of the above

Water Treatment Section - Preliminary Treatment Process

Preliminary Treatment

76. Weeds, leaves, and trash, if not removed, these will cause problems to the treatment plant's pumps and equipment, the best way to protect the plant is?

A. Screening C. Change source
B. Super settling D. None of the above

77. According to the text, wire mesh screens need maintenance and require?

A. Manual cleaning C. No cleaning
B. PM cleaning D. None of the above

Pre-Sedimentation

78. Sand and grit will damage plant equipment and pipes, so it must be removed with either rectangular or round shaped basin are called?

A. Filtration basin(s) C. Sedimentation basin(s)
B. Coagulation basin(s) D. None of the above

79. Which of the following treatment terms is used after the flocculation process?

A. Filtration basin(s) C. Sedimentation basin(s)
B. Coagulation basin(s) D. None of the above

80. Scrapers on the bottom move the settled sludge to one or more hoppers at the influent end of the tank; it may have a _____or traveling bridge used to collect the sludge.

A. Screw conveyor C. Manual skimmer
B. Conveyor belts D. None of the above

Flights and Chains

81. Flights and chains remove the scum from the _____ of the basin.

A. Scum box C. Armature
B. Surface D. None of the above

(S) Means the answer can be plural or singular in nature

Circular Clarifiers

82. Which of the following systems use graded silica sand filter media?
A. Traditional filter systems C. Chemical pretreatment
B. Reconditioning cycle D. None of the above

83. Which of the following processes uses alum and cationic polymer to neutralize the charge of colloidal particles?
A. Filtration C. Flocculation
B. Reconditioning D. None of the above

84. Which of the following compounds combines with alkalinity in the raw water to form a white precipitate that neutralizes suspended particles' electrical charge?
A. Activated sodium C. Alum
B. PAC D. None of the above

85. Which of the following terms may increase filtered water clarity, measured in NTU, by 90% compared with filtration alone?
A. Chemical pretreatment C. Fast rinse
B. Reconditioning cycle D. None of the above

86. Water treatment systems use settling tanks unit to allow for_____.
A. Gravity C. Settling time
B. Particle(s) D. Sedimentation and settling

87. The main aim of tube settlers is to minimize the _____that a small floc particle must settle before agglomerating into larger particles.
A. Gravity C. Settling time
B. Vertical distance D. Solids

Conventional Water Treatment Process Introduction

88. _____ along with pre-chlorination for removal of dissolved iron when present with small amounts relative of manganese
A. Disinfection C. Pre-treatment
B. Coagulation D. Aeration

89. _____to remove particles from water either by passage through a sand bed that can be washed and reused or by passage through a purpose- designed filter that is washable.
A. Disinfection C. Pre-treatment
B. Coagulation D. Filtration

90. _____ for killing bacteria viruses and other pathogens.
A. Disinfection C. Pre-treatment
B. Coagulation D. Aeration along with pre-chlorination

91._____or slow-sand filtration
A. Disinfection C. Pre-treatment
B. Coagulation D. Coagulation or flocculation

Coagulants – Alum and Ferric
Aluminum Sulfate (Alum)

92. Once in water, alum can react with hydroxides, carbonates, bicarbonates, and other anions to form _____.
A. pH C. Large, positively charged molecules
B. Alkalinity D. None of the above

93. Carbon dioxide and sulfate are generally byproducts of these reactions. During the reactions, alum acts as _____to reduce the pH and alkalinity of the water supply. It is important that sufficient alkalinity be present in the water supply for the various reactions to occur.
A. Inorganic coagulant(s) C. Byproducts of these reactions
B. An acid D. None of the above

94. The aluminum ions become soluble rather than insoluble and do not participate in the hydration and _____ necessary to make the alum effective as a coagulant. In these instances the plant may experience higher than normal filtered water turbidities, and much of the aluminum will pass through the filters.
A. Post filtration alum coagulation C. Byproducts of these reactions
B. Olation reaction(s) D. None of the above

95. When the pH level of the water is above 7.8 after the addition of the alum, the aluminum ions again become soluble, and the efficiency of coagulation is decreased. Under these conditions, aluminum ions again penetrate the filters, and _____can occur in the clear well and in the distribution system in some cases.
A. Post filtration alum coagulation C. Byproducts of these reactions
B. Olation reaction(s) D. None of the above

Ferric Chloride (Ferric)

96. Like ferric sulfate, ferric chloride exhibits a wide _____ range for coagulation, and the ferric ion does not easily become soluble.
A. pH C. Olation
B. Alkalinity D. None of the above

97. As a result, many plants are replacing alum with ferric chloride to eliminate the penetration of aluminum ions through the plant filters. Ferric chloride also reacts as an acid in water to reduce _____.
A. pH C. Olation
B. Alkalinity D. None of the above

98. _____are available, such as potash alum, ammonia alum, ferrous sulfate (copperas), and chlorinated copperas.
A. Other inorganic coagulants C. Byproducts of these reactions
B. Olation reaction(s) D. None of the above

99. Typical dosages of the inorganic coagulants range from 50 pounds per million gallons of water treated under ideal conditions to as high as 800 to 1000 pounds per million gallons of water treated under _____ conditions.
A. Worst case C. Increased
B. Decreased D. None of the above

Factors Influencing Coagulation
Effects of pH

100. The pH range in which a coagulation process occurs may be the single most important factor in _____coagulation. The vast majority of coagulation problems are related to improper pH levels.

A. Improper C. Proper
B. Optimum D. None of the above

101. Whenever possible, coagulation should be conducted in_____ . When this is not done, lower coagulation efficiency results, generally resulting in a waste of chemicals and a lowered water quality.

A. The optimum pH zone C. Collision between the colloids
B. The coagulation process D. None of the above

102. Each of the inorganic salt coagulants has its own characteristic _____ pH range.

A. Improper C. Little or no effect
B. Optimum D. None of the above

103. In many plants, it is necessary to adjust the pH level in the coagulation process. In most cases, this involves the addition of lime, caustic soda, or soda ash to maintain a minimum pH level. In some cases, however, acids may be necessary to raise or lower the pH level to an _____ range.

A. Improper C. Little or no effect
B. Optimum D. None of the above

104. In some water plants, the acidic reactions of the inorganic salts are taken advantage of when the raw water pH levels are_____. In these instances, overfeed of the coagulant is intentionally induced in order for the coagulation process to occur in the optimum range.

A. Improper C. Higher than desired
B. Optimum D. None of the above

Effects of Salts

105. Since no natural waters are completely pure, each will have various levels of cations and anions such as calcium, sodium, magnesium, iron, manganese, sulfate, chloride, phosphate, and others. Some of these ions may affect the efficiency of _____.

A. All chemical reactions C. Collision between the colloids
B. The coagulation process D. None of the above

106. Trivalent cations do not have an adverse effect on the process in most instances. In fact, significant concentrations of naturally occurring iron in a water supply has resulted in the ability to feed _____dosages of inorganic salt coagulants.

A. Improper C. Lower than normal
B. Optimum D. None of the above

Nature of Turbidity

107. Generally, higher turbidity levels require higher coagulant dosages. However, seldom is the relationship between turbidity level and coagulant dosage linear. Usually, the additional coagulant required is _____when turbidities are much higher than normal due to higher collision probabilities of the colloids during high turbidities.

A. Improper C. Relatively small
B. Optimum D. None of the above

108. Conversely, low turbidity waters can be very difficult to coagulate due to the difficulty in inducing _____.

A. All chemical reactions C. Collision between the colloids
B. The coagulation process D. None of the above

109. In the above instance, _____ formation is poor, and much of the turbidity is carried directly to the filters.

A. Poor C. Good
B. Average D. None of the above

110. Organic colloids may be present in a water supply due to pollution, and these colloids can be difficult to remove in the coagulation process. In this situation, _____coagulant dosages are generally required.

A. Improper C. Slowly
B. Higher D. None of the above

Water Temperature

111. Cold water temperatures can cause two factors which add to the difficulty of the coagulation process. As water temperatures approach freezing, almost all chemical reactions occur more _____.

A. Improper C. Slowly
B. Higher D. None of the above

Corrosion Control Introduction

112. Corrosion is the deterioration of a substance by chemical action. Lead, cadmium, zinc, copper and iron might be found in water when metals in water distribution systems corrode. Drinking water contaminated with certain metals (such as _____) can harm human health.

A. Lead C. Lead and cadmium
B. Lead and copper D. None of the above

113. The EPA has banned the use of lead solders, fluxes and pipes in the installation or repair of any public water system. In the past, solder used in plumbing has been _____.

A. 60% lead and 40% tin C. 50% copper and 50% lead
B. 50% tin and 50% lead D. None of the above

114. Using lead-free solders, such as _____is a key factor in lead corrosion control.

A. 20% lead and 80% tin C. Lead and cadmium
B. Silver-tin and antimony-tin D. None of the above

Coagulation and Flocculation Summary
Rapid Sand Filtration

115. Which terms is the most prevalent form of water treatment technology in use today?
A. Conventional technology C. Rapid Sand filtration
B. Sedimentation process D. None of the above

116. Rapid Sand filtration process employs a combination of _____in order to achieve maximum effectiveness.
A. Filtration C. Physical and chemical processes
B. Sedimentation process D. None of the above

Coagulation

117. The alum and the water are mixed rapidly by the?
A. Cationic polymers C. Shaker
B. Flash mixer D. None of the above

118. What is the process of joining together particles in water to help remove organic matter called?
A. Cationic binding C. Flocculation
B. Coagulation D. None of the above

119. Fine particles must be coagulated, or "stuck together" to form larger particles that can be filtered, this is achieved through the use of?
A. Sedimentation chemicals C. Flocculation chemicals
B. Coagulant chemicals D. None of the above

120. Which of the following terms are required since colloidal particles by themselves have the tendency to stay suspended in water and not settle out?
A. Sedimentation chemicals C. Flocculation chemicals
B. Coagulant chemicals D. None of the above

121. Which of the following terms are so small, their charge per volume is significant?
A. Aluminum Sulfate molecules C. Colloidal particles
B. Coagulant chemicals D. None of the above

Flocculation

122. Flocculation is the process where the suspended particles can collide, _____, and form heavier particles called “floc”.
A. Equalization C. Destabilized or coagulated particles
B. Agglomerate D. None of the above

123. Gentle _____ and appropriate detention times (the length of time water remains in the basin) help facilitate the flocculation process.
A. Equalizing C. Settling
B. Agitation of the water D. None of the above

124. Which of the following happens in the water when bacteria and other microorganisms are caught in the floc structure?
A. Equalize the basin C. Agitate the water
B. Floc particles mix D. None of the above

Pre-Sedimentation

125. Contingent on the quality of the source water, some plants have pre-sedimentation, which allows larger _____ in a reservoir or lake reducing solid removal loads.

A. Equalization of the basin
B. Particles time to settle
C. Floc particles mix
D. None of the above

Water Filtration Key Terms

Declining Rate Filters

126. The filter flow rate will vary with?

A. Head loss
B. Uniform media
C. Effluent control
D. None of the above

127. Declining Rate Filters system often requires _____ to provide adequate media submergence.

A. Head loss
B. Uniform media
C. Effluent control structure
D. None of the above

Disinfection

128. Chlorine is added again after filtration for?

A. Residual
B. Contact time
C. Post-disinfection
D. None of the above

pH

129. According to the text, which of the following has a pH between 6.0 and 8.5?

A. Acids
B. Disinfectants
C. Natural water
D. None of the above

Taste and Odor Control

130. Which of the following is occasionally added for taste and odor control?

A. Turbidity powder
B. Fluoride
C. Powdered activated carbon (PAC)
D. None of the above

Short-Circuiting

131. Short-Circuiting is usually undesirable, since it may result in shorter contact, reaction, or settling times in comparison with the?

A. Presumed detention times
B. Sedimentation/clarification process
C. Modification of the conventional process
D. None of the above

Tube Settlers

132. Tube settlers are a modification of the conventional process contains many metal "tubes" that are normally placed in?

A. Flocculation basin
B. Sedimentation basin or clarifier
C. An up-flow clarifier
D. None of the above

133. The slope of the tube settlers facilitates gravity settling of the solids to the bottom of the basin, where they can be?

A. Adjusted for detention times
B. Modified
C. Collected and removed
D. None of the above

Filtration Overview

134. According to the text, the filter is periodically cleaned by a reversal of flow and the _____ into a drain.

A. Activated carbon filters
B. Anthracite coal
C. Rapid-sand filters
D. None of the above

EPA Filter Backwash Rule- Introduction

Turbidity

135. Which of the following must comply with specific combined filter effluent turbidity requirements?

A. Watershed
B. Disinfection profile
C. Conventional and Direct filtration systems
D. None of the above

Disinfection Benchmarking

136. Public water systems will be required to develop a _____unless they perform applicability monitoring which demonstrates their disinfection byproduct levels are less than 80% of the maximum contaminant levels.

A. Disinfection profile
B. Direct filtration system
C. Disinfection benchmark
D. None of the above

137. According to the text, if a system considers making a significant change to their disinfection practice they must develop a(n) _____and receive State approval for implementing the change.

A. Disinfection profile
B. Direct filtration systems
C. Disinfection benchmark
D. None of the above

138. Which of the following that practice direct recycle, employ 20 or fewer filters to meet production requirements during a selected month, and recycle spent filter backwash water, thickener supernatant, and/or liquids from the dewatering process within the treatment process must perform a one month, one-time recycle self-assessment?

A. Recycle systems
B. Conventional systems
C. Direct filtration systems
D. None of the above

139. Which of the following will be required to return spent filter backwash water, thickener supernatant, and liquids from the dewatering process prior to the point of primary coagulant addition unless the State specifies an alternative location?

A. Recycle systems
B. Conventional systems
C. Direct filtration systems
D. None of the above

140. Which of the following recycling to the treatment process must provide detailed recycle treatment information to the State, which may require that modifications to the recycle practice be made?

A. Recycle systems
B. Conventional systems
C. Direct filtration systems
D. None of the above

Filtration Process- Detailed

141. Removal of _____ plays an important role in the natural treatment of groundwater as it percolates through the soil.

A. Suspended solids by filtration
B. Serious problems in filter operation
C. Coagulation and flocculation processes
D. None of the above

142. According to the text, since surface water sources are subject to run-off and do not undergo natural filtration, it must be filtered to?
A. Remove particles and impurities
B. Increase chlorination
C. Increase suspended particles
D. None of the above

143. Which of the following traps suspended material between the grains of filter media?
A. Bubble diffuser
B. Filtration process - Compared to a sieve or microstrainer
C. Retention Basins - Suspended particles can easily pass
D. None of the above

144. Which of the following will easily pass through the spaces between the grains of the filter media, this making straining the least important process in filtration?
A. Heavy particles and impurities
B. Sludge
C. Suspended particles
D. None of the above

145. Adsorption is the process of particles sticking onto the surface of the individual filter grains or onto the previously deposited materials. The forces that attract and hold the particles to the grains are the same as those that work in _____.
A. Coagulation and flocculation C. Chlorination
B. Filter operation D. None of the above

146. Which of the following may occur in the filter bed will happen especially if coagulation and flocculation of the water before filtration was not properly controlled?
A. Coagulation and flocculation C. Flocculation
B. Filter operation D. None of the above

Direct Filtration Plant vs. Conventional Plant
147. The primary difference between Direct Filtration Plant vs. Conventional Plant is that the _____or step is omitted from the Direct Filtration plant.
A. Sedimentation process C. Fast rinse
B. Reconditioning cycle D. None of the above

Types of Filters
148. What is the term for the mass of growing material that collects on the surface of the filter?
A. Schmutzdecke C. Mud balls
B. Zoological growth D. None of the above

149. Most water filters are classified by filtration rate, type of _____, or type of operation.
A. Schmutzdecke C. Filter media
B. Backwash capabilities D. None of the above

(S) Means the answer can be plural or singular in nature

Rapid Sand Filters

150. Rapid sand filters can accommodate filter rates 40 times more than?
A. Fixed film C. Mixed media
B. Slow sand filters D. None of the above

Filter Sand

151. Which of the following will contain 24-30 inches of sand, but some newer filters are deeper?
A. Rapid sand filters C. Sedimentation basins
B. Slow rate filters D. None of the above

152. The coarser sand in the _____ has larger voids that do not fill as easily.
A. Rapid filters C. Sedimentation basin
B. Backwash trough D. None of the above

False floor

153. The false floor design of a _____ is used together with a porous plate design or with screens that retain the sand when there is no undergravel layer.
A. Backwash system C. Filter underdrain
B. Leopold system D. None of the above

Pressure Sand Filters

154. Which of the following terms or methods cracking of the filter bed can occur quite easily, allowing the iron and manganese particles to go straight through the filter?
A. Slow sand/RO C. Pressure filters
B. Gravity filters D. None of the above

155. Which of the following filtration types is contained under pressure in a steel tank?
A. Slow sand/RO C. Pressure sand filter
B. Gravity filters D. None of the above

156. In which of the following filtration types is the media usually sand or a combination of media?
A. Slow sand/RO C. Fast sand
B. Gravity filters D. None of the above

157. Which of the following filter types has a major disadvantage in that the backwash cannot be observed?
A. Slow sand/RO C. Pressure filters
B. Gravity filters D. None of the above

158. Filtration operation is divided into three steps: filtering, backwashing, and?
A. Filter run C. Return to waste
B. Filtering to waste D. None of the above

159. Which of the following is a low-pressure membrane filtration process that removes suspended solids and colloids generally larger than 0.1-micron diameter?
A. Nanofiltration C. Semi-permeable
B. Microfiltration D. None of the above

160. Which of the following is a relatively recent membrane process used most often with low total dissolved solids water such as surface water and fresh groundwater?
A. Nanofiltration C. Semi-permeable
B. Microfiltration D. None of the above

Declining Rate
161. According to the text, which of the following methods of control is used where the largest head loss occurs in the filtration process?
A. Declining Rate C. Fast sand
B. Gravity filters D. None of the above

162. The rate through the declining filter is much greater in the beginning of a filter run than at the end when the?
A. Filter run C. Head loss is low
B. Filter is dirty D. None of the above

Loss of Head Indicator
163. Which of the following is required to force the water through the filter?
A. Filter run C. Head loss
B. Force D. None of the above

Filtration Process
164. The filter eventually fills with suspended material, usually after 15 to 30 hours, it will need to be_____ to clean the media.
A. Bumped C. Backwashed
B. Jetted D. None of the above

Back Washing
165. Which of the following if it is too high will cause media to be washed from the filter into the troughs and out of the filter.
A. Media C. Backwash rate
B. Floc(s) D. None of the above

Backwashing Process
166. The backwash valve is opened, allowing backwash water to start flowing into the filter and start carrying _____away from the filter.
A. Headloss C. Suspended material
B. Crust on the filter D. None of the above

Disposal of Filter Backwash Water
167. The supernatant is then pumped back to the head of the treatment plant at a rate not exceeding ten percent of the?
A. Daily flow C. Raw water flow entering the plant
B. Backwash water D. None of the above

Filter Aids
168. Which of the following terms expresses that the polymer strengthens the bonds and prevents the shearing forces in the filter from breaking the floc apart when used?
A. Filter media C. Filter aid
B. Lime D. None of the above

Filter Operating Problems

169. According to the text, there are three major types of filter problems. They can be caused by chemical treatment before the filter, _____, and backwashing of filters.

A. Filter aid
B. Control of filter flow rate
C. Coagulation and flocculation stages
D. None of the above

Chemical Treatment before the Filter

170. Which of the following terms of the water treatment must be monitored continuously?

A. Filter aid
B. Backwash storage basin
C. Coagulation and flocculation stages
D. None of the above

Advanced Water Treatment Section

171. Water contains _____ of which impart a quality known as hardness?

A. TDS
B. Conductivity
C. Various amounts of dissolved minerals
D. None of the above

Occurrence of Hard Water

172. Which of the following is caused by soluble, divalent, metallic cations, (positive ions having valence of 2)?

A. Hard water
B. Permanent hardness
C. Carbonate hardness
D. None of the above

Types of Hardness

173. Hardness can be categorized by either of two methods: calcium versus magnesium hardness and?

A. Carbonate hardness
B. Temporary hardness
C. Carbonate versus non-carbonate hardness
D. None of the above

Carbonate-Noncarbonate Distinction

174. According to the text, the carbonate-noncarbonate distinction, is based on hardness from either the bicarbonate salts of calcium or the _____involved in causing water hardness.

A. $CaCO_3$
B. Water hardness
C. Normal salts of calcium and magnesium
D. None of the above

Membrane Filtration Processes

175. Which of the following enables some water systems having contaminated water sources to meet new, more stringent regulations?

A. Membrane technology
B. Macromolecule(s)
C. Conventional thermal separation process(es)
D. None of the above

Nanofiltration

176. Nanofiltration (NF) process has been used primarily for water softening and reduction of?

A. Process liquid
B. Bacterial and protozoan life
C. Total dissolved solids (TDS)
D. None of the above

Reverse Osmosis

177. RO membranes have very low MWC pore size that can reject ions at very high rates, including?

A. Process liquid
B. Chloride and sodium
C. Bacterial and protozoan life
D. None of the above

Water Laboratory Analysis Section

pH Testing Section

178. Mathematically, pH is the negative logarithm of the activity of the (solvated) hydronium ion, more often expressed as the measure of the?

A. Electron concentration
B. Alkalinity concentration
C. Hydronium ion concentration
D. None of the above

179. Alkalinity is the name given to the quantitative capacity of an aqueous solution to neutralize an?

A. Acid
B. Base
C. Bond formation
D. None of the above

10. Sodium hydroxide, NaOH, is an example of a?

A. Weak base
B. Strong base
C. Strong acid
D. None of the above

Disinfection Section

Chlorine's Appearance and Odor

181. Chlorine is a greenish-yellow gas it will condense to an amber liquid at approximately _____F or at high pressures.

A. -29.2 degrees
B. – 100 degrees
C. 29 degrees
D. None of the above

182. Prolonged exposures to chlorine gas may result in?

A. Moisture, steam, and water
B. Odor thresholds
C. Olfactory fatigue
D. None of the above

Chlorine Gas

Pathophysiology

183. The odor threshold for chlorine gas is approximately?

A. 0.3-0.5 parts per million (ppm)
B. 3 parts per million (ppm)
C. 30-500 parts per million (ppm)
D. None of the Above

Chlorination Chemistry

184. According to the text, pH and temperature affect the ratio of hypochlorous acid to hypochlorite ions. As the temperature is decreased, the _____ increases.

A. Reduction Ratio
B. Ratio of hypochlorous acid
C. "CT" disinfection concept
D. None of the above

185. Although the ratio of _____ is greater at lower temperatures, pathogenic organisms are actually harder to kill.

A. Hypochlorous acid
B. The amount of chlorine
C. Total chlorine
D. None of the above

186. If all other things were equal, _____ and a lower pH are more conducive to chlorine disinfection.
A. Lower pH C. Higher water temperatures
B. Hypochlorous acid D. None of the above

Chlorine DDBP
187. These term means that chlorine is present as Cl, HOCl, and OCl^- is called _____, and that which is bound but still effective is _____.
A. Free available chlorine and Total
B. Free and Residual
C. Free available chlorine and Combined Chlorine
D. None of the above

188. Chloramines are formed by reactions with?
A. Acid and Cl_2 C. Folic Acid and Cl2
B. Ammonia and Cl_2 D. None of the above

Types of Residual
189. Which of the following is all chlorine that is available for disinfection?
A. Chlorine residual C. Total chlorine
B. Chlorine demand D. None of the Above

Chlorine Exposure Limits
190. What is OSHA's PEL?
A. 10 PPM C. 1,000 PPM
B. 1 PPM D. None of the above

191. Liquid chlorine is about _____ times heavier than water
A. 1.5 C. 2.5
B. 10 D. None of the above

192. Gaseous chlorine is about _____ times heavier than air.
A. 1.5 C. 2.5
B. 10 D. None of the above

Alternate Disinfectants - Chloramine
193. It is recommended that Chloramine be used in conjunction with a stronger disinfectant. It is best utilized as a?
A. Chloramine C. Stable distribution system disinfectant
B. T10 value disinfectant D. None of the above

194. In the production of _____, the ammonia residuals in the finished water, when fed in excess of stoichiometric amount needed, should be limited to inhibit growth of nitrifying bacteria.
A. Dry sodium chlorite C. Ammonia residual(s)
B. Chloramines D. None of the above

Chlorine Dioxide
195. Which term provides good Giardia and virus protection but its use is limited by the restriction on the maximum residual of 0.5 mg/L ClO_2/chlorite/chlorate allowed in finished water?
A. Chlorinated byproducts C. Ammonia residual(s)
B. Chlorine dioxide D. None of the above

196. If chlorine dioxide is being used as an oxidant, the preferred method of generation is to entrain this term or substance into a packed reaction chamber with a 25% aqueous solution of sodium chlorite ($NaClO_2$).
A. Chloramine C. Chlorine dioxide
B. Chlorine gas D. None of the above

197. According to the text, which chemical is explosive and can cause fires in feed equipment if leaking solutions or spills are allowed to dry out?
A. Dry sodium chlorite C. Ammonia
B. Chlorine dioxide D. None of the above

198. Chlorine dioxide may be used for either taste or odor control or as a?
A. Chloramine C. Gas
B. Pre-disinfectant D. None of the above

Ozone
199. When determining Ozone CT (contact time) values must be determined for the ozone basin alone; an accurate _____ must be obtained for the contact chamber, and residual levels.
A. Residual C. Contact time
B. T10 value D. None of the above

200. Ozone does not provide a system residual and should be used as a primary disinfectant only in conjunction with?
A. Dry sodium chlorite C. Free and/or combined chlorine
B. Chlorine dioxide D. None of the above

When Finished with Your Assignment...

REQUIRED DOCUMENTS
Please scan the **Registration Page, Answer Key, Proctoring reports, Survey and Driver's License** and email these documents to info@TLCH2O.com.

IPhone Scanning Instructions
If you are unable to scan, take a photo of these documents with your **iPhone** and send these photos to TLC, info@TLCH2O.com.

FAX
If you are unable to scan and email, please fax these documents to TLC, if you fax, call to confirm that we received your paperwork. **(928) 468-0675**