

**Registration form**

**OPERATOR MATH REVIEW \$100.00**  
**48 HOUR RUSH ORDER PROCESSING FEE ADDITIONAL \$50.00**  
***We will match any other price if you can find equivalent course for less.***

**Start and Finish Dates:** \_\_\_\_\_

*You will have 90 days from this date in order to complete this course*

Please record amount 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** \_\_\_\_\_

**Please circle/check which certification you are applying the course CEU's.**

Water Treatment \_\_\_ Water Distribution \_\_\_ Wastewater Treatment \_\_\_

Collections \_\_\_ Other \_\_\_\_\_

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

**If you've paid on the Internet, please write your Customer#** \_\_\_\_\_

**Please invoice me, my PO#** \_\_\_\_\_

**Please pay with your credit card on our website under Bookstore or Buy Now. Or call us and provide your credit card information.**

## **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 caused by this CEU education training course material. 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.

**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.

*You can obtain a printed version of the course manual from TLC for an additional \$129.95 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.

## **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. 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.

**Some States and many employers require the final exam to be proctored.**

**All downloads are electronically tracked and monitored for security purposes.**

***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.***

**Operator Math Review Answer Key**    Name \_\_\_\_\_

Phone \_\_\_\_\_

**You are solely responsible to ensure that this course is accepted for credit by your State. Did you check with your State agency to ensure this course is accepted for credit?**

***Method of Course acceptance confirmation. Please fill this section***

***No refunds***

**Website \_\_\_ Telephone Call \_\_\_ Email \_\_\_ Spoke to \_\_\_\_\_**

**Did you receive the approval number, if applicable? \_\_\_\_\_**

**What is the course approval number, if applicable? \_\_\_\_\_**

***You are responsible to ensure that TLC receives the Assignment and Registration Key. Please call us to ensure that we received it. No refunds.***

Please Circle, Bold, Underline or X, one answer per question.

1. A B C D E

2. A B C D E

3. A B C D E

4. A B C D E

5. A B C D E

6. A B C D E

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| 86. A B C D E  | 103. A B C D E | 120. A B C D E | 137. A B C D E |
| 87. A B C D E  | 104. A B C D E | 121. A B C D E | 138. A B C D E |
| 88. A B C D E  | 105. A B C D E | 122. A B C D E | 139. A B C D E |
| 89. A B C D E  | 106. A B C D E | 123. A B C D E | 140. A B C D E |
| 90. A B C D E  | 107. A B C D E | 124. A B C D E | 141. A B C D E |
| 91. A B C D E  | 108. A B C D E | 125. A B C D E | 142. A B C D E |
| 92. A B C D E  | 109. A B C D E | 126. A B C D E | 143. A B C D E |
| 93. A B C D E  | 110. A B C D E | 127. A B C D E | 144. A B C D E |
| 94. A B C D E  | 111. A B C D E | 128. A B C D E | 145. A B C D E |
| 95. A B C D E  | 112. A B C D E | 129. A B C D E | 146. A B C D E |
| 96. A B C D E  | 113. A B C D E | 130. A B C D E | 147. A B C D E |
| 97. A B C D E  | 114. A B C D E | 131. A B C D E | 148. A B C D E |
| 98. A B C D E  | 115. A B C D E | 132. A B C D E | 149. A B C D E |
| 99. A B C D E  | 116. A B C D E | 133. A B C D E | 150. A B C D E |
| 100. A B C D E | 117. A B C D E | 134. A B C D E |                |
| 101. A B C D E | 118. A B C D E | 135. A B C D E |                |

*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.*

*I will contact TLC if I do not hear back from them within 2 days of assignment submission. 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**

Please fax the answer key to TLC Western Campus  
**Fax (928) 272-0747**

Always call us after faxing the paperwork to ensure that we've received it.

**Please e-mail or fax this survey along with your final exam**

**OPERATOR MATH REVIEW 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.**

1. Please rate the difficulty of your course.  
Very Easy 0 1 2 3 4 5 Very Difficult
2. Please rate the difficulty of the testing process.  
Very Easy 0 1 2 3 4 5 Very Difficult
3. Please rate the subject matter on the exam to your actual field or work.  
Very Similar 0 1 2 3 4 5 Very Different
4. How did you hear about this Course? \_\_\_\_\_
5. What would you do to improve the Course?  
\_\_\_\_\_  
\_\_\_\_\_

How about the price of the course?

Poor \_\_\_\_\_ Fair \_\_\_\_\_ Average \_\_\_\_\_ Good \_\_\_\_\_ Great \_\_\_\_\_

How was your customer service?

Poor \_\_\_\_\_ Fair \_\_\_\_\_ Average \_\_\_\_\_ Good \_\_\_\_\_ Great \_\_\_\_\_

Any other concerns or comments.  
\_\_\_\_\_  
\_\_\_\_\_



## Operator Math Review CEU Training Course Assignment

The Operator Math Review CEU course assignment is available in Word on the Internet for your convenience, please visit [www.ABCTLc.com](http://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](mailto:info@tlch2o.com).

Select one answer per question.

### Build it, Fill it and Dose it.

- Convert 10 cubic feet to gallons of water.
  - 83400
  - 46750
  - 73400
  - 563.00
  - None of the Above
- The liquid in a tank weighs 800 pounds, how many gallons are in the tank?
  - 46.9 gallons
  - 6672 gallons
  - 5872 gallons
  - 95.92 gallons
  - None of the Above
- Convert 75 cubic feet to gallons of water. \*
  - 5.61
  - 625.5
  - 561
  - 173.25
  - None of the Above
- The liquid in a tank weighs 50 pounds, how many gallons are in the tank? \*
  - 374
  - 6
  - 115.5
  - 417
  - None of the Above
- Convert a flow rate of 8936 gallons per minute to million gallons per day.
  - 12867840 or 1.3 MGD
  - 14723200 or 1.4 MGD
  - 15723200 or 1.5 MGD
  - 12723200 or 1.2 MGD
  - None of the Above

(\*) Denotes concept based QA/QC question and not in course booklet.

6. Convert a flow rate of 750 gallons per minute to millions of gallons per day.
- A. 1.08 MGD
  - B. 0.88 MGD
  - C. 0.89 MGD
  - D. 0.90 MGD
  - E. None of the Above
7. Convert a flow rate of 13,250 gallons per minute to million gallons per day.
- A. 9167 MGD
  - B. 21.75 MGD
  - C. 23 MGD
  - D. 19.08 MGD
  - E. None of the Above
8. Convert a flow rate of 5880 gallons per minute to millions of gallons per day.
- A. 8.56 MGD
  - B. 8.76 MGD
  - C. 8.96 MGD
  - D. 8.46 MGD
  - E. None of the Above
9. Convert a flow of 550 gallons per minute to gallons per second.
- A. 9167 gpd
  - B. 91.67 gpd
  - C. 8.167 gpd
  - D. 9.167 gpd
  - E. None of the Above
10. A tank is 5' X 14' x 8' and can hold a maximum of \_\_\_\_\_ gallons of water.
- A. 4612.4 gallons
  - B. 4188.8 gallons
  - C. 4912.4 gallons
  - D. 4812.4 gallons
  - E. None of the Above
11. A tank is 23' X 77' X 9' what is the volume of water in gallons?
- A. 119224
  - B. 150250
  - C. 160250
  - D. 180250
  - E. None of the Above

(\*) Denotes concept based QA/QC question and not in course booklet.



12. A tank holds 57,596 gallons of water. The length is 50' and the width is 14'. How deep is the tank?

- A. 100 feet deep
- B. 1.0 feet deep
- C. 11 feet deep
- D. .10 feet deep
- E. None of the Above

13. Convert a flow of 733 gallons per minute to gallons per second. \*

- A. 43,980
- B. 20
- C. 12.216
- D. 552
- E. None of the Above

14. A tank is 20' X 20' x 40' and can hold a maximum of \_\_\_\_\_ gallons of water. \*

- A. 133,440
- B. 5,984
- C. 16,000
- D. 119,680
- E. None of the Above

15. A tank holds 85,000 gallons of water. The length is 75' and the width is 14'. How deep is the tank? \*

- A. 20
- B. 105
- C. 11 or 10.8
- D. 11,363
- E. None of the Above

16. The diameter of a tank is 50' and the depth is 20'. How many gallons does it hold?

- A. .29 MG
- B. .5 MG
- C. .65 MG
- D. .75 MG
- E. None of the Above

17. The diameter of a tank is 30' and the depth is 5'. How many gallons does it hold? \*

- A. 880,77
- B. 33,660
- C. 3532.5
- D. 26,423
- E. None of the Above

(\*) Denotes concept based QA/QC question and not in course booklet.

18. The diameter of a tank is 160' and the depth is 30'. How many gallons does it hold? \*
- A. 602,880
  - B. 4.5
  - C. 3,768
  - D. 4,509,542.4
  - E. None of the Above

19. The diameter of a tank is 33' and the depth is 20'. How many gallons does it hold? \*
- A. 127,887.8
  - B. 162,914
  - C. 17,097.3
  - D. 77,507.7
  - E. None of the Above

20. The diameter of a tank is 5' and the depth is .5'. How many gallons does it hold? \*
- A. 935
  - B. 734
  - C. 187
  - D. 147
  - E. None of the Above

### **Flow and Velocity**

21. A channel is 2 feet wide and has water flowing to a depth of 3 feet. If the velocity through the channel is 1.5 fps or feet per second, what is the cfs flow rate through the channel?
- A. 1.5 cfs
  - B. 2 cfs
  - C. 9 cfs
  - D. 5 cfs
  - E. None of the Above

22. A channel is 12 inches wide and has water flowing to a depth of 1.5 ft. If the velocity of the water is 2.3 fps, what is the cfs flow in the channel?
- A. 10.5 cfs
  - B. 3.45 cfs
  - C. 13.5 cfs
  - D. 41.4 cfs
  - E. None of the Above

23. A channel is 3 feet wide and has a water flow at a velocity of 1.5 fps. If the flow through the channel is 8.1 cfs, what is the depth of the water?
- A. 4.4
  - B. 1.8
  - C. 54
  - D. 44
  - E. None of the Above

24. The flow through a 6 inch diameter pipe is moving at a velocity of 3 ft/sec. What is the cfs flow rate through the pipeline?
- A. .58875 or .6 cfs
  - B. .88875 or .9 cfs
  - C. .48875 or .5 cfs
  - D. .68875 or .7 cfs
  - E. None of the Above
25. An 12 inch diameter pipe has water flowing at a velocity of 3.4 fps. What is the gpm flow rate through the pipe?
- A. 554.7 or 573 gpm
  - B. 2874.83 or 2875 gpm
  - C. 19.96 or 20 gpm
  - D. 1197.84 or 1198 gpm
  - E. None of the Above
26. A 6 inch diameter pipe delivers 2995 gpm. What is the velocity of flow in the pipe in ft/sec?
- A. 49.916 or 50 ft/sec
  - B. 34.047 or 34.05 ft/sec
  - C. 31.115 or 31.2 ft/sec
  - D. 3.555 or 3.3 ft/sec
  - E. None of the Above
27. A new section of 12 inch diameter pipe is to be disinfected before it is placed in service. If the length is 2000 feet, how many gallons of 5% NaOCl will be needed for a dosage of 10 mg/L?
- A. 84.9 lbs/day
  - B. 97.9 lbs/day
  - C. 2.4 gal/day
  - D. 0.04 lbs/day
  - E. None of the Above
28. A section of 6 inch diameter pipe is to be filled with water. The length of the pipe is 1320 feet long. How many kilograms of chlorine will be needed for a chlorine dose of 3 mg/L?
- A. .02 kg
  - B. 2 kg
  - C. 80 kg
  - D. 3960 kg
  - E. None of the Above
29. A channel is 5 feet wide and has water flowing to a depth of 2 feet. If the velocity through the channel is 2 fps or feet per second, what is the cfs flow rate through the channel? \*
- A. 149
  - B. 20
  - C. 5
  - D. 10
  - E. None of the Above

30. A channel is 36 inches wide and has water flowing to a depth of 2.5 ft. If the velocity of the water is 2.0 fps, what is the cfs flow in the channel? \*
- A. 180
  - B. 7.5
  - C. 15
  - D. 22.5
  - E. None of the Above
31. A channel is 2 feet wide and has a water flow at a velocity of 3.5 fps. If the flow through the channel is 5.5 cfs, what is the depth of the water? \*
- A. .785
  - B. 2
  - C. 7
  - D. 20
  - E. None of the Above
32. The flow through a 8 inch diameter pipe is moving at a velocity of 5 ft/sec. What is the cfs flow rate through the pipeline? \*
- A. 40
  - B. 251
  - C. 1.75
  - D. 5
  - E. None of the Above
33. An 8 inch diameter pipe has water flowing at a velocity of 3.4 fps. What is the gpm flow rate through the pipe? \*
- A. 1278
  - B. 533
  - C. 16.27
  - D. 199.6
  - E. None of the Above
34. A 6 inch diameter pipe delivers 55 gpm. What is the velocity of flow in the pipe in ft/sec? \*
- A. .122
  - B. .622
  - C. 7.5
  - D. .196
  - E. None of the Above
35. A new section of 18 inch diameter pipe is to be disinfected before it is placed in service. If the length is 5000 feet, how many gallons of 5% NaOCl will be needed for a dosage of 200 mg/L? \*
- A. 380
  - B. 35
  - C. 1.76
  - D. 5
  - E. None of the Above

(\*) Denotes concept based QA/QC question and not in course booklet.

36. A section of 18 inch diameter pipe is to be filled with water. The length of the pipe is 1200 feet long. How many kilograms of chlorine will be needed for a chlorine dose of 2 mg/L? \*
- A. .12
  - B. 17.27
  - C. 12
  - D. .264
  - E. None of the Above
37. Determine the chlorinator setting in pounds per 24 hour period to treat a flow of 3.4 MGD with a chlorine dose of 5 mg/L?
- A. 141.78 lbs/day
  - B. 127.16 lbs/day
  - C. 17 lbs/day
  - D. 9.49 lbs/day
  - E. None of the Above
38. To correct an odor problem, you use chlorine continuously at a dosage of 10 mg/L and a flow rate of 80 GPM. Approximately how much will odor control cost annually if chlorine is \$0.20 per pound?
- A. \$701.36
  - B. \$1334.40
  - C. \$7 M
  - D. \$937.32
  - E. None of the Above
39. A wet well measures 8 feet by 10 feet and 4 feet in depth between the high and low levels. A pump empties the wet well between the high and low levels 10 times per hour, 24 hours a day. Neglecting inflow during the pumping cycle, calculate the flow into the pump station in millions of gallons per day (MGD).
- A. .378 or .37 MGD
  - B. .077 or .07 MGD
  - C. .024 or .02 MGD
  - D. .574 or .57 MGD
  - E. None of the Above
40. A sewage treatment plant has a flow of 0.7 MGD and a BOD of 225 mg/L. On the basis of a national average of 0.2 lbs BOD per capita per day, what is the approximate population equivalent of the plant?
- A. 6567.75
  - B. 6777.75
  - C. 6576.75
  - D. 5667.75
  - E. None of the Above
41. What is the detention time of a clarifier with a 300,000 gallon capacity if it receives a flow of 3.0 MGD?
- A. 3 hrs
  - B. 2.4 hrs
  - C. 1 hr
  - D. 5 hrs
  - E. None of the Above

42. Determine the chlorinator setting in pounds per 24 hour period to treat a flow of 5.4 MGD with a chlorine dose of 2.35 mg/L? \*
- A. 16.96
  - B. 12.69
  - C. 105.8
  - D. 2540
  - E. None of the Above
43. To correct an odor problem, you use chlorine continuously at a dosage of 15 mg/L and a flow rate of 7 GPM. Approximately how much will odor control cost annually if chlorine is \$0.15 per pound? \*
- A. 6,000,000
  - B. 460
  - C. 69.04
  - D. 47,944
  - E. None of the Above
44. A wet well measures 12 feet by 15 feet and 11 feet in depth between the high and low levels. A pump empties the wet well between the high and low levels 9 times per hour, 24 hours a day. Neglecting inflow during the pumping cycle, calculate the flow into the pump station in millions of gallons per day (MGD). \*
- A. 290,822
  - B. 3.199
  - C. .133
  - D. .427
  - E. None of the Above
45. A sewage treatment plant has a flow of 1.3 MGD and a BOD of 25 mg/L. On the basis of a national average of 0.2 lbs BOD per capita per day, what is the approximate population equivalent of the plant?
- A. 1355
  - B. 54
  - C. 494575
  - D. 250
  - E. None of the Above
46. What is the detention time in hours of a clarifier with a 750,000 gallon capacity if it receives a flow of 10.0 MGD?
- A. 1.8
  - B. 1,800,000
  - C. 1.8 min
  - D. 18 days
  - E. None of the Above
47. How many grams equal 4,500 mg?
- A. 45
  - B. 4.5
  - C. 450
  - D. .450
  - E. None of the Above

48. How many grams equal 7,500 mg?

- A. 7.5
- B. .75
- C. 750
- D. 7500
- E. None of the Above

49. How many grams equal 12,500 mg?

- A. 12.5
- B. 125
- C. 1.25
- D. .125
- E. None of the Above

## Temperature

50. Convert 4 degrees Celsius to degrees Fahrenheit.

- A. 33
- B. 34
- C. 35
- D. 39.2
- E. None of the Above

51. Convert 22 degrees Celsius to degrees Fahrenheit.

- A. 68.9
- B. 44.4
- C. 71.6
- D. 73.5
- E. None of the Above

52. Convert 2 degrees Celsius to degrees Fahrenheit.

- A. 35.6
- B. 42.5
- C. 34
- D. 40.6
- E. None of the Above

53. Convert 82 degrees Fahrenheit to degrees Celsius.

- A. 21.75
- B. 32.30
- C. 26.00
- D. 27.78
- E. None of the Above

54. Convert 33 degrees Fahrenheit to degrees Celsius.

- A. .555
- B. 5
- C. 1.89
- D. 3.33
- E. None of the Above

55. Convert 72 degrees Fahrenheit to degrees Celsius.
- A. 25
  - B. 22.2
  - C. 25.2
  - D. 31
  - E. None of the Above

## Water Treatment Filters

56. A 19 foot wide by 31 foot long rapid sand filter treats a flow of 2,050 gallons per minute. Calculate the filtration rate in gallons per minute per square foot of filter area.
- A. 5
  - B. 1472.5
  - C. 589
  - D. 3.48
  - E. None of the Above
57. A 26 foot wide by 36 foot wide long rapid sand filter treats a flow of 2,500 gallons per minute. Calculate the filtration rate in gallons per minute per square foot of filter area.
- A. 2.67
  - B. 936
  - C. 3.36
  - D. 1123200
  - E. None of the Above
58. A 25 foot wide by 25 foot long rapid sand filter treats a flow of 300 gallons per minute. Calculate the filtration rate in gallons per minute per square foot of filter area.
- A. 1.48 gal/min./ft<sup>2</sup>
  - B. .48 gal/min./ft<sup>2</sup>
  - C. 4.8 gal/min./ft<sup>2</sup>
  - D. 48 gal/min./ft<sup>2</sup>
  - E. None of the Above
59. A 30 foot wide by 30 foot wide long rapid sand filter treats a flow of 1,500 gallons per minute. Calculate the filtration rate in gallons per minute per square foot of filter area.
- A. 1.67 gal/min/ft<sup>2</sup>
  - B. 167.00 gal/min/ft<sup>2</sup>
  - C. 16.7 gal/min/ft<sup>2</sup>
  - D. 3.54 gal/min/ft<sup>2</sup>
  - E. None of the Above



## Chemical Dose

60. A pond has a surface area of 51,500 square feet and the desired dose of a chemical is 6.5 lbs per acre. How many pounds of the chemical will be needed?
- A. 9.68 lbs
  - B. 8.68 lbs
  - C. 7.68 lbs
  - D. 6.68 lbs
  - E. None of the Above
61. A pond having a volume of 6.85 acre feet equals how many millions of gallons?
- A. 2.231 MG
  - B. 20.231 MG
  - C. 200.231 MG
  - D. .2231 MG
  - E. None of the Above
62. A pond has a surface area of 75,000 square feet and the desired dose of a chemical is 5.5 lbs per acre. How many pounds of the chemical will be needed? \*
- A. 412,500
  - B. 26
  - C. 4234.5
  - D. 9.47
  - E. None of the Above
63. A pond having a volume of 13,000 acre feet equals how many millions of gallons? \*
- A. 4.2
  - B. 97240
  - C. 4235.8
  - D. 42345
  - E. None of the Above
64. Alum is added in a treatment plant process at a concentration of 10.5 mg/L. What should the setting on the feeder be in pounds per day if the plant is treating 3.5 MGD?
- A. 3064.95
  - B. 3.06
  - C. 30.649
  - D. 306.495
  - E. None of the Above
65. Alum is added in a treatment plant process at a concentration of 4.5 mg/L. What should the setting on the feeder be in pounds per day if the plant is treating 23.5 MGD? \*
- A. 791
  - B. 882
  - C. 105.75
  - D. 8.82
  - E. None of the Above

(\* ) Denotes concept based QA/QC question and not in course booklet.

## Q=AV Review

66. An 8 inch diameter pipe has water flowing at a velocity of 3.4 fps. What is the GPM flow rate through the pipe?
- A. 432 gpm
  - B. 532 gpm
  - C. 632 gpm
  - D. 5.32 gpm
  - E. None of the Above
67. A 6 inch diameter pipe delivers 280 GPM. What is the velocity of flow in the pipe in Ft/Sec?
- A. 3.2 fps
  - B. 4.2 fps
  - C. 5.2 fps
  - D. 2.2 fps
  - E. None of the Above
68. An 36 inch diameter pipe has water flowing at a velocity of 1.4 fps. What is the GPM flow rate through the pipe? \*
- A. 73.98
  - B. 4439
  - C. 10653
  - D. 1479
  - E. None of the Above
69. An 18 inch diameter pipe delivers 80 GPM. What is the velocity of flow in the pipe in Ft/Sec? \*
- A. .17
  - B. 6.056
  - C. 45
  - D. 0.101
  - E. None of the Above

## Collection Math Section

70. A 24-inch sewer carries an average daily flow of 5 MGD. If the average daily flow per person from the area served is 110 GPCD (gallons per capita per day), approximately how many people discharge into the wastewater collection system?
- A. 145454.5 people
  - B. 45.45 people
  - C. 45454.5 people
  - D. 454 people
  - E. None of the Above
71. Using a dose rate of 5 mg/L, how many pounds of chlorine per day should be used if the flow rate is 1.2 MGD?
- A. 504 lbs
  - B. 50.04 lbs
  - C. 250.04 lbs
  - D. 150.04 lbs
  - E. None of the Above
72. What capacity blower will be required to ventilate a manhole which is 3.5 feet in diameter and 17 feet deep? The air exchange rate is 16 air changes per hour.
- A. 26.15 cfh
  - B. 2.61cfh
  - C. 2615.6 cfh
  - D. .26 cfh
  - E. None of the Above
73. Approximately how many feet of drop are in 455 feet of 8-inch sewer with a 0.0475 ft/ft. slope?
- A. 20.61 ft
  - B. 25.61 ft
  - C. 23.61 ft
  - D. 21.61 ft
  - E. None of the Above
74. How much brake horsepower is required to meet the following conditions: 250 gpm, total head = 110 feet? The submersible pump that is being specified is a combined 64% efficient?
- A. 10.85 bhp
  - B. 20.85 bhp
  - C. 15.85 bhp
  - D. 11.85 bhp
  - E. None of the Above
75. How wide is a trench at ground surface if a sewer trench is 2 feet wide at the bottom, 10 feet deep, and the sides have been sloped at a 4/5 horizontal to 1 vertical (3/4:1) ratio?
- A. 17.1 ft
  - B. 17 ft
  - C. 1.7 ft
  - D. 171 ft

76. A 24-inch sewer carries an average daily flow of 3 MGD. If the average daily flow per person from the area served is 125 GPCD (gallons per capita per day), approximately how many people discharge into the wastewater collection system? \*
- A. 24,000
  - B. 240
  - C. 4,200
  - D. 3750
  - E. None of the Above
77. Using a dose rate of 4 mg/L, how many pounds of chlorine per day should be used if the flow rate is 3.2 MGD? \*
- A. 12.8
  - B. 106.75
  - C. 95.7
  - D. 4
  - E. None of the Above
78. What capacity blower will be required to ventilate a manhole which is 3.0 feet in diameter and 18 feet deep? The air exchange rate is 16 air changes per hour. \*
- A. 7
  - B. 8
  - C. 9
  - D. 10
  - E. None of the Above
79. Approximately how many feet of drop are in 575 feet of 8-inch sewer with a 0.0375 ft/ft. slope? \*
- A. 15.33
  - B. 8
  - C. 21.56
  - D. 7.35
  - E. None of the Above
80. How wide is a trench at ground surface if a sewer trench is 2 feet wide at the bottom, 12 feet deep, and the sides have been sloped at a 4/5 horizontal to 1 vertical (3/4:1) ratio? \*
- A. 20
  - B. 23
  - C. 35
  - D. 21
  - E. None of the Above
81. A float arrives in a manhole 550 feet down stream three minutes and thirty seconds from its release point. What is the velocity in ft/sec.?
- A. 2.62 fps
  - B. 3.62 fps
  - C. 4.62 fps
  - D. 5.62 fps
  - E. None of the Above

82. A new sewer line plan calls out a 0.6% slope of the line. An elevation reading of 108.8 feet at the manhole discharge and an elevation of 106.2 feet at a distance of 200 feet from the manhole are recorded. What is the existing slope of the line that has been installed?

- A. 13.10 or 13.1%
- B. 1.013 or 10.3%
- C. .13 or 13%
- D. .013 or 1.3%
- E. None of the Above

83. A triangular pile of spoil is 12 feet high and 12 feet wide at the base. The pile is 60' long. If the dump truck hauls 9 cubic yards of dirt, how many truck loads will it take to remove all of the spoil?

- A. 17.7 or 18 trucks
- B. 15.7 or 16 trucks
- C. 16.7 or 17 trucks
- D. 19.7 or 20 trucks
- E. None of the Above

84. A red dye is poured into an upstream manhole connected to a 12 inch sewer. The dye first appears in a manhole 400 feet downstream 3 minutes later. After 3 minutes and 40 seconds the dye disappears. Estimate the flow velocity in feet per second.

- A. 1 fps
- B. 2 fps
- C. 3 fps
- D. 4 fps
- E. None of the Above

85. Calculate the total dosage in pounds of a chemical. Assume the sewer is completely filled with the concentration. Pipe diameter: 18 inches, Pipe length: 420 feet, Dose: 120 mg/L.

- A. 3.55 lbs
- B. 4.55 lbs
- C. 5.55 lbs
- D. 6.55 lbs
- E. None of the Above

86. A float arrives in a manhole 850 feet down stream four minutes and thirty seconds from its release point. What is the velocity in ft/sec.? \*

- A. 314
- B. 3.148
- C. 197.67
- D. 212.5
- E. None of the Above

87. A new sewer line plan calls out a 0.6% slope of the line. An elevation reading of 210.3 feet at the manhole discharge and an elevation of 106.2 feet at a distance of 100 feet from the manhole are recorded. What is the existing slope of the line that has been installed? \*

- A. 0.6
- B. 7.8
- C. 5.5
- D. .56
- E. None of the Above

88. A red dye is poured into an upstream manhole connected to a 12 inch sewer. The dye first appears in a manhole 300 feet downstream 3 minutes later. After 3 minutes and 20 seconds the dye disappears. Estimate the flow velocity in feet per second. \*

- A. 1.071
- B. 2
- C. 5
- D. 20
- E. None of the Above

**Convert the following:**

89. 87 seconds to minutes:

- A. 1.45 min
- B. 2.5 min
- C. None of the Above

90. 1045 seconds to minutes:

- A. 27.4 min
- B. 17.4 min
- C. None of the Above

91. 24 minutes to seconds:

- A. 1440 sec
- B. 4440 sec
- C. None of the Above

92. 15 minutes to seconds:

- A. 900 sec
- B. 1200 sec
- C. None of the Above

93. 109 minutes to hours

- A. 2.8 hr
- B. 1.8 hr
- C. None of the Above

94. 44 minutes to hours

- A. 0.8 hr
- B. 0.73 hr
- C. None of the Above

95. 2.8 hours to minutes

- A. 368 min
- B. 168 min
- C. None of the Above

96. 0.5 hours to minutes

- A. 30 min
- B. 15 min
- C. None of the Above

97. 13 hours to days
- A. 1.5 day
  - B. 0.4 day
  - C. 0.4 day
  - D. 0.5 or 0.54 day
  - E. None of the Above

98. 45 hours to days
- A. 0.9 day
  - B. 1.9 day
  - C. 2.9 day
  - D. 3.9 day
  - E. None of the Above

99. 0.5 days to hours
- A. 1.2 hr
  - B. 12 hr
  - C. 22 hr
  - D. 0.2 hr
  - E. None of the Above

100. 3 days to hours
- A. 86 hrs
  - B. 48 hrs
  - C. 36 hrs
  - D. 72 hrs
  - E. None of the Above

101. 2 days to minutes
- A. 880 min
  - B. 1880 min
  - C. 2880 min
  - D. 3880 min
  - E. None of the Above

102. 452 min to days
- A. 0.1 day
  - B. 0.4 day
  - C. 0.3 day
  - D. 0.2 day
  - E. None of the Above

103. 250 gpm to MGD
- A. 0.6 MGD
  - B. 0.2 MGD
  - C. 0.9 MGD
  - D. 0.36 or 0.4 MGD
  - E. None of the Above

104. 600 gpm to MGD

- A. 0.6 MGD
- B. 0.2 MGD
- C. 0.86 or 0.9 MGD
- D. 0.4 MGD
- E. None of the Above

105. 120 gpm to MGD

- A. 0.6 MGD
- B. 0.17 or 0.2 MGD
- C. 0.9 MGD
- D. 0.4 MGD
- E. None of the Above

106. 0.25 MGD to gpm

- A. 174 gpm
- B. 903 gpm
- C. 556 gpm
- D. 83 gpm
- E. None of the Above

107. 1.3 MGD to gpm

- A. 174 gpm
- B. 903 gpm
- C. 556 gpm
- D. 803 gpm
- E. None of the Above

108. 0.12 MGD to gpm

- A. 14 gpm
- B. 93 gpm
- C. 56 gpm
- D. 83 gpm
- E. None of the Above

109. 1500 cu.ft. to gal

- A. 1311 cu.ft.
- B. 3,740 gal
- C. 3117 gal
- D. 11,220 gal
- E. None of the Above

110. 5 cu.ft. to gal

- A. 13 cu.ft.
- B. 34 gal
- C. 37 gal
- D. 11 gal
- E. None of the Above



111. 500 cu.ft. to gal  
A. 1300 cu.ft.  
B. 3,740 gal  
C. 3107 gal  
D. 11,220 gal  
E. None of the Above

112. 100 gal to cu.ft.  
A. 16 cu.ft.  
B. 13 cu.ft.  
C. 3334 cu.ft.  
D. 5.5 cu.ft.  
E. None of the Above

113. 2500 gal to cu.ft.  
A. 336 cu.ft.  
B. 313 cu.ft.  
C. 334 cu.ft.  
D. 355 cu.ft.  
E. None of the Above

114. 45 gal to cu.ft.  
A. 6 cu.ft.  
B. 13 cu.ft.  
C. 3 cu.ft.  
D. 5 cu.ft.  
E. None of the Above

115. 2.5 gal to lbs  
A. 21 lbs  
B. 917 lbs  
C. 687 lbs  
D. 167 lbs  
E. None of the Above

116. 20 gal to lbs  
A. 21 lbs  
B. 917 lbs  
C. 687 lbs  
D. 167 lbs  
E. None of the Above

117. 110 gal to lbs  
A. 21 lbs  
B. 917 lbs  
C. 687 lbs  
D. 167 lbs  
E. None of the Above

118. 24 lbs to gal
- A. 3 gal
  - B. 6 gal
  - C. 18 gal
  - D. 46 gal
  - E. None of the Above

119. 53 lbs to gal
- A. 3 gal
  - B. 6 gal
  - C. 18 gal
  - D. 46 gal
  - E. None of the Above

120. 150 lbs to gal
- A. 3 gal
  - B. 6 gal
  - C. 18 gal
  - D. 46 gal
  - E. None of the Above

121. 20 psi to ft
- A. 46 ft
  - B. .433 ft
  - C. 173 ft
  - D. 231 ft
  - E. None of the Above

122. 100 psi to ft
- A. 23 ft
  - B. .433 ft
  - C. 173 ft
  - D. 231 ft
  - E. None of the Above

123. 75 psi to ft
- A. 146 ft
  - B. .433 ft
  - C. 173 ft
  - D. 331 ft
  - E. None of the Above

124. 100 ft to psi
- A. 33.4 psi
  - B. 216 psi
  - C. 22 psi
  - D. 43 psi
  - E. None of the Above

125. 50 ft to psi

- A. 33.4 psi
- B. 21 psi
- C. 22 psi
- D. 23 psi
- E. None of the Above

126. 500 ft to psi

- A. 233.4 psi
- B. 216 psi
- C. 222 psi
- D. 243 psi
- E. None of the Above

127. 90 cu.ft. to lbs

- A. 5614 lbs
- B. 6732 lbs
- C. 750.60
- D. 3354 lbs
- E. None of the Above

128. 150 lbs to cu.ft.

- A. 17.98
- B. 2
- C. 32
- D. 200
- E. None of the Above

129. What is the area of a filter that is 8 ft by 12 ft?

- A. 100 ft
- B. 2,000 ft
- C. 96 sq. ft
- D. 7,850 sq.ft.
- E. None of the Above

130. What is the area of a clearwell that has a width of 25 ft and a length of 80 ft?

- A. 200 ft
- B. 2,000 sq. ft
- C. 26 ft
- D. 2,850 sq.ft.
- E. None of the Above

131. What is the area of the tank that is 10 ft long and 10 ft wide?

- A. 100 sq. ft
- B. 1,000 ft
- C. 16 ft
- D. 1,850 sq.ft.
- E. None of the Above

132. A tank has a diameter of 100 ft. What is the area?

- A. 7800 sq.ft.
- B. 7,000 sq.ft.
- C. 796 sq.ft.
- D. 7,850 sq.ft.
- E. None of the Above

133. What is the area of a clarifier with a diameter of 30 feet?

- A. 1,256 sq.ft.
- B. 62.8 ft
- C. 94.2 ft
- D. 176,625 sq.ft.
- E. None of the Above

134. What is the area of a tank with a radius of 20 ft?

- A. 1,256 sq.ft.
- B. 162.8 ft
- C. 1 94.2 ft
- D. 176,625 sq.ft.
- E. None of the Above

135. What is the circumference of a circle if the diameter is 20 ft?

- A. 256 ft
- B. 62.8 ft
- C. 94.2 ft
- D. 175 ft
- E. None of the Above

136. What is the circumference of a circle if the radius is 15 ft?

- A. 1,256 ft
- B. 62.8 ft
- C. 94.2 ft
- D. 176,625 ft
- E. None of the Above

137. What is area of a clarifier that is 15 ft across?

- A. 76,625 sq.ft.
- B. 176.625 sq.ft.
- C. 276,625 sq.ft.
- D. 1,176,625 sq.ft.
- E. None of the Above

138. What is the area of a pipe in feet that has a 12 inch diameter?

- A. .485 sq.ft.
- B. .585 sq.ft.
- C. .685 sq.ft.
- D. .785 sq.ft.
- E. None of the Above

139. A tank is 10 ft long, 10 ft wide, with a depth of 5 ft. What is the volume of the tank?
- A. 300 cu.ft.
  - B. 400 cu.ft.
  - C. 500 cu.ft.
  - D. 600 cu.ft.
  - E. None of the Above
140. What is the volume of a sedimentation basin that is 12 ft long, 6 ft wide and 10 ft deep?
- A. 520 cu.ft.
  - B. 620 cu.ft.
  - C. 720 cu.ft.
  - D. 820 cu.ft.
  - E. None of the Above
141. What is the capacity of a tank in gallons with the following dimensions, 12 ft by 10 ft by 8 ft?
- A. 560 cu.ft.
  - B. 760 cu.ft.
  - C. 1960 cu.ft.
  - D. 960 cu.ft.
  - E. None of the Above
142. A tank is 25 ft wide, 75 feet long and has a water depth of 10 ft. How many gallons of water are in the tank?
- A. 140,250 gal
  - B. 40,250 gal
  - C. 1,140,250 gal
  - D. .40,250 gal
  - E. None of the Above
143. A clarifier has a diameter of 50 ft. If the depth of the water is 15 ft, what is the volume?
- A. 1,29,438 cu.ft.
  - B. 29,438 cu.ft.
  - C. .29,438 cu.ft.
  - D. 59,438 cu.ft.
  - E. None of the Above
144. What is the volume of a piece of pipe that is 2000 ft long and has a diameter of 18 inches?
- A. 1,533 cu.ft.
  - B. 3,533 cu.ft.
  - C. 2,533 cu.ft.
  - D. 4,533 cu.ft.
  - E. None of the Above
145. What is the perimeter of a water plant with the following dimensions: 100 ft, 250 ft, 300 ft, 500 ft, and 220 ft?
- A. 137 ft
  - B. .370 ft
  - C. 1,370 ft
  - D. 10,370 ft
  - E. None of the Above

146. Your system has just installed 2, 000 feet of 8" line. How many gallons of water will it take to fill this line?

- A. 3,272 gal
- B. 4,272 gal
- C. 5,272 gal
- D. 6,272 gal
- E. None of the Above

147. Your finished water storage tank is 35' in diameter and 65' high. With no water entering it the level dropped 4' in 5 hours. How many gallons of water were used in this period?

- A. 28 gal
- B. 28,772 gal
- C. 287 gal
- D. 2877 gal
- E. None of the Above

148. If a clarifier has a diameter of 68 feet, and a height of 86 feet, what is the surface area of the water within the clarifier?

- A. 3,630 sq.ft.
- B. 363 sq.ft.
- C. 3.6 sq.ft.
- D. 300,630 sq.ft.
- E. None of the Above

149. Determine the chlorinator setting (lbs/day) needed to treat a flow of 4 MGD with a chlorine dose of 5 mg/L. \*

- A. 166.8
- B. 1.6
- C. 16.8
- D. .168
- E. None of the Above

150. Determine the chlorinator setting (lbs/day) if a flow of 3.8 MGD is to be treated with a chlorine dose of 2.5 mg/L. \*

- A. .79
- B. 7.9
- C. 79.23
- D. 792.3
- E. None of the Above

**You are finished with your assignment.**

**E-mail or fax the answer sheet and registration page and call to confirm we've received it.**