

Water Quality Laboratory Analyst

Practice Test

March 24, 2026

Time limit: 180 minutes

Solution key: <https://www.californiacerts.com/resources/pdfs/ca-water-quality-analyst/practice-solution.pdf>

1. What is the function of a "Blank" cuvette when "zeroing" a spectrophotometer before analyzing a batch of samples?

- A. To zero the instrument by subtracting the background absorbance of the reagents and the glass
- B. To clean the optical path before inserting the actual sample
- C. To provide a colored standard for visual comparison
- D. To safely dispose of the highly concentrated standard solution

2. The provided diagram shows an agar plate inoculated using the streak plate technique. What is the primary objective of sterilizing the inoculation loop between streaking each of the four sequential quadrants?

- A. To create an anaerobic environment in the final quadrant
- B. To test the heat resistance of the bacterial strain being cultured
- C. To sequentially dilute the inoculum to yield distinct, pure isolated colonies
- D. To prevent the agar from drying out during the incubation period

3. What is the primary purpose of calculating the Langelier Saturation Index (LSI) for a municipal water distribution system?

- A. To calculate the total concentration of dissolved organic carbon
- B. To predict whether the water is corrosive (dissolves CaCO_3) or scale-forming (deposits CaCO_3)
- C. To evaluate the aesthetic taste and odor properties of the water
- D. To determine the required chlorine dosage for primary disinfection

4. In the Multiple-Tube Fermentation (MTF) technique for total coliform analysis, what is the primary purpose of the small inverted Durham tube located inside the larger culture broth tube?

- A. To provide a separate environment for anaerobic bacterial growth
- B. To concentrate the bacteria into a smaller volume for easier counting
- C. To maintain a constant pH within the culture medium during incubation
- D. To physically trap and indicate the production of gas from lactose fermentation

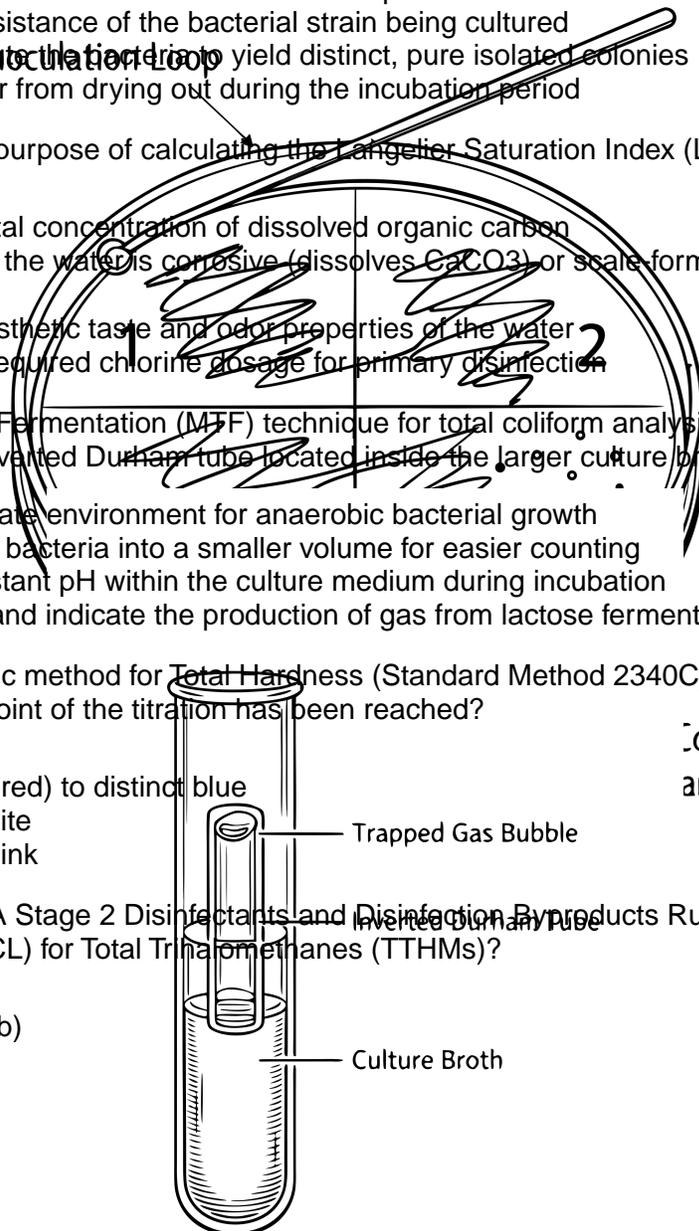
5. In the EDTA titrimetric method for Total Hardness (Standard Method 2340C), what color change indicates that the endpoint of the titration has been reached?

- A. Blue to yellow
- B. Red-wine (pinkish-red) to distinct blue
- C. Clear to cloudy white
- D. Colorless to faint pink

Colonies
ant 4)

6. According to the EPA Stage 2 Disinfectants and Disinfection Byproducts Rule, what is the Maximum Contaminant Level (MCL) for Total Trihalomethanes (TTHMs)?

- A. 0.100 mg/L
- B. 0.080 mg/L (80 ppb)
- C. 1.0 mg/L



D. 0.060 mg/L (60 ppb)

7. When preparing a serial dilution (e.g., 1:10) of a highly contaminated wastewater sample for plating, what diluent should be used?

- A. Sterile, pure deionized water
- B. Tap water that has been boiled
- C. A strong 10% bleach solution
- D. Sterile, buffered diluent (like phosphate-buffered water)

8. In addition to health-based MCLs, the EPA Surface Water Treatment Rule requires a "Treatment Technique" for which parameter to ensure pathogen removal?

- A. Turbidity
- B. TDS
- C. Alkalinity
- D. Iron and Manganese

9. When diluting a concentrated strong acid (such as sulfuric acid) to prepare a reagent, what is the correct safety procedure?

- A. Rapidly pour the acid into the water, then seal the container immediately
- B. Rapidly pour the water into the acid, then place it in an ice bath
- C. Slowly add the water into the concentrated acid while stirring continuously
- D. Slowly add the concentrated acid into the water while stirring continuously

10. According to EPA Method 180.1 and Standard Methods for the Examination of Water and Wastewater, the provided diagram illustrates a nephelometric turbidimeter. At what angle to the incident light beam is the scattered light detected?

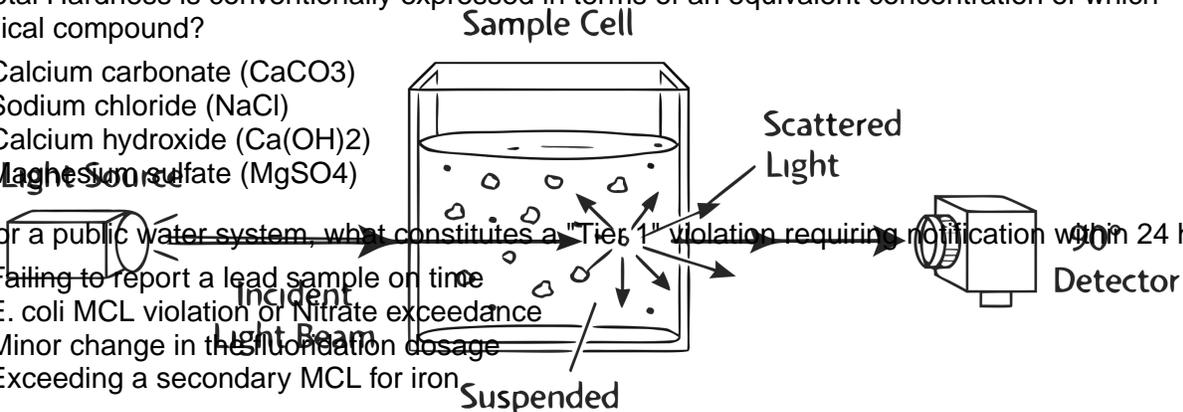
- A. 360 degrees
- B. 45 degrees
- C. 180 degrees
- D. 90 degrees

11. Total Hardness is conventionally expressed in terms of an equivalent concentration of which chemical compound?

- A. Calcium carbonate (CaCO_3)
- B. Sodium chloride (NaCl)
- C. Calcium hydroxide (Ca(OH)_2)
- D. Magnesium sulfate (MgSO_4)

12. For a public water system, what constitutes a "Tier 1" violation requiring notification within 24 hours?

- A. Failing to report a lead sample on time
- B. E. coli MCL violation or Nitrate exceedance
- C. Minor change in the disinfection dosage
- D. Exceeding a secondary MCL for iron



13. The diagram illustrates the separation of particles in Ion Chromatography (IC). What fundamental property of the analytes (the mixed sample) determines the speed at which they travel through the stationary phase column and separate into distinct bands?

The Separation Principle of Ion Chromatography (IC)

- A. The differential affinity of each ion for the charged exchange sites on the resin
- B. The physical size of the ions compared to the pore size of the column filter
- C. The boiling point of each compound as it passes through the heated column
- D. The speed of the motorized pump pushing the eluent fluid

14. When adding the measurements 12.11 mL and 1.3 mL together, how should the final result be correctly reported using significant figures?

- A. 16 mL
- B. 16.41 mL
- C. 16.410 mL
- D. 16.4 mL

15. What is the federal Maximum Contaminant Level (MCL) for Nitrite (measured as Nitrogen) in drinking water?

- A. 10.0 mg/L
- B. 5.0 mg/L
- C. 1.0 mg/L
- D. 0.1 mg/L

16. Which three primary anionic species contribute to the total alkalinity of a typical natural water sample?

- A. Calcium, Magnesium, and Sodium
- B. Chloride, Sulfate, and Nitrate
- C. Iron, Manganese, and Aluminum
- D. Bicarbonate, Carbonate, and Hydroxide

17. When using the Colilert (enzyme substrate) method, what does a sample that turns yellow but does NOT fluoresce under a UV lamp indicate?

- A. Positive for Total Coliforms, Positive for E. coli
- B. Negative for Total Coliforms, Negative for E. coli
- C. Positive for Total Coliforms, Negative for E. coli
- D. Negative for Total Coliforms, Positive for E. coli

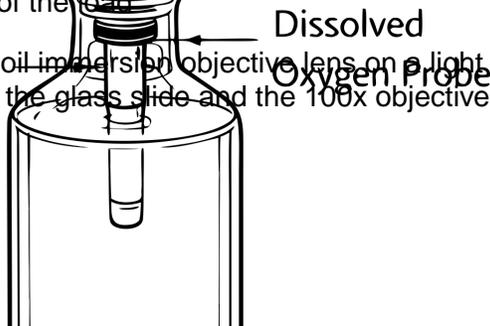
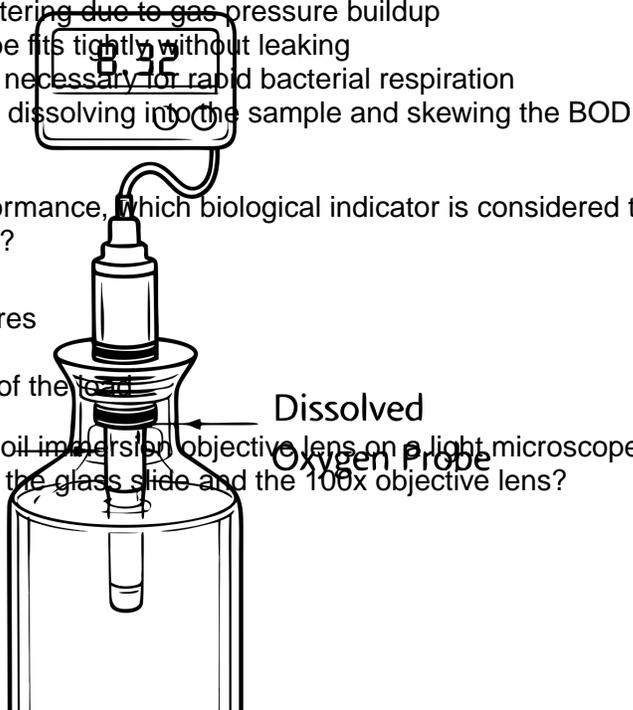
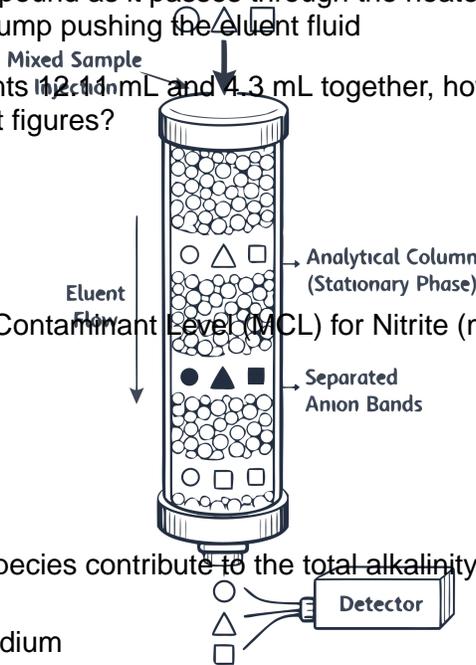
18. The diagram shows a standard 300-mL glass BOD bottle with a dissolved oxygen probe inserted. Why is it critical that the bottle be completely filled with the liquid sample, leaving absolutely no headspace or air bubbles?

- A. To prevent the glass bottle from shattering due to gas pressure buildup
- B. To ensure the dissolved oxygen probe fits tightly without leaking
- C. To create an anaerobic environment necessary for rapid bacterial respiration
- D. To prevent atmospheric oxygen from dissolving into the sample and skewing the BOD result

19. When evaluating an autoclave's performance, which biological indicator is considered the gold standard to ensure sterility was achieved?

- A. Escherichia coli (E. coli)
- B. Geobacillus stearothermophilus spores
- C. A chemical tape that turns black
- D. A thermometer placed in the center of the load

20. The diagram illustrates the use of immersion oil on a light microscope. Why must a drop of immersion oil be placed between the glass slide and the 100x objective lens?



- A. To prevent light rays from refracting and scattering, thereby improving image resolution
- B. To cool the slide and prevent the high-intensity light source from cooking the bacteria
- C. To physically adhere the objective lens to the slide so the focus does not drift
- D. To stain the bacteria on the slide so they are visible under the 100x Objective Lens

21. What is the required incubation temperature and time for the Total Coliform Membrane Filtration (MF) technique using m-Endo medium?

- A. 35 ± 0.5 °C for 22 to 24 hours
- B. 44.5 ± 0.2 °C for 24 hours
- C. 20 °C for 5 days
- D. 121 °C for 15 minutes

22. What is the required frequency for a large public water system to sample for asbestos, assuming no waivers are granted?

- A. Monthly
- B. Once per year
- C. Once every three years
- D. Once every nine years (compliance cycle)

23. When analyzing a water sample for Orthophosphate (Reactive Phosphorus) using the ascorbic acid method, what color is developed in the sample prior to spectrophotometric measurement?

- A. Molybdenum Blue
- B. DPD Pink
- C. Yellow-Green
- D. Red-wine

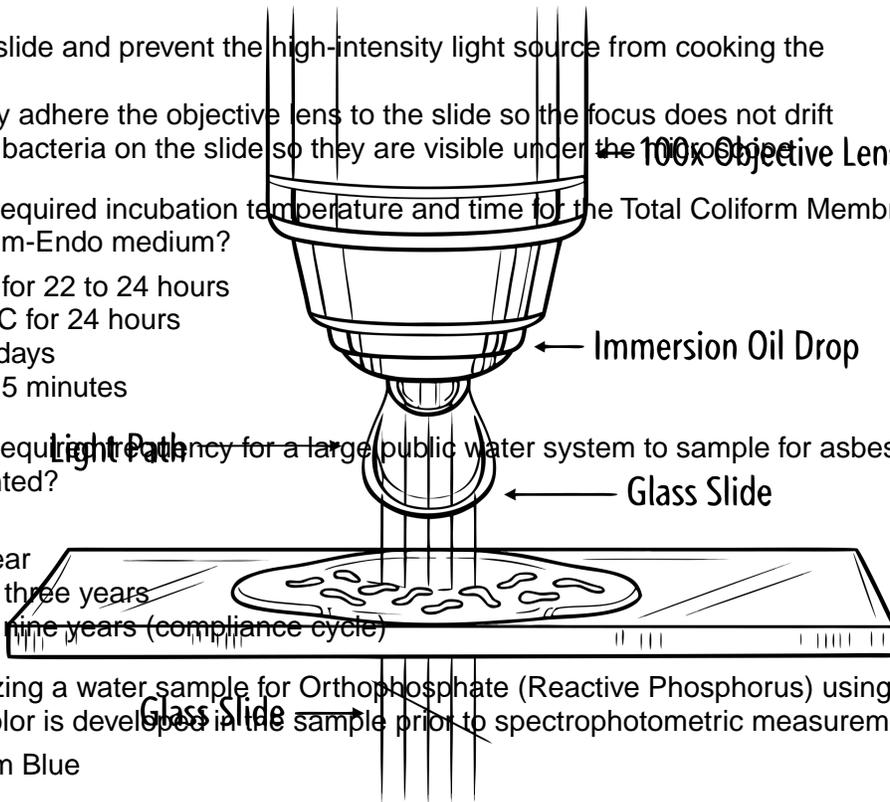
24. What is the maximum holding time and transport temperature for a drinking water sample collected for compliance bacteriological analysis?

- A. Cool (<10 °C, not frozen), analyzed within 30 hours
- B. Room temperature, analyzed within 48 hours
- C. Frozen solid, analyzed within 14 days
- D. Cool (<10 °C), analyzed within 7 days

25. What is the primary difference between "True Color" and "Apparent Color" when analyzing a water sample?

- A. There is no difference; the terms are used interchangeably
- B. True color measures only the inorganic compounds in the water
- C. Apparent color is measured using a spectrophotometer, while true color is visual
- D. True color requires the sample to be filtered or centrifuged prior to analysis

26. Based on the provided color development scale for nitrate analysis, which of the following concentrations represents the federal Maximum Contaminant Level (MCL) for Nitrate (measured as Nitrogen)?



- A. 5.0 mg/L
- B. 10.0 mg/L
- C. 15.0 mg/L
- D. 1.0 mg/L

Principle of Colorimetric Nitrate Analysis

27. The diagram illustrates a visual color comparator block. When using this apparatus to determine the color of a water sample, the results are typically reported in which standard units?

- A. Threshold Odor Number (TON)
- B. Nephelometric Turbidity Units (NTU)
- C. Milligrams per Liter (mg/L)
- D. Platinum-Cobalt (Pt-Co) Units

28. Which of the following describes the definition of the Coliform group of bacteria as used in drinking water testing?

- A. Gram-positive bacteria that produce an acidic environment.
- B. Gram-negative, spore-forming bacteria that do not ferment lactose.
- C. Viruses capable of infecting and replicating within human host cells.
- D. Gram-negative, non-spore-forming bacteria that ferment lactose with gas within 48h at 35°C.

29. Which of the following is considered a primary safety hazard when working with dehydrated, powdered culture media?

- A. Risk of radiation exposure
- B. Inhalation of fine dust causing respiratory irritation
- C. Spontaneous combustion
- D. Extreme flammability when exposed to air

30. What is a Laboratory Control Sample (LCS) used for in a quality assurance/quality control (QA/QC) program?

- A. To verify that the analytical method accurately measures the analyte in an ideal, clean matrix
- B. To calibrate the instrument across a range of different concentrations
- C. To determine the background level of contamination in the laboratory
- D. To test if the sample matrix causes interference with the analyte recovery

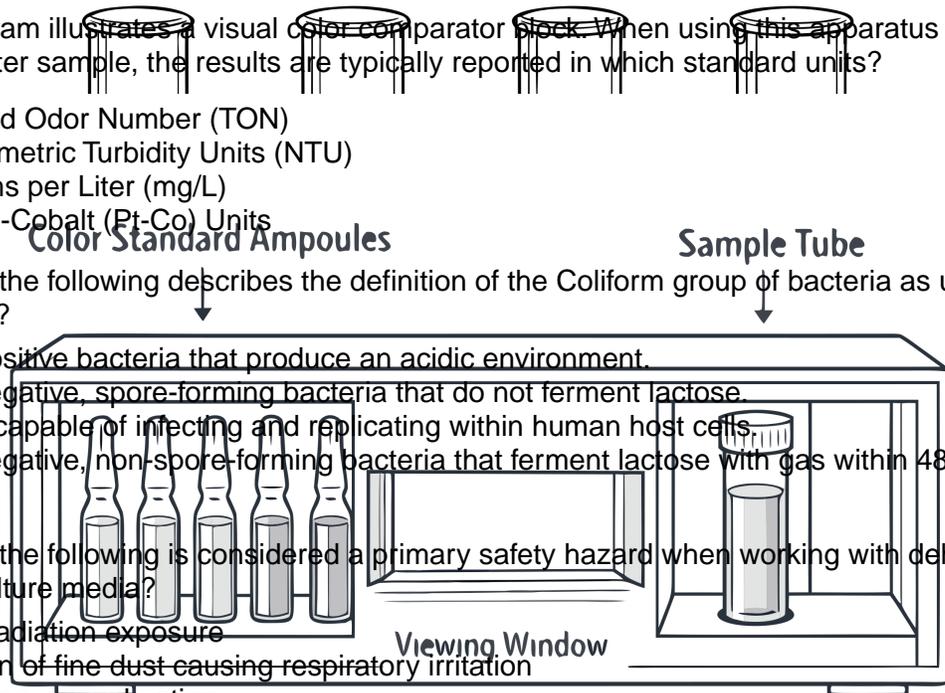
31. In laboratory quality control (QC), what is the primary purpose of analyzing a "Method Blank"?

- A. To verify that no contamination is introduced by reagents or the laboratory environment
- B. To check for interferences caused by the sample matrix
- C. To calibrate the analytical instrument at the zero point
- D. To verify the accuracy of the standard stock solutions

32. What is the Maximum Contaminant Level Goal (MCLG) for a known human carcinogen such as Benzene or Vinyl Chloride?

- A. 0.005 mg/L
- B. 1.0 mg/L
- C. Zero (0 mg/L)
- D. The same as the MCL

33. The provided diagram shows a volumetric (transfer) pipette. According to good laboratory practice, what does the single calibration mark (often denoted with "TD") indicate?



- A. The volume the pipette is calibrated "To Deliver" (TD) by free drainage
- B. The volume that must be "blown out" after draining
- C. The volume the pipette will "To Contain" (TC) before dispensing
- D. The maximum volume that can be safely drawn into the bulb

34. Which analytical instrument is best suited for the rapid, simultaneous determination of multiple trace metals (e.g., Lead, Copper, Arsenic) in a drinking water sample?

- A. Gas Chromatography - Mass Spectrometry (GC-MS)
- B. Inductively Coupled Plasma - Mass Spectrometry (ICP-MS)
- C. Amperometric Titrator
- D. Ion Chromatography (IC)

35. According to Standard Methods, a Biochemical Oxygen Demand (BOD₅) test requires the sample to be incubated in the dark at what temperature and for how many days?

- A. 4 °C for 14 days
- B. 20 ± 1 °C for 5 days
- C. 35 ± 0.5 °C for 24 hours
- D. 103 °C for 1 hour

36. The diagram illustrates a DPD (N,N-Diethyl-p-phenylenediamine) colorimetric comparator used for measuring chlorine residual. If the reagent produces a pink color in the sample cell, which form of chlorine is being detected?

- A. Total Dissolved Solids (TDS)
- B. Fluoride residual
- C. Hardness
- D. Free or Total Chlorine residual

37. For the determination of Total Dissolved Solids (TDS) per Standard Method 2540C, at what temperature is the filtered sample dried?

- A. 550 ± 50 °C
- B. 100 °C
- C. 103 to 105 °C
- D. 180 ± 2 °C

38. What is the Maximum Contaminant Level (MCL) for Haloacetic Acids (HAA5) in drinking water?

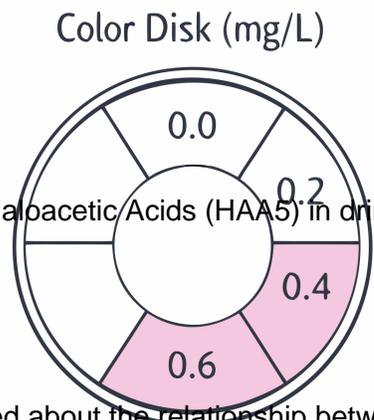
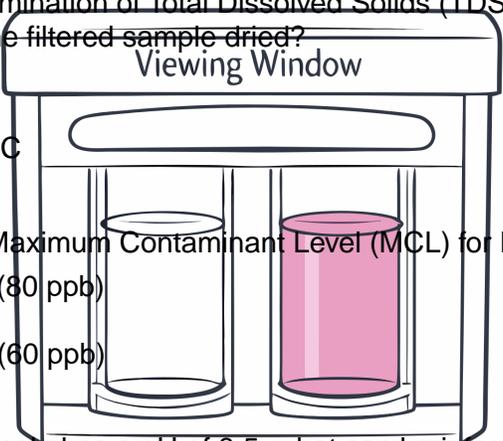
- A. 0.080 mg/L (80 ppb)
- B. 0.010 mg/L
- C. 0.060 mg/L (60 ppb)
- D. 0.150 mg/L

39. If a water sample has a pH of 8.5, what can be inferred about the relationship between hydrogen ions [H⁺] and hydroxide ions [OH⁻]?

- A. [OH⁻] is greater than [H⁺]
- B. [H⁺] and [OH⁻] are equal
- C. There are no [H⁺] ions present
- D. [H⁺] is greater than [OH⁻]

40. Which type of pipette is marked to deliver variable volumes and has graduations that extend all the way down to the tip?

- A. Serological Pipette
- B. Volumetric Transfer Pipette
- C. Mohr Pipette



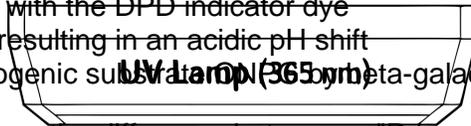
D. Pasteur Pipette

41. How many significant figures are in the measurement "0.004050 mg/L"?

- A. Six
- B. Four
- C. Two
- D. Three

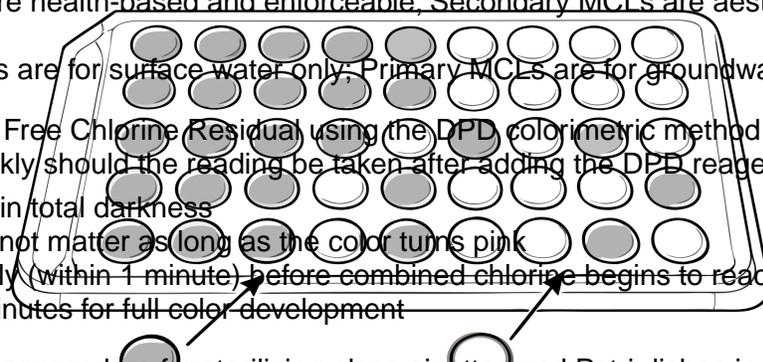
42. The diagram shows a Colilert Quanti-Tray under a 365 nm UV lamp. What specifically causes certain wells to fluoresce brightly, indicating a positive result for E. coli?

- A. The hydrolysis of the fluorogenic substrate MUG by the enzyme beta-glucuronidase
- B. The reaction of free chlorine with the DPD indicator dye
- C. The fermentation of lactose resulting in an acidic pH shift
- D. The hydrolysis of the chromogenic substrate beta-galactosidase



43. Which of the following describes the difference between a "Primary" MCL and a "Secondary" MCL?

- A. Primary MCLs apply to industrial water; Secondary MCLs apply to drinking water.
- B. There is no difference; both are legally enforceable by the EPA.
- C. Primary MCLs are health-based and enforceable; Secondary MCLs are aesthetic-based and non-mandatory.
- D. Secondary MCLs are for surface water only; Primary MCLs are for groundwater.



44. When measuring Free Chlorine Residual using the DPD colorimetric method (Standard Method 4500-Cl G), how quickly should the reading be taken after adding the DPD reagent to the sample?

- A. Wait 15 minutes in total darkness
- B. The timing does not matter as long as the color turns pink
- C. Read immediately (within 1 minute) before combined chlorine begins to react
- D. Wait exactly 5 minutes for full color development

45. What is the proper procedure for sterilizing glass pipettes and Petri dishes in a laboratory dry-heat oven?

- A. 121 °C for 15 minutes
- B. 170 °C for 2 hours
- C. 100 °C for 30 minutes
- D. 250 °C for 5 minutes

**Enzyme Substrate (Coli-ert) Quanti-Tray
Under UV Light**

46. During the Confirmed Phase of the Multiple-Tube Fermentation (MTF) technique for total coliforms, positive presumptive tubes are transferred to which medium?

- A. Nutrient Agar
- B. Phosphate-buffered water
- C. Brilliant Green Lactose Bile (BGLB)
- D. Lauryl Tryptose Broth (LTB)

47. According to standard laboratory safety protocols, how should strong acids and strong bases be stored?

- A. In a standard flammable storage cabinet to contain any fumes
- B. In separate, dedicated corrosive storage cabinets away from each other
- C. In the same corrosive cabinet, provided they are in secondary containment
- D. Alphabetically on the same shelf to ensure they are easy to locate

48. Which of the following physical parameters is used as an indirect, rapid measurement of the Total Dissolved Solids (TDS) concentration in a water sample?

- A. Color

- B. pH
- C. Specific conductance
- D. Turbidity

49. When a public water system (PWS) detects a contaminant at a level exceeding an MCL, what is the required first step according to the EPA Public Notification Rule?

- A. Rinse the pipes with distilled water
- B. Notify the public of the violation
- C. Double the chlorine dose automatically
- D. Immediately shut down the entire water system

50. A laboratory worker accidentally spills a broth culture of *E. coli* on the benchtop. What is the immediate, correct protocol for cleaning the spill?

- A. Leave the lab immediately and call a hazardous materials (HAZMAT) team
- B. Cover with paper towels soaked in a laboratory disinfectant, wait 15-30 mins, then wipe up
- C. Immediately wipe it up with dry paper towels and throw them in the regular trash
- D. Pour concentrated sulfuric acid on the spill to instantly kill the bacteria

51. When counting colonies on an m-Endo agar plate after Membrane Filtration, which colonies are counted as typical Total Coliforms?

- A. Opaque white with fuzzy borders
- B. Clear and colorless
- C. Blue and fluorescing under UV light
- D. Dark red with a metallic (golden-green) surface sheen

52. Which of the following is the standard Maximum Contaminant Level (MCL) for Fluoride in drinking water to prevent dental fluorosis and skeletal damage?

- A. 4.0 mg/L
- B. 0.7 mg/L
- C. 10.0 mg/L
- D. 1.0 mg/L

53. Turbidity in drinking water is primarily monitored because suspended particles can cause which adverse effect?

- A. Shield pathogens from chemical disinfectants
- B. Rapidly decrease the pH of the distribution system
- C. Cause immediate acute toxicity if ingested
- D. Increase the concentration of dissolved heavy metals

54. In the Multiple-Tube Fermentation (MTF) technique, the Presumptive Phase utilizes which culture medium?

- A. Lauryl Tryptose Broth (LTB)
- B. m-Endo Medium
- C. Brilliant Green Lactose Bile (BGLB)
- D. EC Broth

55. The standard unit of measurement for color in water analysis is based on the platinum-cobalt (Pt-Co) method. One color unit is equivalent to the color produced by 1 mg/L of which substance?

- A. Iron
- B. Platinum
- C. Cobalt
- D. Manganese

56. The diagram illustrates an amperometric titrator setup used for measuring chlorine residual. What specific change in the electrical circuit indicates that the titration endpoint has been reached when adding PAO (Phenylarsine Oxide)?

- A. The microammeter needle deflects rapidly upwards (increases current)
- B. The digital display flashes a red warning light
- C. The sample liquid suddenly changes from pink to clear
- D. The microammeter needle increases its downward deflection (current stops decreasing)

57. What is the fundamental difference between "Accuracy" and "Precision" in laboratory measurements?

- A. Accuracy only applies to instrument calibration, while precision applies to sample analysis.
- B. They mean the exact same thing in laboratory analytics.
- C. Accuracy is how close repeated measurements are to each other; Precision is how close they are to the true value.
- D. Accuracy is how close a measurement is to the true value; Precision is how close repeated measurements are to each other.

58. When preparing a dilution for a BOD5 test on a sample with an expected BOD of 200 mg/L, what must be added to the dilution water to ensure the bacteria have the necessary nutrients to metabolize the organic matter?

- A. A heavy metal inhibitor to stop toxic interference
- B. A nutrient buffer solution containing phosphate, magnesium, calcium, and iron
- C. Sodium thiosulfate to neutralize any organic matter
- D. Concentrated sulfuric acid to lower the pH

59. When determining the Threshold Odor Number (TON) of a water sample, the test is typically conducted at what temperature?

- A. 60 °C
- B. 25 °C
- C. 100 °C
- D. 40 °C

60. The diagram illustrates a laboratory desiccator containing a sample crucible. What is the primary purpose of the desiccant material located in the bottom chamber of this apparatus?

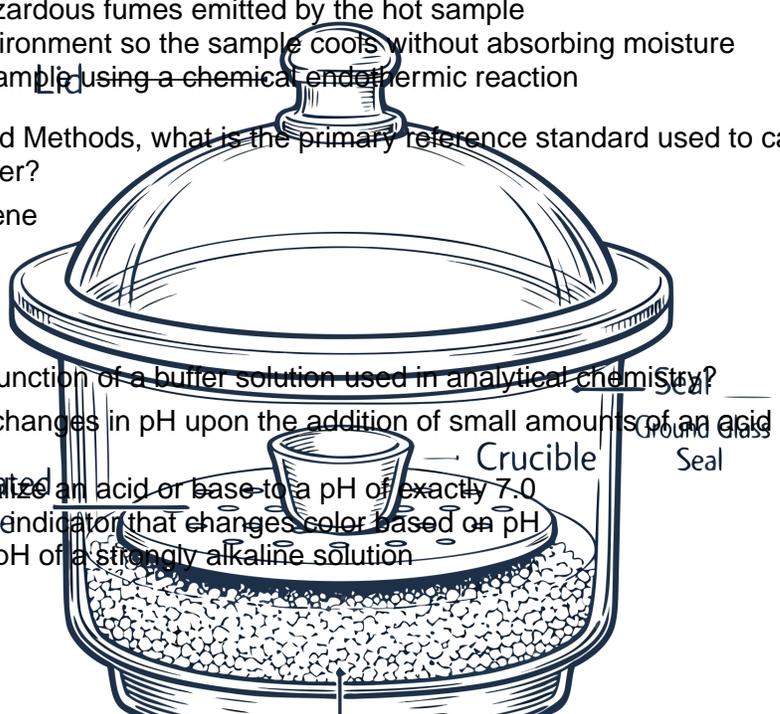
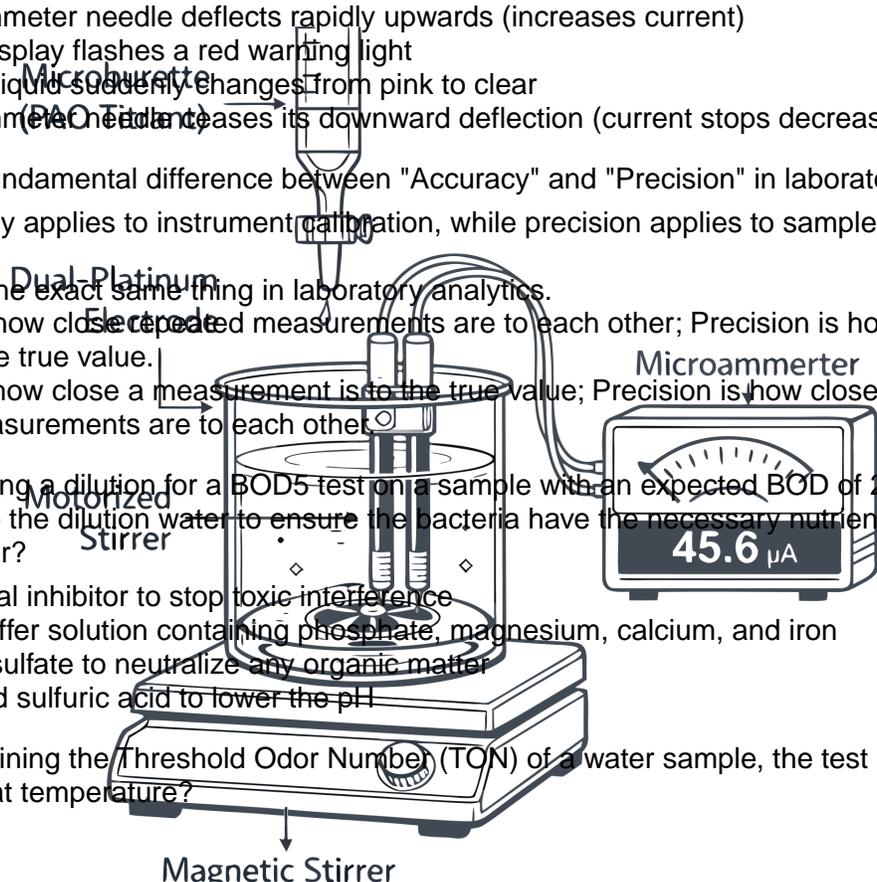
- A. To prevent the sample from oxidizing during the cooling process
- B. To safely contain hazardous fumes emitted by the hot sample
- C. To provide a dry environment so the sample cools without absorbing moisture
- D. To rapidly cool the sample using a chemical endothermic reaction

61. According to Standard Methods, what is the primary reference standard used to calibrate a nephelometric turbidimeter?

- A. Styrene divinylbenzene
- B. Kaolin clay
- C. Silica
- D. Formazin

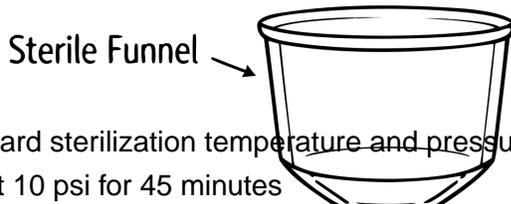
62. What is the primary function of a buffer solution used in analytical chemistry?

- A. To resist significant changes in pH upon the addition of small amounts of an acid or a base
- B. To completely neutralize an acid or base to a pH of exactly 7.0
- C. To act as a universal indicator that changes color based on pH
- D. To rapidly lower the pH of a strongly alkaline solution



63. The diagram illustrates the Membrane Filtration (MF) setup used for isolating coliform bacteria from water. According to Standard Methods, what is the standard pore size of the gridded membrane filter used to retain these bacteria?

- A. 0.45 ;ÆD
- B. 1.20 ;ÆD
- C. 0.10 ;ÆD
- D. 0.22 ;ÆD



64. What is the standard sterilization temperature and pressure used in a laboratory autoclave?

- A. 70 °C (158 °F) at 10 psi for 45 minutes
- B. 180 °C (356 °F) at 30 psi for 5 minutes
- C. 121 °C (250 °F) at 15 psi for 15 to 30 minutes
- D. 100 °C (212 °F) at 0 psi for 60 minutes

65. Which type of laboratory glassware provides the highest level of accuracy and precision for preparing a standard solution of a specific concentration?

- A. Griffin Beaker
- B. Class A Volumetric Flask
- C. Erlenmeyer Flask
- D. Graduated Cylinder

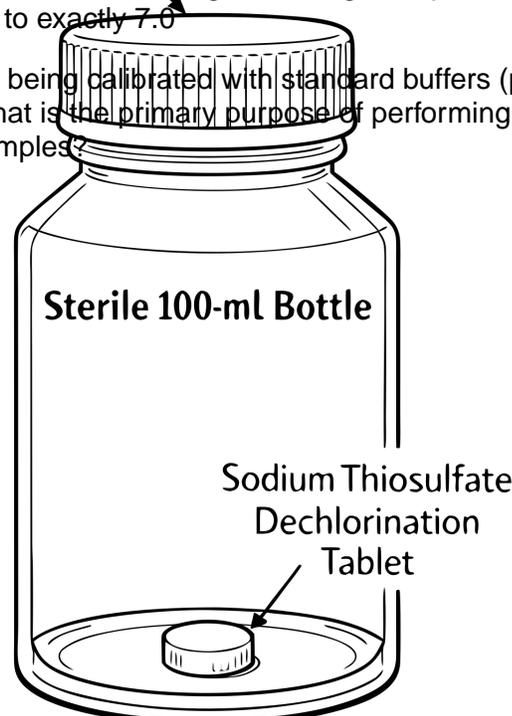
66. Why are Total Coliform bacteria used as an "indicator organism" for drinking water safety rather than testing directly for specific pathogens?

- A. Testing for them takes only a few minutes compared to other pathogens.
- B. Coliforms are the most lethal type of pathogen found in water.
- C. They are easy to detect, abundant in feces, and their absence generally indicates the absence of harder-to-detect pathogens.
- D. They are the only type of bacteria that can survive the chlorination process.

67. The diagram shows a sterile 100-mL bottle containing a white dechlorination tablet. Why is this specific tablet (typically Sodium Thiosulfate) added to bottles used for bacteriological sampling of chlorinated water?

- A. To neutralize any residual chlorine and stop the disinfection process
- B. To act as a preservative for heavy metals analysis
- C. To provide a nutrient source for the bacteria to grow during transport
- D. To adjust the pH of the sample to exactly 7.0

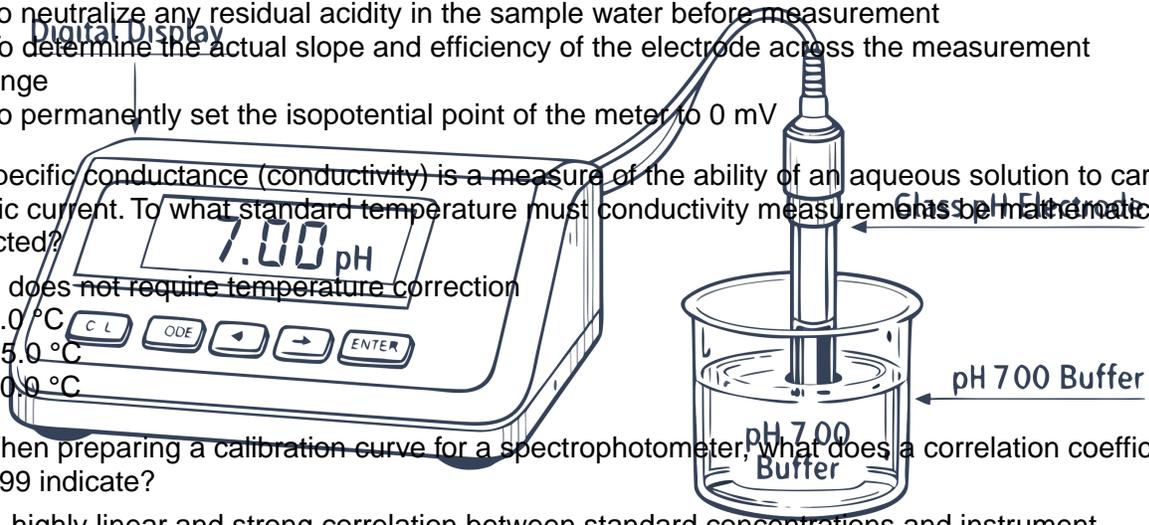
68. The diagram shows a pH meter being calibrated with standard buffers (pH 4.00, 7.00, and 10.00). According to Standard Methods, what is the primary purpose of performing a multi-point calibration that brackets the expected pH of the samples?



- A. To clean the electrode bulb of any biological or chemical fouling
- B. To neutralize any residual acidity in the sample water before measurement
- C. To determine the actual slope and efficiency of the electrode across the measurement range
- D. To permanently set the isopotential point of the meter to 0 mV

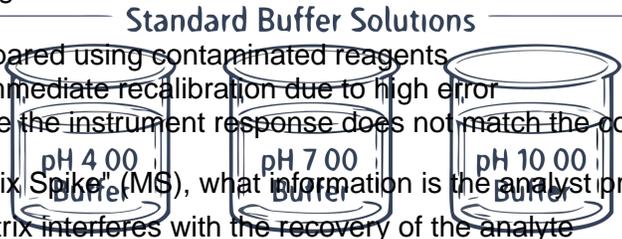
69. Specific conductance (conductivity) is a measure of the ability of an aqueous solution to carry an electric current. To what standard temperature must conductivity measurements be mathematically corrected?

- A. It does not require temperature correction
- B. 4.0 °C
- C. 25.0 °C
- D. 20.0 °C



70. When preparing a calibration curve for a spectrophotometer, what does a correlation coefficient (r^2) of 0.999 indicate?

- A. A highly linear and strong correlation between standard concentrations and instrument response
- B. The standards were prepared using contaminated reagents
- C. The instrument needs immediate recalibration due to high error
- D. A weak correlation where the instrument response does not match the concentration



71. When performing a "Matrix Spike" (MS), what information is the analyst primarily trying to obtain?

- A. Whether the sample matrix interferes with the recovery of the analyte
- B. Whether the laboratory reagents are contaminated
- C. Whether the analyst followed the method accurately
- D. Whether the instrument calibration curve is still valid

72. Which chemical preservation method is required for a sample collected for Total Metals analysis (e.g., Iron or Manganese) to keep the metals dissolved in solution during transport?

- A. Add Sodium Thiosulfate to remove chlorine
- B. Store the sample at 35 °C
- C. Add Nitric Acid (HNO₃) to lower the pH to < 2.0
- D. Add Sodium Hydroxide (NaOH) to raise the pH to > 12.0

73. What is the primary regulated disinfection byproduct (DBP) formed when using Ozone as a disinfectant in water containing bromide?

- A. 1.0 mg/L
- B. 0.002 mg/L
- C. 0.080 mg/L
- D. 0.010 mg/L (10 ppb)

74. Which of the following describes the relationship between water temperature and the solubility of dissolved oxygen (DO)?

- A. As temperature increases, DO solubility increases
- B. Temperature has no effect on DO solubility
- C. As temperature increases, DO solubility decreases
- D. DO solubility peaks at 25 °C and decreases at higher or lower temperatures

75. The diagram illustrates a precision analytical balance. What is the primary purpose of the glass draft shield surrounding the weighing pan?

- A. To create a vacuum environment for weighing volatile samples
- B. To prevent air currents and environmental factors from causing reading fluctuations
- C. To protect the operator from hazardous or explosive samples
- D. To maintain the sample at a constant temperature of 25°C

76. What is the maximum holding time for a sample collected for pH analysis?

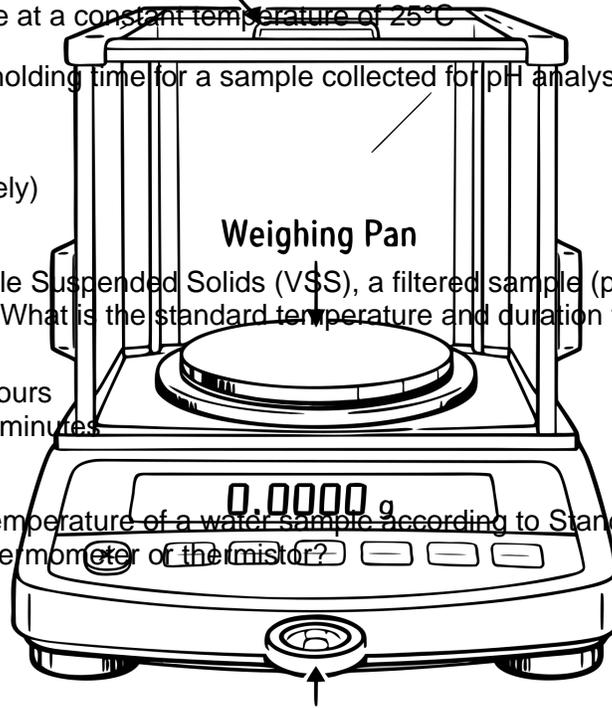
- A. 24 hours
- B. 48 hours
- C. 15 minutes (Immediately)
- D. 14 days

77. When calculating Volatile Suspended Solids (VSS), a filtered sample (previously dried for TSS) is ignited in a muffle furnace. What is the standard temperature and duration for this ignition?

- A. 180 ± 2 °C for 1 hour
- B. 103 to 105 °C for 24 hours
- C. 550 ± 50 °C for 15-20 minutes
- D. 1000 °C for 5 minutes

78. When measuring the temperature of a water sample according to Standard Methods, what is the required accuracy of the thermometer or the resistor?

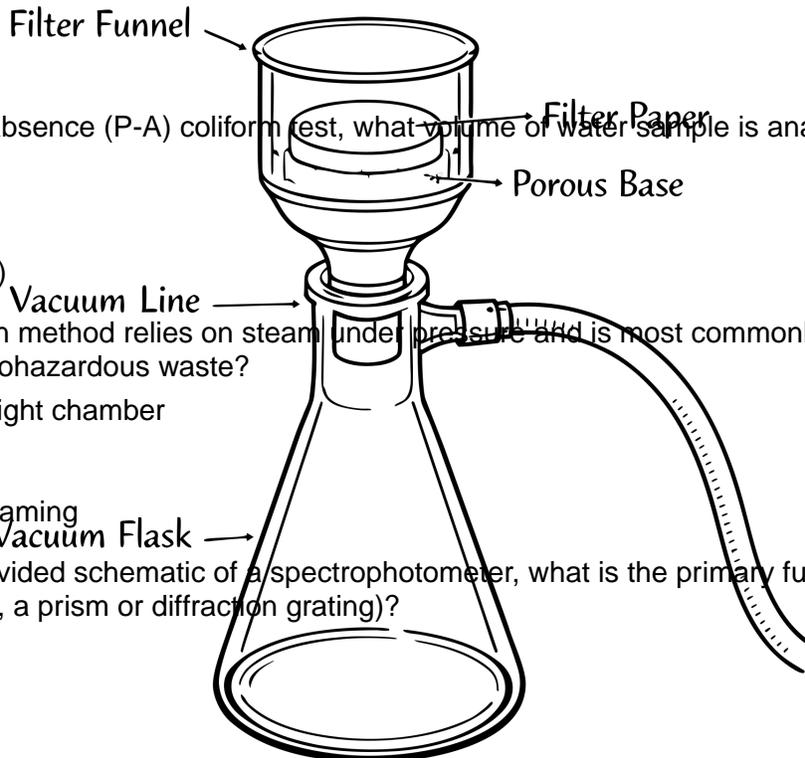
- A. ± 1.0 °C
- B. ± 0.1 °C
- C. ± 2.0 °C
- D. ± 0.5 °C



Leveling Bubble

79. The diagram shows a vacuum filtration setup typically used for Total Suspended Solids (TSS) analysis. According to Standard Methods 2540D, what is the required drying temperature for the filter after the sample has been processed?

- A. 35 ± 0.5 °C
- B. 550 ± 50 °C
- C. 180 ± 2 °C
- D. 103 to 105 °C



80. In the presence-absence (P-A) coliform test, what volume of water sample is analyzed?

- A. 10 mL
- B. 100 mL
- C. 50 mL
- D. 1000 mL (1 Liter)

81. Which sterilization method relies on steam under pressure and is most commonly used for liquids, culture media, and biohazardous waste?

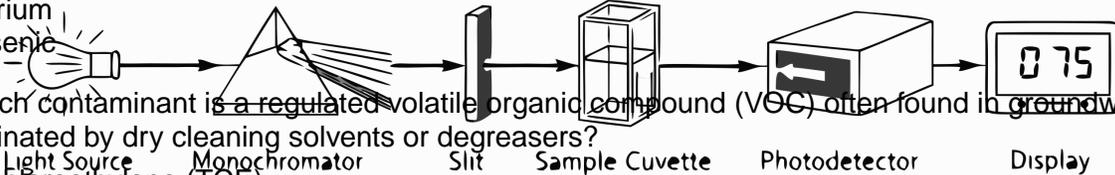
- A. Ultraviolet (UV) light chamber
- B. Autoclave
- C. Dry-heat oven
- D. Bunsen burner

82. Based on the provided schematic of a spectrophotometer, what is the primary function of the monochromator (e.g., a prism or diffraction grating)?

- A. To convert the absorbed light energy directly into a digital concentration reading
- B. To hold the liquid sample in a perfectly square optical path
- C. To separate the light source into its component wavelengths for specific selection
- D. To amplify the electrical signal generated by the photodetector

83. Which of the following chemicals is regulated under the EPA Lead and Copper Rule (LCR) via an "Action Level" rather than an MCL?

- A. Mercury
- B. Lead
- C. Barium
- D. Arsenic



84. Which contaminant is a regulated volatile organic compound (VOC) often found in groundwater contaminated by dry cleaning solvents or degreasers?

- A. Trichloroethylene (TCE)
- B. Total Coliform
- C. Nitrate
- D. Lead

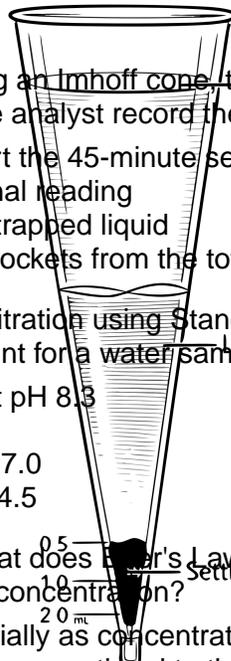
85. Based on the provided diagram of a titration setup, what is the primary function of the stopcock valve located at the bottom of the burette?

- A. To prevent the Erlenmeyer flask from overflowing
- B. To measure the final pH of the solution automatically
- C. To mix the titrant and analyte within the burette tube
- D. To precisely control the flow and drop-rate of the titrant into the analyte

86. The provided diagram illustrates an Imhoff Cone. This apparatus is primarily used in water and wastewater analysis to measure which of the following physical parameters?

- A. Total Dissolved Solids (TDS)
- B. Volatile Suspended Solids (VSS)
- C. Total Suspended Solids (TSS)
- D. Settleable Solids

Imhoff Cone



87. During a settleable solids test using an Imhoff cone, the analyst observes pockets of liquid trapped between settled solids. How should the analyst record the volume?

- A. Vigorously stir the cone and restart the 45-minute settling period
- B. Include the liquid pockets in the final reading
- C. Add more sample to displace the trapped liquid
- D. Subtract the volume of the liquid pockets from the total settled volume

88. When performing a total alkalinity titration using Standard Method 2320B, what is the standard titrant used and what is the typical pH endpoint for a water sample with alkalinity around 150 mg/L?

- A. 0.1 N Sodium Hydroxide; endpoint pH 8.3
- B. 0.1 N EDTA; endpoint pH 10.0
- C. 0.05 N Silver Nitrate; endpoint pH 7.0
- D. 0.02 N Sulfuric Acid; endpoint pH 4.5

89. In spectrophotometric analysis, what does Beer's Law (the Beer-Lambert Law) state regarding the relationship between absorbance and concentration?

- A. Transmittance increases exponentially as concentration increases
- B. Absorbance is directly and linearly proportional to the concentration of the absorbing species

- C. Concentration can only be determined by boiling the sample first
- D. Absorbance is inversely proportional to concentration

90. What is the regulated Maximum Residual Disinfectant Level (MRDL) for Chlorine (as Cl₂)?

- A. 10.0 mg/L
- B. 4.0 mg/L
- C. 0.2 mg/L
- D. 1.0 mg/L

91. The Threshold Odor Number (TON) is calculated using the formula $TON = (A + B) / A$. What does "A" represent in this formula?

- A. Total volume of the flask
- B. Volume of the sample in mL
- C. Volume of odor-free water in mL
- D. Number of analysts performing the test

92. Based on the provided diagram and standard laboratory practices, what is the proper technique for reading the volume of a clear aqueous liquid in a graduated glass cylinder?

- A. Read at the bottom of the meniscus at eye level
- B. Read at the top edge of the liquid at a 45-degree angle
- C. Read from above looking down on the meniscus
- D. Read at the top of the meniscus at eye level

93. For optimal performance and safety, what is the recommended operating sash height for a standard chemical fume hood?

- A. Fully open (all the way up) to maximize airflow and visibility
- B. Lowered to the indicated safe operating height (typically 12 to 18 inches)
- C. At whatever height the user finds most comfortable for working standing up
- D. Fully closed, opening it only just enough to reach hands inside

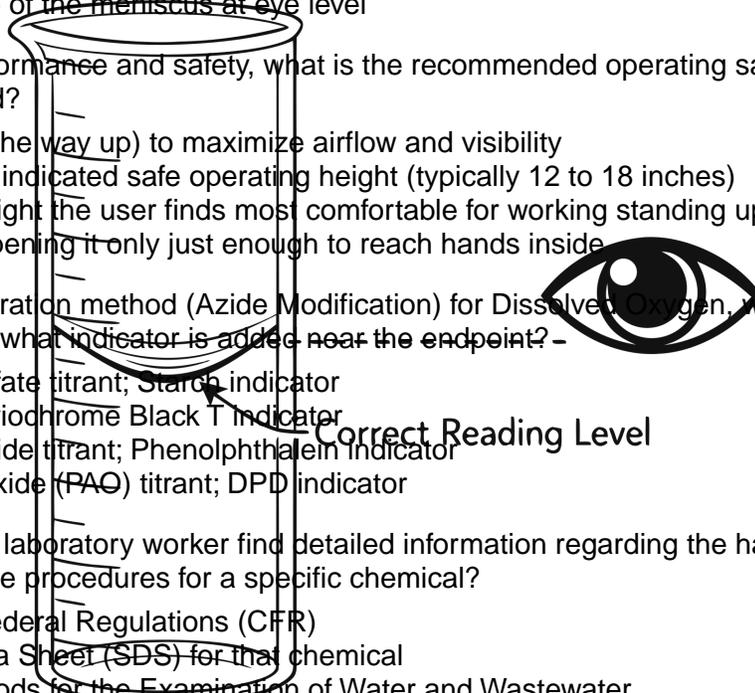
94. In the Winkler titration method (Azide Modification) for Dissolved Oxygen, what chemical is used as the final titrant, and what indicator is added near the endpoint? -

- A. Sodium thiosulfate titrant; Starch indicator
- B. EDTA titrant; Eriochrome Black T indicator
- C. Sodium hydroxide titrant; Phenolphthalein indicator
- D. Phenylarsine oxide (PAO) titrant; DPD indicator

95. Where should a laboratory worker find detailed information regarding the hazards, handling, and emergency response procedures for a specific chemical?

- A. The Code of Federal Regulations (CFR)
- B. The Safety Data Sheet (SDS) for that chemical
- C. Standard Methods for the Examination of Water and Wastewater
- D. The Laboratory Quality Assurance Manual (QAM)

96. The provided diagram shows a standard Secchi disk. In water quality analysis, this device is used primarily to measure which physical characteristic of a water body?



- A. Dissolved Oxygen Profile
- B. Transparency (Clarity)
- C. Specific Conductance
- D. Total Dissolved Solids

97. The provided diagram shows a laboratory Chain of Custody (COC) form. What is the primary legal and regulatory purpose of the signature and time-stamp fields in the relinquished/received sections?

- A. To indicate the cost of the analytical testing performed
- B. To provide a legally defensible record of sample possession and transfer
- C. To record the GPS coordinates of the sampling location
- D. To verify the identity of the bacteria found in the sample

98. The "Chlorine Demand" of a water sample is defined as the difference between which two values?

- A. The difference between the amount of chlorine added and the chlorine residual remaining
- B. The difference between Free Chlorine and Total Chlorine
- C. The regulatory minimum limit for chlorine in the distribution system
- D. The total amount of chlorine added at the treatment plant in one day

99. The diagram illustrates the 'first-draw' sampling technique. According to the Lead and Copper Rule, what is the required minimum period of stagnation before a sample can be collected?

- A. 24 hours
- B. 6 hours
- C. 12 hours
- D. 1 hour

"First-Draw" Sampling for Lead & Copper Rule

100. The Revised Total Coliform Rule (RTCR) requires a system to perform a "Level 1 Assessment" when which of the following occurs?

- A. Detection of more than one total coliform positive sample in a month
- B. Any detection of E. coli in the water system
- C. When the turbidity exceeds 5.0 NTU
- D. When the water pressure drops below 20 psi

