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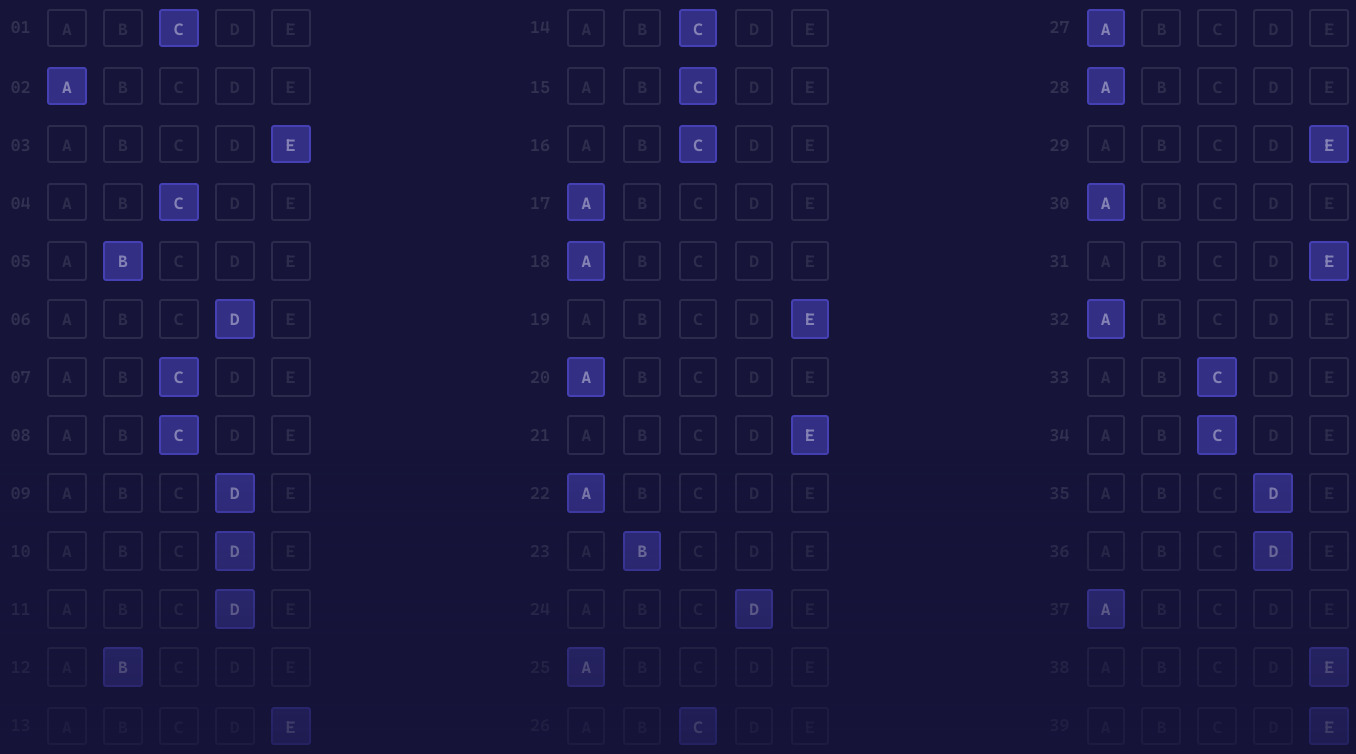

PRACTICE QUESTIONS

California - Nevada Section American Water Works Association

TYME999V

CA-NV AWWA Water Quality Laboratory Analysts Grade 2

EDITION	QUESTIONS	FORMAT
Demo	9	Limited Edition PDF

Before you begin

What this is

9 practice questions for California - Nevada Section American Water Works Association `TYME999V`, each with its answer key and an explanation. Answer a question before you read its key — the explanation is worth more once you have committed.

If something looks wrong

Send us three things and we will check it:

- the exam code, `TYME999V`
- the question number
- the email address on your order

Write to **support@mometrix.net**. We reply within one business day.

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QUESTION 1 SINGLE CHOICE

A water quality laboratory analyst is preparing to standardize a sodium thiosulfate titration solution using a primary standard. Which of the following reagents is the appropriate primary standard for standardizing sodium thiosulfate?

A **Potassium iodate (KIO_3)**

B Sodium chloride (NaCl)

C Ammonium ferrous sulfate ($(NH_4)_2Fe(SO_4)_2$)

D Hydrochloric acid (HCl)

ANSWER **A**

WHY Potassium iodate is an accepted primary standard used to standardize sodium thiosulfate solutions for the titrimetric determination of residual chlorine (and other oxidizing halogens) via the iodometric method. Sodium chloride, ferrous ammonium sulfate, and hydrochloric acid are not appropriate primary standards for this titration.

QUESTION 2 SINGLE CHOICE

In the DPD (N,N-diethyl-p-phenylenediamine) colorimetric method for free and total chlorine, what is the purpose of adding potassium iodide (KI) to a separate aliquot of sample when determining total chlorine?

A To mask the color produced by free chlorine so only combined chlorine is measured

B To reduce interferences from manganese

C **To convert combined chloramines to free chlorine, which then reacts with DPD to produce color**

D To buffer the sample to a pH between 6.2 and 6.5

ANSWER **C**

WHY In the DPD total chlorine procedure, excess potassium iodide is added to a second portion of sample. Combined chlorine (chloramines) oxidizes iodide to iodine, which then reacts with DPD to form the magenta color. Free chlorine is read directly on a separate aliquot without KI, and combined chlorine is obtained by difference.

QUESTION 3 SINGLE CHOICE

A laboratory analyst is plotting results from an ongoing analysis of a known reference sample on a control chart. Which statement correctly describes the proper interpretation and action when a single control standard result exceeds the upper warning limit (typically ±2 standard deviations) but remains within the upper control limit (±3 standard deviations)?

A The run must be rejected and all associated sample results discarded

B No action is required because the result is still in control

C The result is acceptable for reporting with no further investigation required

D The run is out of control and all samples in the batch must be reanalyzed

ANSWER B

WHY On a Shewhart-type control chart, warning limits (±2 SD) signal that the method may be trending toward an out-of-control condition but the analysis is still considered in control. A single point within ±3 SD remains acceptable. Exceeding the upper or lower control limit (±3 SD) is what indicates an out-of-control condition requiring corrective action and possible reanalysis.

QUESTION 4 SINGLE CHOICE

When performing the membrane filtration (MF) method for total coliform and E. coli analysis, what is the correct incubation temperature and time for total coliforms using Standard Methods m-Endo agar?

A 44.5 ± 0.2 °C for 24 ± 2 hours

B 35.0 ± 0.5 °C for 24 ± 2 hours

C 30.0 ± 0.5 °C for 48 hours

D 37.0 ± 0.5 °C for 4 hours

ANSWER B

WHY Per Standard Methods for the Examination of Water and Wastewater, the membrane filter technique for total coliforms on m-Endo or LES Endo agar requires incubation at 35.0 ± 0.5 °C for 24 ± 2 hours. Fecal coliforms (or E. coli at elevated temperature) are incubated at 44.5 ± 0.2 °C.

QUESTION 5 SINGLE CHOICE

A laboratory analyst is measuring the turbidity of a finished drinking water sample using a nephelometric turbidimeter. According to Standard Methods, what is the maximum recommended sample holding time before analysis, and what storage condition should be used?

A 48 hours, refrigerated at 4 °C

B 24 hours, room temperature in the dark

C 7 days, refrigerated at 4 °C

D Analyze immediately or as soon as possible; if storage is necessary, store at 4 °C and analyze within 48 hours

ANSWER D

WHY Turbidity samples should be analyzed as soon as possible after collection because turbidity can change with settling or temperature shifts. Standard Methods permits storage at 4 °C (refrigerated, not frozen) for up to 48 hours when analysis must be delayed. Samples should be brought to room temperature before measurement.

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QUESTION 6 SINGLE CHOICE

While preparing standard acid solutions in the laboratory, an analyst spills a small amount of concentrated sulfuric acid on the bench top. What is the appropriate FIRST response?

A Immediately apply sodium bicarbonate powder directly to the spill to neutralize the acid

B Notify the supervisor and wait for the hazardous materials response team

C Contain the spill and then neutralize it with an appropriate agent, such as soda ash or sodium bicarbonate, then clean up and dispose of properly

D Wipe the spill with paper towels and discard them in the regular trash

ANSWER C

WHY For a small spill of concentrated acid on a bench top, the analyst should first contain the spill, then neutralize it with an appropriate alkaline agent such as soda ash or sodium bicarbonate. After neutralization (foaming will occur), the residue is cleaned up and disposed of in the proper hazardous waste container. Personal protective equipment must be worn throughout. Wiping it up without neutralization or discarding in regular trash is unsafe.

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QUESTION 7 SINGLE CHOICE

An analyst is titrating a water sample for total alkalinity using 0.0200 N sulfuric acid titrant and a phenolphthalein/methyl orange (or bromocresol green) endpoint indicator system. The sample volume is 100 mL and the burette reading to reach the methyl orange endpoint (pH 4.5) is 12.50 mL. What is the total alkalinity expressed as mg/L as $CaCO_3$?

A 125 mg/L as $CaCO_3$

B **250 mg/L as $CaCO_3$**

C 25 mg/L as $CaCO_3$

D 12.5 mg/L as $CaCO_3$

ANSWER **B**

WHY Alkalinity (mg/L as $CaCO_3$) = (V × N × 50,000) / mL sample. With V = 12.50 mL, N = 0.0200, and sample = 100 mL: (12.50 × 0.0200 × 50,000) / 100 = 12,500 / 100 = 125 mg/L as $CaCO_3$ per N of titrant. With 0.0200 N, the result is 0.0200 × 50,000 = 1,000 mg/L per mL titrant per 100 mL sample, so 12.50 × 0.0200 × 50,000/100 = 250 mg/L as $CaCO_3$. Correctly calculated: 12.50 × 1.0 (per mL of 0.0200 N) × (50,000/100 × 0.0200) = 12.50 × 2 = 250 mg/L as $CaCO_3$.

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QUESTION 8 SINGLE CHOICE

An analyst is preparing a calibration curve for a spectrophotometric method and obtains the following correlation results: r = 0.9992. Which statement best describes the meaning and acceptance of this correlation coefficient?

A The correlation is unacceptable because r must equal 1.000 for a linear calibration

B The correlation is acceptable; a coefficient of ≥ 0.995 (or as specified by the method) indicates a linear relationship suitable for quantitative work

C The correlation is acceptable only if r^2 is also calculated and exceeds 0.999

D An r value of 0.9992 indicates poor precision and the calibration must be repeated

ANSWER B

WHY A correlation coefficient (r) of 0.999 indicates an excellent linear relationship between concentration and instrument response. Most Standard Methods and laboratory QA programs accept calibration curves with r ≥ 0.995 (or r^2 ≥ 0.990), with the specific acceptance criterion defined in the method SOP. A perfect r = 1.000 is not required for quantitative work; a deviation from 1.000 indicates acceptable method performance.

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QUESTION 9 SINGLE CHOICE

An analyst is performing an amperometric titration for free chlorine using a phenylarsine oxide titrant. What is the function of the pH 7 buffer solution added to the sample before titration begins?

A To convert combined chlorine species (chloramines) into free chlorine so the result reports total chlorine

B To maintain the sample pH in the range at which only free chlorine reacts with the titrant, preventing chloramine interference

C To neutralize alkalinity so the endpoint potential is more easily detected

D To precipitate interfering manganese and iron species before they can be oxidized by the titrant

ANSWER B

WHY In amperometric titration for free chlorine, a pH 7 phosphate buffer establishes the pH at which free chlorine is titrated by phenylarsine oxide while the chloramines present do not react. Adding a second buffer at pH 4 (or adding KI) converts the total chlorine fraction. Without the pH 7 buffer holding the sample at the proper pH, chloramines would partially react and falsely inflate the free chlorine reading.

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