



Medical Lab Tech ASCP

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Practice Questions

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1. Which red cell index is calculated as (hemoglobin / hematocrit) x 100 and reflects the average concentration of hemoglobin in a given volume of packed red cells?

- A. MCV
- B. MCHC
- C. MCH
- D. RDW

2. Which gray-top additive both inhibits glycolysis and acts as an anticoagulant to preserve glucose in a specimen?

- A. EDTA only
- B. Sodium fluoride with potassium oxalate
- C. Lithium heparin
- D. Sodium citrate

3. In the Gram stain, which reagent acts as the decolorizer that differentiates gram-positive from gram-negative cells?

- A. Crystal violet
- B. Acetone-alcohol
- C. Safranin
- D. Gram's iodine

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4. An individual with blood group O has which antibodies in their plasma?

- A. No ABO antibodies
- B. Anti-A only
- C. Anti-A and anti-B
- D. Anti-B only



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5. Which immunoglobulin class is the most abundant in serum and the only one that crosses the placenta?

- A. IgM
- B. IgG
- C. IgA
- D. IgE

6. Which urine specimen is preferred for routine urinalysis because it is the most concentrated?

- A. Random midday specimen
- B. First morning specimen
- C. 24-hour collection
- D. Catheterized specimen

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7. A Levey-Jennings chart is used primarily to do which of the following?

- A. Calibrate pipettes
- B. Plot daily control values to monitor analytical performance over time
- C. Record patient demographics
- D. Track reagent inventory

8. Standard precautions are based on which underlying principle?

- A. Only known infectious patients are hazardous
- B. All blood and body fluids are treated as potentially infectious
- C. Only blood is infectious
- D. Gloves alone provide complete protection

9. A patient has a hemoglobin of 12 g/dL and a hematocrit of 36%. What is the MCHC?

- A. 30.0 g/dL
- B. 36.0 g/dL
- C. 33.3 g/dL
- D. 25.0 g/dL

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10. According to common diagnostic criteria, a fasting plasma glucose at or above which value is consistent with diabetes mellitus?

- A. 100 mg/dL
- B. 110 mg/dL
- C. 126 mg/dL
- D. 140 mg/dL

11. After proper Gram staining, gram-negative organisms appear which color?

- A. Purple/blue
- B. Green
- C. Black
- D. Pink/red

12. A patient types as A antigen positive on forward grouping and shows anti-B in reverse grouping. What is the ABO group?

- A. Group A
- B. Group B
- C. Group AB
- D. Group O

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13. Which immunoglobulin is the largest, is a pentamer, and is the first antibody produced in a primary immune response?

- A. IgG
- B. IgA
- C. IgM
- D. IgD

14. If a urine specimen for routine analysis cannot be tested within two hours, what is the preferred preservation method?

- A. Refrigeration at 2-8 C
- B. Freezing at -20 C
- C. Adding bleach
- D. Leaving at room temperature



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15. The Westgard rule 1-3s is violated when a single control result falls outside which limit?

- A. Plus or minus 3 standard deviations from the mean
- B. Plus or minus 2 standard deviations
- C. Plus or minus 1 standard deviation
- D. The mean exactly

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16. Which sequence is correct for donning personal protective equipment when entering a contaminated area?

- A. Gloves, gown, mask, goggles
- B. Goggles, gloves, gown, mask
- C. Gown, mask, goggles, gloves
- D. Mask, gloves, gown, goggles

17. A red cell count of $4.0 \times 10^{12}/L$ and a hematocrit of 36% give which MCV?

- A. 90 fL
- B. 100 fL
- C. 80 fL
- D. 72 fL

18. Hemoglobin A1c reflects average blood glucose over approximately what time period?

- A. The preceding 2 to 3 months
- B. The preceding 24 hours
- C. The preceding 1 to 2 weeks
- D. The preceding 6 months

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19. Which test best differentiates *Staphylococcus aureus* from coagulase-negative staphylococci?

- A. Coagulase test
- B. Catalase test
- C. Oxidase test
- D. Indole test

20. The most immunogenic antigen of the Rh blood group system is which of the following?

- A. c
- B. e
- C. C
- D. D

21. Which immunoglobulin is the predominant antibody in mucosal secretions such as saliva, tears, and breast milk?

- A. IgG
- B. IgM
- C. IgE
- D. IgA

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22. A normal, freshly voided urine specimen is typically which color due to urochrome pigment?

- A. Red
- B. Green
- C. Pale yellow to amber
- D. Colorless and milky

23. Which Westgard rule is most sensitive to systematic error such as a reagent or calibration shift?

- A. 1-2s warning rule
- B. 1-3s rule
- C. 2-2s rule
- D. R-4s rule



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24. The OSHA Bloodborne Pathogens Standard requires employers to offer which vaccination to at-risk employees at no cost?

- A. Hepatitis B vaccine
- B. Influenza vaccine only
- C. Tetanus vaccine
- D. Pneumococcal vaccine

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25. Microcytic, hypochromic red cells with a low MCV and elevated RDW most classically suggest which condition?

- A. Folate deficiency
- B. Iron deficiency anemia
- C. Hereditary spherocytosis
- D. Acute blood loss

26. Which electrolyte is the major extracellular cation and the principal determinant of plasma osmolality?

- A. Potassium
- B. Calcium
- C. Magnesium
- D. Sodium

27. Beta-hemolytic, catalase-negative, gram-positive cocci that are bacitracin-sensitive most likely represent which organism?

- A. Staphylococcus aureus
- B. Enterococcus faecalis
- C. Streptococcus pyogenes (group A)
- D. Streptococcus agalactiae (group B)

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28. Which red blood cell unit is considered the universal donor for emergency transfusion?

- A. AB positive
- B. O negative
- C. A positive
- D. B negative

29. Anaphylaxis mediated by IgE binding to mast cells and basophils represents which Gell and Coombs hypersensitivity type?

- A. Type I (immediate)
- B. Type II (cytotoxic)
- C. Type III (immune complex)
- D. Type IV (delayed)

30. Urine specific gravity primarily reflects which property?

- A. Urine pH
- B. Glucose concentration only
- C. Bacterial load
- D. Concentration (density) of dissolved solutes relative to water



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Answer Key & Explanations

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1. B — MCHC

MCHC = (Hgb/Hct) x 100, reported in g/dL; it describes hemoglobin concentration per unit of packed cell volume, unlike MCV (size) or MCH (content per cell).

2. B — Sodium fluoride with potassium oxalate

Sodium fluoride inhibits enolase to stop glycolysis, while potassium oxalate anticoagulates; together they preserve glucose that would otherwise drop with time at room temperature.

3. B — Acetone-alcohol

The acetone-alcohol decolorizer washes the crystal violet-iodine complex out of thin-walled gram-negative cells while thick peptidoglycan retains it in gram-positive cells.

4. C — Anti-A and anti-B

Group O individuals lack A and B antigens and naturally produce both anti-A and anti-B (predominantly IgM), making O the universal red cell donor.

5. B — IgG

IgG is the predominant serum antibody and the only class actively transported across the placenta, providing passive immunity to the newborn.

6. B — First morning specimen

The first morning specimen is the most concentrated and acidic, improving detection of formed elements and substances like protein and nitrite.

7. B — Plot daily control values to monitor analytical performance over time

The Levey-Jennings chart plots control results against the mean and standard deviation limits over time, allowing visual detection of trends, shifts, and out-of-control events.

8. B — All blood and body fluids are treated as potentially infectious

Standard precautions assume that every patient's blood and body fluids may carry bloodborne pathogens, so protective measures are applied universally regardless of known diagnosis.

9. C — 33.3 g/dL

MCHC = (Hgb/Hct) x 100 = (12/36) x 100 = 33.3 g/dL, within the normal reference range of roughly 32-36 g/dL.

10. C — 126 mg/dL

A fasting plasma glucose of 126 mg/dL or higher on more than one occasion meets the diagnostic threshold for diabetes; 100-125 mg/dL defines impaired fasting glucose.

11. D — Pink/red

Gram-negative cells lose the primary crystal violet during decolorization and take up the safranin counterstain, appearing pink to red.



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12. A — Group A

Forward typing detects A antigen and reverse typing detects anti-B; the presence of A antigen with anti-B (and no anti-A) confirms group A.

13. C — IgM

IgM is a pentamer with ten binding sites, appears first in the primary response, and is the most efficient complement activator due to its multiple Fc regions.

14. A — Refrigeration at 2-8 C

Refrigeration slows bacterial growth and preserves cells and casts; specimens delayed beyond two hours without refrigeration can show bacterial overgrowth, pH shifts, and cast lysis.

15. A — Plus or minus 3 standard deviations from the mean

The 1-3s rule rejects a run when one control exceeds the mean by more than 3 SD; it primarily detects random error and is a common rejection rule.

16. C — Gown, mask, goggles, gloves

The recommended donning order is gown first, then mask or respirator, then goggles or face shield, and gloves last so that the gloves cover the gown cuffs.

17. A — 90 fL

$MCV = (Hct\% \times 10) / RBC(x10^{12}/L) = (36 \times 10) / 4.0 = 90 \text{ fL}$, a normocytic value within the 80-100 fL reference interval.

18. A — The preceding 2 to 3 months

A1c forms by nonenzymatic glycation of hemoglobin over the ~120-day red cell lifespan, so it estimates mean glycemia over roughly the previous 2-3 months.

19. A — Coagulase test

Staphylococcus aureus produces coagulase, which clots plasma; a positive coagulase result separates it from coagulase-negative species like S. epidermidis, whereas catalase only separates staph from strep.

20. D — D

The D antigen is by far the most immunogenic Rh antigen; D-negative recipients readily form anti-D after exposure, which is why Rh(D) typing is routine.

21. D — IgA

Secretory IgA (a dimer joined by a secretory component) is the chief antibody protecting mucosal surfaces against pathogens.

22. C — Pale yellow to amber

Urochrome gives normal urine its yellow color; intensity varies with concentration, while abnormal colors may signal blood, bilirubin, or other pigments.

23. C — 2-2s rule

The 2-2s rule (two consecutive controls beyond the same 2 SD limit) flags systematic error such as a calibration or reagent shift, whereas R-4s detects random error.

24. A — Hepatitis B vaccine

OSHA requires that the hepatitis B vaccine series be offered free of charge to employees with occupational



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exposure to blood and other potentially infectious materials.

25. B — Iron deficiency anemia

Iron deficiency produces small (low MCV), pale (low MCHC) cells with increased size variation (high RDW); megaloblastic anemias from folate/B12 deficiency are macrocytic instead.

26. D — Sodium

Sodium is the dominant extracellular cation and, with its associated anions, accounts for most of plasma osmolality and water distribution.

27. C — Streptococcus pyogenes (group A)

Group A strep (*S. pyogenes*) is beta-hemolytic and characteristically susceptible to bacitracin, whereas group B strep is bacitracin-resistant and CAMP-positive.

28. B — O negative

Group O red cells lack A and B antigens, and Rh-negative cells lack D, so O-negative packed cells can be given to nearly any recipient in an emergency.

29. A — Type I (immediate)

Type I hypersensitivity is IgE-mediated, causing immediate mast cell degranulation and release of histamine, as in anaphylaxis and allergic rhinitis.

30. D — Concentration (density) of dissolved solutes relative to water

Specific gravity compares urine density to water and reflects renal concentrating ability; it rises with dehydration and high solute loads and falls with dilute urine.



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