**Clinical Laboratory Chemistry**

**Laboratory Basics**

1.Reverse osmosis (RO) is described as a process:

A. In which water is forced through a semipermeable membrane that acts as a molecular filter.

B. Used to purify liquid chemicals.

C. In which water forced through a carbon filter eliminates organic solvents.

D. In which salt in water moves through filter paper.

2. Activated carbon filters remove:

A. Ions from water.

B. Organic compounds from water.

C. Acids and bases from water.

D. Large particulates from water.

3. A 0.22-micron filter will remove:

A. Particles with a diameter of 0.01 microns.

B. Particles with a diameter of 0.01 nanometer.  
C. Particles with a diameter of 2.2 microns.

D. Only sodium chloride crystals.

4. The unit of resistivity is:

A. Amperes.

B. Volts.

C. Coulombs.

D. MΩ∙cm

5. The electrical resistance measured between opposite faces of a 1.00 cm cube of an aqueous solution at a specified temperature is termed:

A. Resistivity.

B. Conductivity.

C. Amperometry.

D. Voltammetry.

6. According to CLSI, the resistivity of clinical laboratory reagent water (CLRW) must be:

A. > 100 milliamps.

B. < 10 millivolts.

C. > 10 MΩ∙cm.

D. < 10 MΩ∙cm.

7. Which of the following should not be storied in borosilicate glass because it will etch the inside surface of the glass container?

A. Saline

B. Strong bases (caustics)

C. Clinical laboratory reagent water

D. Weak acids

8. Low actinic glassware has which of the following properties:

A. High thermal resistance with no color added to the glass.

B. Low thermal resistance with a green-yellow color added as an integral part of the glass.  
C. High thermal resistance with a blue color added as an integral part of the glass.

D. High thermal resistance with an amber or red color added as an integral part of the glass.

9. Care must be taken before selecting polyethylene plastic for use as test tubes and disposable transfer pipets because:

A. Polyethylene can bind or absorb proteins, dyes, stains, and picric acid.

B. Polyethylene does not bind or absorb proteins, dyes, stains, and picric acid.

C. Polyethylene cannot be used to pipet serum.

D. Polyethylene forms insoluble salts in the presence of sodium chloride.

10. Which of the following classes of glassware, including pipets, is manufactured and calibrated to deliver the most accurate volume of liquid?

A. A

B. B

C. AA

D. C

11. A *to deliver* or *TD pipets* are designed to:

A. Allow the user to remove a portion of the sample in the tip for better accuracy.

B. Be vigorously tapped against the test tube after all the liquid is removed.

C. Drain by gravity.

D. Be refilled or rinsed out with the appropriate solvent after the initial liquid has been drained from the pipet.

12. Which of the following devices is used to calibrate laboratory thermometers?

A. Barometer

B. Gallium melting point cell

C. Titanium freezing point cell

D. Platinum cathode voltmeter

13. Convert 75 mg/dL to mg/L.

A. 7.5 mg/L

B. 75.0 mg/L

C. 750 mg/L

D. 7500 mg/L

14. Convert 70.0 mg/dL glucose to mmol/L glucose.

A. 3.89 mmol/L

B. 38.9 mmol/L

C. 70.0 mmol/L

D. 389 mmol/L

15. If a thermometer reads 39°F, what is the equivalent degree Celsius?

A. 0.39°C

B. 3.9°C

C. 39°C

D. 40°C

16. Convert 200 picograms to grams.

A. 2.0 x 10–10 grams

B. 2.0 x 10–8 grams

C. 20.0 grams

D. 200 grams

17. A patient’s calcium result is 8.0 mg/dL. Convert this result to mmol/L.

A. 0.004 mmol/L

B. 0.20 mmol/L

C. 2.0 mmol/L

D. 20.0 mmol/L

18. The surface area of a laboratory bench measures 12 square feet. What is the surface area in square meters?

A. 1.115 square meters

B. 11.15 square meters

C. 111.5 square meters

D. 1115 square meters

19. A 24-hours stool specimen weights 0.50 pounds. What is the weight in kilograms?

A. 0.0226 kilograms

B. 0.2265 kilograms

C. 2.265 kilograms

D. 22.65 kilograms

20. A 1 to 4 dilution must be prepared to make a total volume of 100.0 µL. How much serum must be used?

A. 0.025 µL

B. 0.25 µL

C. 2.5 µL

D. 25 µL

21. A patient’s creatinine is outside the linear range of the analyzer; 10 µL of serum is added to 90.0 µL of diluent and the diluted sample is reanalyzed. The creatinine value of the diluted sample is 1.0 mg/dL. Which of the following creatinine values is correct?

A. 1.0 mg/dL

B. 10.0 mg/dL

C. 20.0 mg/dL

D. 100 mg/dL

22. If 10 mL of sample is added to 190 mL of diluent, what is the dilution factor?

A. 10

B. 19

C. 20

D. 25

23. A serum creatine kinase is diluted 1/200 with a result of 50 U/L. What is the patients’ actual amylase result?

A. 50 U/L

B. 200 U/L

C. 1000 U/L

D. 10,000 U/L

24. How many grams of sodium hydroxide (NaOH) are required to prepare 250 mL of a 1.00 molar solution?

A. 2.5 g

B. 10.0 g

C. 25.0 g

D. 100 g

25. What is the normality of a 1.5 molar H2SO4 solution?

A. 1.0 N

B. 1.5 N

C. 3.0 N

D. 36 N

26. What is the molality of a solution that contains 330 g of CaCL2 per kilogram?

A. 3.0 molal

B. 3.3 molal

C. 33.0 molal

D. Unable to determine

27. What is the concentration in mg/dL of a 140 mEq/L sodium standard?

A. 0.323 mg/dL

B. 3.23 mg/dL

C. 32.3 mg/dL

D. 322 mg/dL

28. Convert 145 mEq/L sodium standard to mmoles/L.

A. 14.5 mmol/L

B. 145 mmol/L

C. 167 mmol/L

D. 333 mmol/L

29. What is the molarity of a 20.0% w/v glucose solution?

A. 0.111 molar

B. 1.11 molar

C. 2.22 molar

D. 11.1 molar

30. Determine the molarity of a solution if 125 mL of a 3.5 molar solution is diluted to a final volume of 500 mL.

A. 0.875 M

B. 3.50 M

C. 8.75 M

D. 10.0 M

31. Convert 40°C to °F.

A. 60°F

B. 90°F

C. 100°F

D. 104 °F

32. What is the concentration (g/dL) of a 1/10 dilution of a 12% NaCl solution?

A. 0.12

B. 1.20

C. 12.0

D. 120.0

33. A solution contains 45 g/100 mL of glucose. It is diluted 1/10 and rediluted 1/10. What is the concentration of the final solution?

A. 45.0 g/100mL

B. 4.5 g/100 mL

C. 0.45 g/100mL

D. 0.045 g/100mL

34. How many milliliters of a 2.0M solution is required to prepare 50 mL of a 0.3M solution?

A. 0.075 ml

B. 0.75 ml

C. 7.5 ml

D. 75 ml

35. Calculate the chloride concentration in milliequivalents per liter of a solution prepared by diluting 20 g of barium chloride to 1L.

A. 1.92 mEq/L

B. 19.2 mEq/L

C. 192.0 mEq/L

D. 384 mEq/L

**Answers**  
1. A

2. B

3. C

4. D

5. A

6. C

7. B

8. D

9. A

10. A

11. C

12. B

13. C

14. A

15. B

16. A

17. C

18. A

19. B

20. D

21. B

22. C

23. D

24. B

25. C

26. A

27. D

28. B

29. B

30. A

31. D

32. B

33. B

34. C

35. C