Blood Gas & Electrolytes Practice Exam

1. An emphysema patient suffering from fluid accumulation in the alveolar spaces is likely to be in what metabolic state?
    a. Respiratory acidosis
    b. Respiratory alkalosis
    c. Metabolic acidosis
    d. Metabolic alkalosis

2. The reference range for pH of arterial blood is:
    a. 7.25-7.35
    b. 7.30-7.35
    c. 7.35-7.45
    d. 6.90-7.10

3. At a pH of 7.0 the ratio of HCO_3^-:H_2CO_3 should be:
    a. 20:2
    b. 10:1
    c. 15:1
    d. 20:1

4. The buffering system that contributes the most buffering capacity to plasma is:
    a. Phosphate
    b. Bicarbonate
    c. Protein
    d. Sulphate

5. Respiratory alkalosis may be caused by:
    a. Vomiting
    b. Starvation
    c. Allergic reaction
    d. Hyperventilation

6. The largest quantity of CO2 in the blood is in the form of
    a. pCO2
    b. Carbonate
    c. Bicarbonate
    d. Carbonic acid

7. Elevated lipid and protein values may cause the following results in indirect ISE measurements
    a. Falsely high sodium
    b. Falsely low potassium
    c. Falsely low bicarb
    d. Falsely low sodium

8. Which one of the following will contribute to an increased anion gap?
    a. Increase in unmeasured anions
    b. Increase in measured anions
    c. Increase in calcium
    d. Increase in chloride

9. Correction for the electrolyte exclusion effect is most easily corrected for by means of:
    a. Dilution with normal saline
    b. Direct ISE measurement
    c. Dilution with Di-H_2O
    d. Atomic Absorption Spectroscopy

10. Which of the following could be described as the relationship between PTH and PO_4^- levels?
    a. No relationship
    b. Inversely proportional due to PO_4^-'s actions
    c. Proportional due to PO_4^-'s actions
    d. Proportional due to PTH's actions

11. What disease is responsible for increasing the chloride content of sweat?
    a. Multiple Sclerosis
    b. Huntington's Disease
    c. Tay-Sach's
    d. Cystic Fibrosis

12. Which statement best describes the process of iontophoresis:
    a. Extraction and collection of sweat with pilocarpine
    b. The inhibition of excess chloride excretion in sweat
    c. The diagnostic method of measuring sweat chloride
    d. The process by which excess sweating is inhibited

13. Which electrolyte is present at highest amounts *inside* the red blood cell?
    a. Sodium
    b. Bicarbonate
    c. Potassium
    d. Calcium

14. Approximately what percentage of plasma calcium is ionized at any given time
    a. 45%
    b. 90%
    c. 1%
    d. 25%

15. The active form of Vitamin D3 and location of activation is:
    a. 25-OH-D_3/Kidney
    b. 1,25-$[OH]_2$-D_3/lungs
    c. 25-OH-D_3/lungs
    d. 1,25-$[OH]_2$-D_3/Kidney

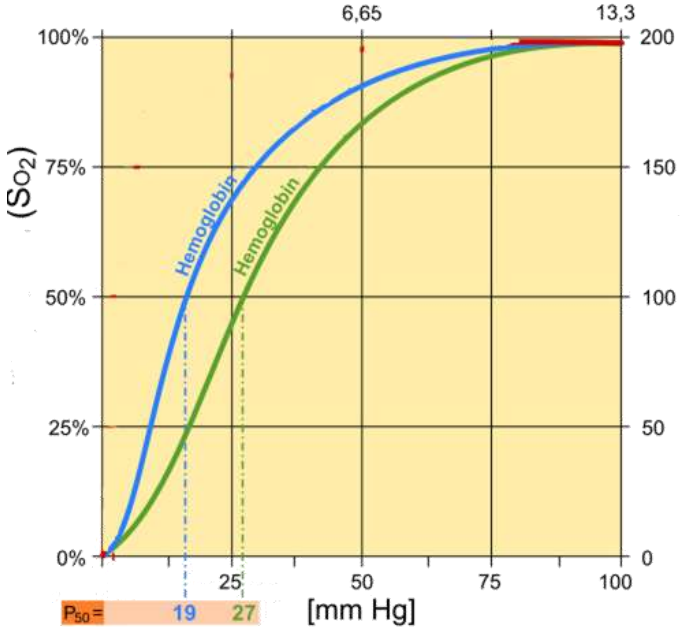
16. Ionized magnesium has all of the following functions ***except***:
    a. Enzymatic co-factor
    b. Protein synthesis
    c. Osmotic pressure
    d. Neuromuscular excitability

17. An increased concentration of 2,3-DPG has what effect upon hemoglobin's oxygen affinity?
    a. It decreases affinity for O_2
    b. It has no effect on affinity for O_2
    c. It has an unpredictable effect on affinity for O_2
    d. It increases affinity for O_2

18. What mechanism leads to a respiratory alkalosis in asthmatic patients?
    a. Hyperventilation
    b. Hypoventilation
    c. Tachycardia
    d. Apnea

19. In the above patient what is the eventual acid base status likely to become if left untreated:
    a. Respiratory alkalosis, uncompensated
    b. Respiratory acidosis, uncompensated
    c. Metabolic acidosis, fully compensated
    d. Normal pH

20. Given that oxygen travels from a mother's hemoglobin to fetus's hemoglobin please label the curves below assuming that one is fetal hemoglobin (HbF) and one is adult hemoglobin (HbA).



21. The solute that contributes the MOST to total serum osmolality is:
    a. Glucose
    b. Sodium
    c. Chloride
    d. Urea

22. The concentration of which plasma electrolytes is directly affected by the acid-base status of the patient?
    a. Sodium and Chloride
    b. Magnesium and Phosphate
    c. Chloride and Potassium
    d. Bicarbonate and ammonium

23. If a patient is experiencing cramps, tetany, convulsions, and dyspnea what would one expect to find in their lab results?
    a. Low potassium
    b. Low phosphate
    c. Low calcium
    d. Low sodium

24. Given a pH of 7.40 and a bicarbonate value of 23 mmol/L what is the approximate pCO_2?
    a. 37.5 mmHg
    b. 460 mmHg
    c. 29.1 mmHg
    d. 45.0 mmHg

25. Please assess the acid-base balance of the following patient:

    pH = 7.18
    pCO_2 = 30 mmHg
    pO_2 = 98 mmHg
    HCO_3^- = 15 mmol/L

    a. Metabolic acidosis fully compensated
    b. Respiratory acidosis partially compensated
    c. Metabolic acidosis partially compensated
    d. Respiratory alkalosis fully uncompensated