Self Assessment – Module G

1) Name three ways CO_2 is transported in the RBC and the % of each.

    A) **DISSOLVED**
    B) **AS BICARBONATE**
    C) **AS CARBAMINO COMPOUNDS**

2) Since we cannot measure H_2CO_3 directly, what parameter do we use instead to reflect the carbonic acid concentration in the blood? **$PaCO_2$**

3) You are caring for a patient in PCV – A/C mode, Pressure limit 30 cm H_2O, Inspiratory time .8 seconds, f 15/min, Total f 15/min, FIO2 .60, PEEP + 5 cm H_2O. The pH is 7.49; $PaCO_2$ is 28; HCO_3 22; PaO_2 83 torr.   You would:

    A) Increase the f
    B) Increase the Vt
    C) Increase the FiO_2
    D) Increase the pressure limit
    E) Decrease the f

4) The effect of O_2 on the CO_2 dissociation curve is the **HALDANE** effect.

5) HCO_3 moves out of the RBC in exchange for Cl^- anions at the
    A) Tissue level
    B) Lung level

6) If the plasma $PaCO_2$ is 50 mm Hg, calculate the $PaCO_2$ in mEq/L
    50 mm Hg x .03 mEq/l/mm Hg = 1.5 mEq/L

7) Name three causes for an increased $PaCO_2$.

    A) **INCREASED CO_2 PRODUCTION**
    B) **HYPOVENTILATION**
    C) **INCREASED DEADSPACE**

8) CO_2 combined to hemoglobin in the RBC is called **CARBAMINO-HB**.

9) CO_2 combined to protein in the plasma is referred to as a **CARBAMINO COMPOUNDS**.

10) The movement of HCO3 out of the RBC in exchange for Cl anions at the tissue level is called the **HAMBURGER (CHLORIDE SHIFT)** effect.

11) Given a pH of 7.37, $PaCO_2$ 60 mm Hg, HCO3 36 mEq/L, PaO_2 80 torr, FiO_2 .40, on volume ventilation A/C mode at Vt of 700 mL, f 12/min, Peak flow 70 L/min. What ventilator changes should be made?

   A) Increase the Vt
   B) Increase the f
   C) Maintain current settings
   D) Add PEEP
   E) Increase the pressure limit

12) What % of CO_2 is carried as dissolved in the plasma? **5%**

13) Given the following ABG, calculate the total CO_2: pH 7.20, $PaCO_2$ 66 torr, HCO_3 37 mEq/L, PaO_2 55 torr, FIO_2 .50.

   A) 35 mEq/L
   B) 24 mEq/L
   C) 45 mEq/L
   D) 39 mEq/L **$HCO_3^- + PaCO_2 = 37 + (66 \times .03) = 37 + 1.98 = 39$ mEq/L**
   E) 29 mEq/L

14) What is the normal Total CO_2 content? **25 mEq/L**

15) The majority of CO_2 in the blood is carried as:

   A) Dissolved
   B) Combined with Hb
   C) Plasma Proteins
   D) HCO_3
   E) Water

16) The average amount of CO_2 produced each minute from the tissue cells is normally **200 mL/min**.

17) Which of the following equations best reflects the **$PaCO_2$** level in the arterial blood?

   A)   Minute Ventilation (V_E)
   B)   Alveolar Minute Ventilation (V_A)
   C) V_D/Vt ratio
   D) CaO_2

18) You are caring for a patient on mechanical ventilation and have just received the ABG results. Based on these results, what recommendation would you make?
pH 7.20 $PaCO_2$ 69 mm Hg, PaO_2 80 mm Hg, FiO_2 .40, Vt 400 mL
Plateau pressure 18 cm H20, Set f 12/min, total f 20/min, mode A/C- VC
   A) Decrease the Vt
   B) Decrease the f
   C) Increase the Vt
   A) Increase the FiO_2
   B) Increase the peak flowrate

19) You are called to the bedside of a patient C/O dyspnea, chest pain and exhibiting tachypnea. The patient's V_E is 16 L/min. You do an ABG and the results are pH 7.38, $PaCO_2$ 43 torr, HCO_3 25 mEq/L, PaO_2 77 mm Hg, FiO_2 NC at 5 L/min. What is your evaluation of the clinical situation? **SINCE A $PaCO_2$ OF ABOUT 25 torr SHOULD BE ACHIEVED WITH A MINUTE VOLUME OF 16 L/min, THERE IS AN INCREASED DEADSPACE PRESENT. WE NEED TO EVALUATE THE CAUSE.**

20) Given the following information: pH 7.38, $PaCO_2$ 42 mm Hg, HCO_3 24, PaO_2 98 mmHg, V_A 10 L/min. What would explain the high V_A? **INCREASED V_d**

21) Explain the effect of an increased $PaCO_2$ on the following

   A) pH **DECREASES**
   B) P_{AO_2} **DECREASES**
   C) V_A **BAD QUESTION. THE $PaCO_2$ IS A RESULT OF THE ALVEOLAR MINUTE VOLUME.**

Given the following ABG results, determine if the $PaCO_2$ should be corrected and if so, by how much.

22) pH 7.10, $PaCO_2$ 100 mm Hg, HCO_3 38 mEq/L

   A) Would you correct the $PaCO_2$ **YES**
   B) How much would you correct the $PaCO_2$ **63 torr**

23) pH 7.58, $PaCO_2$ 18 mm Hg, HCO_3 15 mEq/L

   A) Would you correct the $PaCO_2$ **YES**
   B) How much would you correct the $PaCO_2$ **25 torr**

24) pH 7.38, $PaCO_2$ 50, HCO_3 30 mEq/L
   A) Would you correct the $PaCO_2$ **NO**
   B) Is this acute or chronic? **CHRONIC**

22) Given an A-a gradient of 250 mm Hg, calculate the approximate % shunt
   5% + (5% x 2.5) = 5% + 12.5 = 17.5%