1).What solutions are most likely Acids?

Solution	Effect on Blue Litmus	Effect on Red Litmus
1	None	Turns Blue
2	None	Turns Blue
3	None	None
4	Turns Red	None
5	None	Turns Blue
6	None	None
7	Turns Red	None

A) 1 and 2
B)1 ,2 and 3
C)4,7
D)4,6and7

2)Which of the following pH determination methods provides a pH range of 1-14?

A) Litmus paper
B) Acid-base indicator
C) Universal indicator
D) Electronic pH meter

3)Which of the following is a characteristic of a universal indicator?
A) It can only indicate if a solution is acidic or basic
B) It provides a broad range of colors corresponding to different pH levels
C) It is used to measure the exact concentration of hydrogen ions
D) It is more accurate than an electronic pH meter

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4. How does the addition of a small amount of hydrochloric acid (HCl) affect the pH of an acetic acid buffer?

- A) The pH increases significantly
- B) The pH decreases significantly
- C) The pH remains nearly the same
- D) The pH decreases slightly

5. Why does the pH of a buffer solution change less than that of pure water when an acid or base is added?

- A) Buffers have a high concentration of ions
- B) Buffers neutralize the added acid or base
- C) Buffers do not react with acids or bases
- D) Buffers have a very low pH

6. What is the effect of adding a large amount of strong acid to an acetic acid buffer?

- A) The buffer capacity is exceeded, and the pH drops significantly
- B) The pH increases significantly
- C) The pH remains unchanged
- D) The buffer neutralizes all the added acid

7. Which of the following best describes the pH stability of pure water compared to an acetic acid buffer when exposed to small amounts of strong acid or base?

- A) Water's pH remains stable, while the buffer's pH changes significantly
- B) Both water and buffer pH change significantly
- C) Water's pH changes significantly, while the buffer's pH remains stable
- D) Both water and buffer pH remain stable

8. What is a titration curve?

- A) A graph showing the change in pH as a titrant is added to a solution
- B) A graph showing the volume of titrant added over time
- C) A graph showing the concentration of solute in a solution
- D) A graph showing the temperature change during a reaction

9. In a titration curve of a buffer, what is the region called where the pH changes very little despite the addition of titrant?

- A) Equivalence point
- B) Buffer region
- C) Initial point
- D) Endpoint

10. What happens to the pH of a buffer solution at the equivalence point during a titration?

- A) The pH remains constant
- B) The pH changes rapidly
- C) The pH is neutral (pH 7)
- D) The pH becomes highly acidic

11. What characteristic feature is observed on the titration curve of a buffer near the equivalence point?

- A) A horizontal line
- B) A vertical steep rise
- C) A sloping line
- D) A plateau

12. In the titration of a weak acid buffer with a strong base, what happens to the pH at the half-equivalence point?

- A) pH equals pKa of the weak acid
- B) pH equals 7
- C) pH equals 14
- D) pH equals the concentration of the acid

13)A titration reaches its equivalence point. You measure the pH and find it to be 6.4. You were most likely working with which of the following sets of compounds:

A)HF and KOH
B)HNO_3 and NH_3

C)HCN and LiOH

D)H_2S and $C_5H_8O_2$

E)HCl and NaOH

14)Which of the following pH values is an acceptable equivalence point for a weak base being titrated by a strong acid?

A)5.2

B)7.7

C)11.4

D)1.3

E)7.0

15)A weak acid is slowly titrated with a strong base. Where on the titration curve would the solution be the most well-buffered?

A)The equivalence point

B)When the amount of base added equals the amount of acid in the solution.

C)The half equivalence point

D)When no base has been added

16)A scientist decides to study an acid, HA, by carefully adding a base to the solution through a titration. At the equivalence point of an acid-base titration _____.

A)half of the base has been neutralized by the titrant

B)all the acid has been neutralized by the titrant

C)half of the acid has been neutralized by the titrant

D)[HA]=[A−]

E)all the base has been neutralized by the titrant

17)What does the pKa of a buffer indicate?

A) The temperature at which the buffer works best

B) The pH at which the buffer has its maximum buffering capacity

C) The concentration of the buffer

D) The color change of the buffer

18. Which buffer system is most important within cells?

a) Carbonic acid-bicarbonate system
b) Dihydrogen phosphate-monohydrogen phosphate system
c) Hemoglobin
d) Protein buffer system

19. where is the dihydrogen phosphate-monohydrogen phosphate buffer system mainly active?

a) In the blood plasma
b) In the intracellular fluid
c) In the extracellular fluid
d) In the lymphatic system

20) Why is bicarbonate an effective buffer in the blood?

a) It has a pKa of 6.1.
b) It is present in low concentrations.
c) It is regulated by the lungs and kidneys.
d) It does not interact with CO_2.

21.) What role do the lungs play in the bicarbonate buffer system?

a) They produce bicarbonate.
b) They regulate carbon dioxide levels.
c) They eliminate hydrogen ions.
d) They synthesize carbonic acid.

22)A patient presents with confusion, rapid breathing, and a pH of 7.48. Which of the following conditions is most likely responsible for this alkalosis?

A) Diabetic ketoacidosis
B) Severe vomiting
C) Acute renal failure
D) Asthma attack

23)In a patient with respiratory alkalosis, which of the following laboratory findings would you expect?

A) Decreased arterial CO_2 levels
B) Increased serum bicarbonate levels
C) Decreased blood pH
D) Increased urine pH

24). A hydronium ion:

a) has the structure H3O

b)is ahydrated hydrogen ion.

c)is a hydrated proton

d) is the usual form of one of the dissociation products of water in
solution.

e)all of the above are true

25.) Which of the following is true about the properties of aqueous solutions?

a) A pH change from 5.0 to 6.0 reflects an increase in the hydroxide ion concentration (OH^-) of 20%.

b) A pH change from 8.0 to 6.0 reflects a decrease in the proton concentration (H^+) by a factor of 100.

c) Charged molecules are generally insoluble in water.

d) Hydrogen bonds form readily in aqueous solutions.

e) The pH can be calculated by adding 7 to the value of the pOH.

26). The pH of a sample of blood is 7.4, while gastric juice is pH 1.4. The blood sample has:

a) 0.189 times the $[H^+]$ as the gastric juice.

b) 5.29 times lower $[H^+]$ than the gastric juice.

c) 6 times lower $[H^+]$ than the gastric juice.

d) 6,000 times lower $[H^+]$ than the gastric juice.

e) a million times lower $[H^+]$ than the gastric juice.

27). The aqueous solution with the lowest pH is:

a) 0.01 M HCL

b) 0.1 M acetic acid ($pK_a = 4.86$).

c) 0.1 M formic acid ($pK_a = 3.75$)

d) 0.1 M HCL.

e) 10^{-12} M NaOH.

28). Phosphoric acid is tribasic, with pK_a's of 2.14, 6.86, and 12.4. The ionic form that predominates at pH 3.2 is:

a) H_3PO_4

b) $H_2PO_4^-$

c) HPO_4^{2-}

d) PO_4^{3-}

29). Which of the following statements about buffers is true?

a) A buffer composed of a weak acid of $pK_a = 5$ is stronger at pH 4 than at pH 6.

b) At pH values lower than the pK_a, the salt concentration is higher than that of the acid.

c) The pH of a buffered solution remains constant no matter how much acid or base is added to the solution.

d) The strongest buffers are those composed of strong acids and strong bases.

e) When pH = pK_a, the weak acid and salt concentrations in a buffer are equal.

30)compound has a pK_a of 7.4. To 100 mL of a 1.0 M solution of this compound at pH 8.0 is added 30 mL of 1.0 M hydrochloric acid. The resulting solution is pH:

a) 6.5
b) 6.8
c) 7.2
d) 7.4
e) 7.5

1	C	13	B	25	D						
2	C	14	A	26	e						
3	B	15	C	27	D						
4	C	16	B	28	B						
5	B	17	B	29	e						
6	A	18	B	30	D						
7	C	19	B								
8	A	20	C								
9	B	21	B								
10	B	22	B								
11	B	23	A								
12	A	24	e								