BIOCHEMISTRY

PAST PAPERS 2014-2022

Collected by : Sadeel Al-hawawsheh , Hala Swiedan , Raghad Hamdan , Mais Salman , Lubna Qasem , Zain Al-ghalaieni , Mas Nafoukh

Introduction to biochemistry & pH and buffers

1- Water has polar covalent bonds, yet that's not enough for its molecules to be polar. What makes water molecules polar is :

A- The bonds are bent

B- It is made of only two elements

C- It is neutral when it dissociates

D- It is abundant

Answer : A

2-Dipole-charge interactions in water are between water molecules and :

A- Ions generally

B- Other water molecules

C- Positively charged ions only

D- Partially charged molecules

E- Hydrophobic molecules

Answer : A

3-Ion product of water is:

A- The concentrations of H+ and OH- in any solution

B- The equilibrium constant of water

C- The water concentration constant

D- The ratio of water in a solution

E-The sum of water and its ions product

Answer : A

4-KOH is neutralized by 10 ml of 0.5M H2SO4. Find the equivalents of KOH in the solution:

A- 1 eq

B- 0.01 eq

C- 0.1 eq

D- 10^-3 eq

E-10 eq

Answer : B

5-If pH of patient's urine sample is 5, find the concentration of OH- in the sample :

A- 10^-4

B- 10^-5

C- 10^-7

D- 10^-9

E-10^-10

Answer : D

6-Which of these solutions is the most acidic :

A- 10^-12M NaOH

B- 0.01M HCl

C- 0.1M formic acid (pKa is 3.75)

D- 0.1M acetic acid (pKa is 4.76)

E- 0.1 M HCl

Answer : E

7-A patient's HCO3- level is 32mM, while CO2 levels are normal. Which of the following best describes his condition:

A- Metabolic acidosis

B- Metabolic alkalosis

C- Respiratory alkalosis

D- Not enough information

E- Respiratory acidosis

Answer : B

(The normal range for HCO_3^- is typically 22-28 mM)

8-When you increase the concentration of NaOH gradually in a solution :

A- OH- decreases , pOH decreases, H+ decreases, pH increases

B- All of them remain the same

C- OH- increases, pOH decreases, H+ decreases, pH increases

D- OH- increases, pOH increases, H+ decreases, pH increases

Answer : C

9-Which of the following is true about the bicarbonate buffer in the blood :

A- It behaves the same way it does in a closed system

B- There are high concentrations of H_2CO_3 in blood

C- It is the only buffer in the blood

D- It allows for modest changes in the pH

Answer : D

10- When pH=5.1, which of the following is the best choice of buffer :

A- A buffer with pKa= 4.76

B- A buffer with pKa= 6.1

C- A buffer with pKa= 8.4

D- A buffer with pKa= 9

Answer : A

11- Which of the following is an example of a buffer and its components :

A- $NaCl$ and HCl

B- KH_2PO_4 and NaH_2PO_4

C- H_2CO_3 and $NaHCO_3$

D- HCl and $NaOH$

Answer : C

12- Which of the following is NOT true about alkalosis :

A- Can be caused by an inability to excrete HCO3-

B- Caused by panic attacks

C- Characterized by high levels of carbonic acid in the blood

Answer : C

13- Which is untrue regarding the following graph representing the titration curve of the ammonium ion :

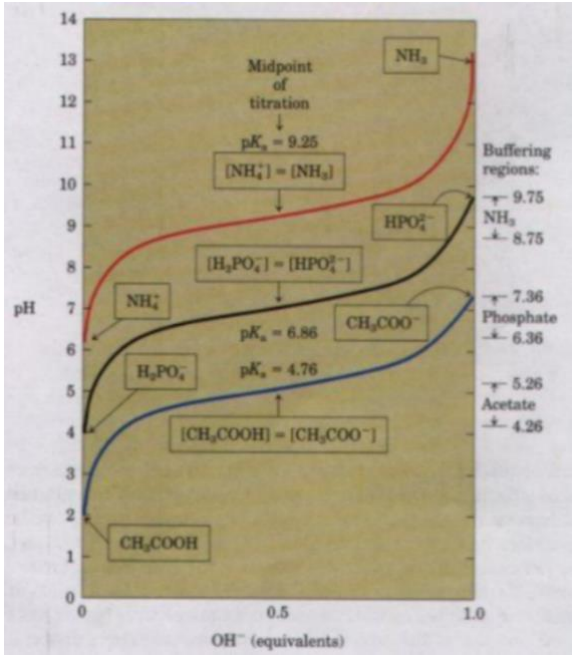
(Refer to the red curve)

A- Equivalence point is nearly 9

B- The capacity ranges between 8-10

C- At midpoint, concentration of OH is 10^-5

D- pKa is nearly 9



Answer : A

14- Concentration of lactic acid = 0.055, lactate = 0.045, calculate the pH (PKa is 3.8) :

A- 2.84

B- 3.76

C- 3.11

D- 4.15

E- 2.2

Answer : B

15- A patient was found to have undetected diabetes mellitus for a while, in the urine sample taken [HCO3-] = 14.1 and [CO2] = 1.1, most likely pH of blood was , pKa = 6.1 :

A- 7.1

B- 7.2

C- 7.4

D- 7.5

E- 7.6

Answer : B

16- If you have × moles of KOH how many moles of an acid must be added to make a buffer solution?

A- 2X HCI

B- X/2 acetic acid

C- 1.5 X acetic acid

D- X acetic acid

Answer : C

17- Which one of the following works as a buffer?

A- KOH

B- NaOH

C- HCL

D- H_2SO_4

E- None of the above

Answer : E

18- The pKb of a base is 4. If you have a 0.01M solution of this base, what is the pH?

A- 8

B- 9

C-10

D- 11

E- 12

Answer : D

19- If 10 m moles of NaOH were dissolved in 1 L of water. What will be the pH of the solution?

A- 2

B- 1

C- 3

D- 12

E- 9

Answer : D

20- The two most important buffer systems in blood are:

A- Phosphorylated organic metabolites and hemoglobin

B- Inorganic phosphate and hemoglobin

C- phosphorylated organic metabolites and pyruvate

D- hemoglobin and albumin

E- hemoglobin and bicarbonate

Answer : E

21- What initial effects does hyperventilation have on the human's blood pH and H_2CO_3 concentration?

A- pH increases and [H_2CO_3] increases

B- pH increases and [H_2CO_3] decreases

C- pH decreases and [H_2CO_3] increases

D- pH decreases and [H_2CO_3] decreases

Answer : B

22- Which of the following acids will be 70% unprotonated at pH=4.9 ?

A- X acid pKa= 5.1

B- Y acid pKa= 5.9

C- Z acid pKa= 5.5

D- V acid pKa= 4.4

E- N acid pKa= 4.8

Answer : A

23- The pKb of a base is 3.0. what is the pH of a 1mM solution of the base ?

A- 8

B- 3

C- 11

D- 6

Answer : C

24- Water acquires its high specific heat, boiling point, melting point and other physical properties because :

A- It is an amphipathic molecule

B- It has a high ion product of water

C- It can form hydrogen bonds with each other

D- It can dissociate to protons and hydroxyl ions

E- It acts as an amphoteric molecule

Answer : C

25- Protein buffer system:

A- Acts both intracellularly and extracellularly

B- Activates carbonic anhydrase when pH is increased

C- Acts only intracellularly

D- Is related to the phosphate groups at phosphorylation sites

E- Has a pKa of 6.1

Answer : A (not entirely included but good to practice)

26- You want to turn a solution containing X moles of $Ca(OH)_2$ into a buffer solution.Which of the following should you add ?

A- 2X moles of acetic acid

B- X/2 moles of acetic acid

C- 2X moles of HCL

D- 3X moles of acetic acid

E- X moles of H_2SO_4

Answer : D

27- Increasing reabsorption of HCO_3^- can be the mechanism of compensation for:

A- A starved individual

B- An asthmatic patient

C- An uncontrolled diabetic patient

D- A mountain climber

E- A controlled diabetic patient

Answer : B

28- Which of the following makes water a liquid at room temperature?

A- Noncovalent interactions

B- Hydrogen bonds between water molecules

C- Van der Waals forces of attraction

D- Covalent bonding

Answer: B

29- Which of the following mixture in aqueous solution of equimolar concentration acts as a buffer solution?

A- $(NH_4)OH$(excess) + HCl

B- HNO_3 + NaOH

C- CH_3COOH + NaOH(excess)

D- H_2SO_4 + KOH

Answer : A

30- Untreated diabetic patient will have?

A- Metabolic alkalosis

B- Metabolic acidosis

C- Respiratory alkalosis

D- Respiratory acidosis

Answer : B

31- If 10 mmoles of KOH were dissolved in 1 L of water. What will be the pH of the solution?

A- 2

B- 1

C- 3

D- 12

Answer : D

32- Which one of these pairs can form hydrogen bond with each other ?

A- Methane and water

B- Alcohol and water

C- Carbon Dioxide and Oxygen

D- Carbon Dioxide and ammonia

Answer : B

33- Which one of these pairs is NOT an acid/conjugate base pair?

A- H_2O / OH^-

B- H_2CO_3 / HCO_3^-

C- CH_3CH_2OH / $CH_3CH_2O^-$

D- CH_3CH_3 / CH_2CH_2

Answer : D

34- If a 10 mmoles of KOH were dissolved in 10 liters of water. The pH of the solution will be :

A- 12

B- 3

C- 2

D- 10

E- 11

Answer : E

35- How many equivalents of phosphoric acid are contained in 300ml of 3.00 M phosphoric acid?

A- 1.80 eq

B- 0.90 eq

C- 9.00 eq

D- 3.60 eq

E- 2.70 eq

Answer : E

36- In a hospital laboratory a 5 mL sample of gastric HCl juice, obtained several hours after a meal, was titrated with 1 M NaOH to neutrality; 0.15 mL of NaOH was required. Assuming that no buffers were present, what was the pH of the gastric juice before titration?

A- 2.10

B- 1.05

C- 3.10

D- 1.98

E- 1.50

Answer : E

37- Which of the following buffer systems is exclusively intracellular?

A- All biological buffers act at the same capacity level.

B- Phosphate buffer system

C- Hemoglobin buffer system

D- Protein buffer system

E- Bicarbonate buffer system

Answer : B

38- All of the following properties of buffer solutions are correct EXCEPT :

A- When pH = pKa, the buffer solution has equal amounts of the acid and its conjugate base

B- Polyprotic acids have multiple buffering capacities at different pH ranges.

C- A maximum buffer capacity is obtained when the pH = +/- 1 of its pKa

D- The pKa of the acid stays the same no matter what pH is.

E- Concentrations of the used weak acid or base to prepare a buffer solution is lower than its salt.

Answer : E

39- A ketose can form hydrogen bonds with the same type of molecules, but a ketone cannot because :

A- The ketose has only hydrogen bond acceptors.

B- The ketose has hydrogen donors and acceptors.

C- The ketone cannot be oxidized.

D- The ketone does not have a carbonyl carbon.

E- The ketone is more soluble in water than the ketose.

Answer : B

40- A patient has undergone surgery that required the removal of the content of his upper gastrointestinal tract. After surgery, his blood pH was 7.60, HCO_3^- was 50 mM and PCO_2 was 52 mmHg. We can describe his situation as:

A- Metabolic acidosis

B- Respiratory alkalosis

C- Metabolic alkalosis

D- Respiratory acidosis

E- His blood pH is normal.

Answer : C

41- You want to turn a solution containing X moles of Ca(OH)2 into a buffer solution.

Which of the following should you add?

A- 2X moles of acetic acid

B- X/2 moles of acetic acid

C- 2X moles of HCL

D- 3X moles of acetic acid

E- X moles of H2SO4

Answer : D

42- The buffer system that provides the highest extracellular capacity is:

A- Protein

B- Bicarbonate carbonic acid

C- Albumin

D- Phosphate

E- Hemoglobin

Answer : B

43- Calculate the pH of a solution prepared by dissolving 600 mg of monoprotic acid in 10 ml of 0.5 M solution of NaOH. pka of the acid is 7.0 (M.W of the acid is 100).

A- 8.0

B- 7.7

C- 6.5

D- 7.0

E- 6.7

Answer : B

44- In a hospital laboratory, a 100 ml sample of gastric HCl juice, obtained several hours after a meal, was titrated with 0.2 M NaOH to neutrality; 50 mL of NaOH was required . Assuming that no buffers were present, what was the pH of the gastric juice?

A- 7.00

B- 1.05

C- 1.00

D- 13.00

E- 0.40

Answer : C

45- Any of these pairs have equal pH ?

A- 2 M HCL , 1 M HNO_3

B- 1 M HCL , 1 M NaOH

C- 1 M HCL , 0.5 M H_2SO_4

D- 1 M $Ca(OH)_2$, 0.5 M NaOH

Answer : C

46- Which bond is the strongest?

A- Between NaCl

B- Amide bond

C- Non covalent

D- Hydrophobic interaction

Answer : B

47- What true about compensation in respiratory alkalosis?

A) Brain work immediately and take control

B) work in both H+ and HCO3-

C) breathing rate change

D) The reaction go toward H+ and HCO3- , favorable to make HCO3-

Answer : B

48- You have 10 grams , 20 M.W and 500 ml of HCL . You take 50 ml of it and want to titrate it with 10 molarity of NaOH , What is the volume of NaOH you need (in ml) ?

A- 5

B- 2.5

C- 10

D- 7.5

Answer : A

49- Which isn't true about pKa ?

A- Even strong acids have PKa

B- The number of hydrogens the acid can donate is not related to the PKa

C- The lower the PKa the stronger the acid

D- Diprotonated acids will have 2 PKa

Answer : B

50- Van der waals week but important because :

A- they form every where

B- the distance does not matter

C- there is a lot of them

Answer : C

51- The most important buffer in blood ?

A- carbonic acid bicarbonate

B- dihydrogen phosphate

C- proteins

D- ATP

Answer : A

52- Gastric juice (pH= 1.4) compared to human's blood (pH= 7.4):

A- [H+] in gastric juice is 6 times higher than in blood

B- [H+] in gastric juice is 10^6 times higher than in blood

C- [H+] in blood is 10^6 times higher than in gastric juice

D- [H+] in gastric juice is 7 times higher than in blood

Answer : B

53- Below is the pKa for weak acids, which weak acid will be approximately 9% dissociated at pH 3.88?

A- Acetoacetic acid (pKa=3.6)

B- Lactic acid (pKa=3.9)

C- Beta-hydroxyl butyric acid (pKa=4.6)

D- Propionic acid (pKa=4.9)

E- Imidazolium (pKa=5.9)

Answer : D

54- If the pH of a solution decreased from 7.5 to 7. What change has occurred to the concentration of H3O+?

A- increased approximately 3 times

B- Increased 5 times

C- Increased 500 times

D- Increased 10^5 times

Answer : A

55- The correct choice about water at 25C :

A- pH= -Log OH

B- CON. of OH- = CON. of H3O+

C- OH- = H3O+ = 1 * 10 ^-14

Answer : B

56- All of the following properties of buffer solutions are correct EXCEPT:

A- When pH = pKa, the buffer solution has equal amounts of the acid and its conjugate base

B- Polyprotic acids have multiple buffering capacities at different pH ranges.

C- A maximum buffer capacity is obtained when the pH = +/- 1 of its pKa

D- The pKa of the acid stays the same no matter what pH is.

E- Concentrations of the used weak acid or base to prepare a buffer solution is lower than its salt.

Answer : E

57- The following statement is CORRECT regarding the equivalence point of a titration curve:

A- The solution cannot act as a buffer.

B- 70% of titration is finished.

C- pH equals 7.

D- pH equals pKa.

E- the curve is in plateau phase.

Answer : A

58- Calculate the normality of a solution that contains 5g of H3A acid in 2000 ml of solution. (molecular weight is 25)

A- 3.0

B- 0.50

C- 7.5

D- 0.30

E- 0.0003

Answer : D

(mostly not included)

59- Buffers work the best at all these conditions except :

A- when the pH to be maintained using the buffer has a value close to the pKa of its acid component.

B- When the concentration of the acid component is equal to that of the base component.

C- When the acid component is completely dissociated

Answer : C

60- 100 mmol of a triprotic acid were titrated with KOH. PKa values = 3, 6, 9. How many mmoles of KOH must be added to have pH=6?

A. 100

B- 150

C- 200

D- 250

E- 300

Answer : B

61- Which of the following acids or bases can make a buffer with its conjugate acid or its conjugate base?

A- HCl

B- KOH

C- H_2SO_4

D- None of the above

Answer : D

62- Below is the pKa of some weak acids. Which weak acid will be 91 % undissociated at pH=4.86?

A- Acetoacetic acid pka = 3.6

B- Lactic acid pKa=3.9

C- beta-hydroxyl butyric acid pka=4.8

D- propionic acid pka=4.9

E- Imidazolium pka=5.9

Answer : E

63- If you have X moles of KOH, how many moles of an acid must be added to have a buffer with equal concentrations of A- and HA?

A- X

B- X/2

C- 2X

D- 1.5 X

E- None of the above

Answer : C

64- All of the following will cause mild or severe acidosis except:

A- the presence of ketone bodies in untreated diabetic patient

B- The production of acids like lactic acid during metabolism

C- Excessive breathing

D- Repeated vomiting from the stomach containing HCL.

Answer : C&D

65- One of the following statements is not true about Carbonic acid/Bicarbonate buffer:

A- The most common extracellular buffer.

B- Under physiological conditions the ratio of [HCO3-]/[H2CO3]= 20

C- Its buffering range is less than the desirable pH and that's compensated by CO2 mobility.

D- When adding a strong acid, it will react with HCO3-

E- When adding a strong base, it will react with CO3-2

Answer : E not entirely included but good to practice

66- Given pka of different acids, which one will have the strongest conjugate base when being dissociated with water?

A- 3.5

B- 2.9

C- 4.76

D- 7.2

E- 12.4

Answer : E

67- A patient has been diagnosed with enteropathy where intestinal bacteria secrete NH_3 and it's transported to blood circulation through the portal vein. What happens to the body?

A- Metabolic alkalosis

B- Respiratory acidosis

C- Respiratory alkalosis

D- Metabolic acidosis

E- Does not have any effect as the bicarbonate buffer system is not affected.

Answer : A

68- What is the pH if the concentration of the conjugate base (A^-) is 0.35M and the concentration of the weak acid (HA) is 0.25M if we add 0.05 M of NaOH ? (pKa = 7)

A- 7.3

B- 8.4

C- 9.1

D- 10.0

E- 5.2

Answer : A

69- We have 0.5 ml of HCl and it's titrated by 0.5 M of NaOH with a volume of 0.12 ml what is the pH of the acid :

A- 0.9

B- 0.08

C- 8

D- 7

E- 1.8

Answer : A

70- Carbon dioxide reacts with water to form carbonic acid which then ionizes according to the following equilibrium reaction: $CO_2+H_2O = H_2CO_3 = H^+ + HCO_3^-$ All the components of the reaction are water soluble, but carbon dioxide is a gas. If you dissolve some sodium bicarbonate in water and then add hydrochloric acid, one of the following should be seen :

A- Carbon dioxide bubbling out.

B- Carbon dioxide dissolving.

C- Nothing, Carbon dioxide is an invisible gas

D- The solution should turn blue

E- The solution should turn red

Answer : A

Explanation : When adding HCL, it will interact with HCO_3^- producing more of H_2CO_3 which will dissociate according to the equation provided effectively produced $H_2O + CO_2$ and subsequently, bubbling of CO_2 can be observed.

72- What is the concentration of H_2PO_4 if we have 0.5 eq in 500ml ?

A- 0.5 M

B- 0.25 M

C- 1M

Answer : A

73- A buffer is made by adding 0.200 M $HC_2H_3O_2$ and 0.150 M $NaC_2H_3O_2$. If 0.005 mol of NaOH is added to 125 mL of this buffer,What is the pH? ($K_a=1.8*10^{-5}$) :

A- 4.82

B- 4.18

C- 5.23

D- 6.47

Answer : A

74- Given that Ka for Pyruvate=3.1*10^-3 ,What is the pH of a buffer made by mixing 0.1 M Pyruvate with 0.12 M Sodium Pyruvate ?

A- 4.2

B- 2.45

C- 1.60

D- 2.59

Answer : D

75- Homeostasis maintains a blood plasma pH ranging between 7.35 and 7.45. The kidneys control the amount of bicarbonate ion, and the lungs control the amount of carbon dioxide in plasma. If a person suffered from acidosis (caused, perhaps, by drinking acid):

A- The respiratory system would hypoventilate, keeping more CO_2 in the plasma

B- The lungs would hyperventilate, keeping CO_2 levels high in plasma

C- The kidneys would remove HCO_3 (from blood plasma and excrete it into the urine)

D- The lungs would hyperventilate, decreasing CO_2 in the plasma, and the kidneys would save HCO_3^- (and excrete it into blood plasma)

E- The kidneys would remove CO_2 and excrete it into blood plasma rather than into urine

Answer : D

76- Given a choice between acid A and acid B :

A- Acid A is stronger if its conjugate base is stronger than that of Acid B.

B- Acid A is stronger if its conjugate base is weaker than that of Acid B.

C- Acid A is stronger if its conjugate base is a more complex ion than that of Acid B.

D- Acid A is stronger if its conjugate base is a noble gas.

E- There is no way to compare acid strength based on any of these factors

Answer: B

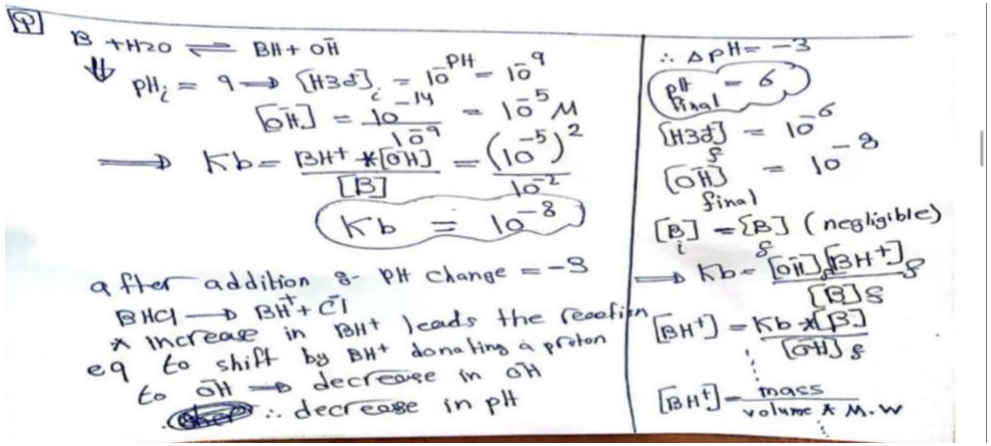
77- A solution of a weak base (B) with a Volume of 2 L , Concentration = 0.01 M , pH =9 ,upon the addition of 0.685 g of its salt (BHCL) , the pH value changed by a 3 unit difference , the M.W of the Salt BHCL (Hint : [B] remains the same) :-

A- 68.5

B- 34.25

C- 6.85

D- 137



Answer: B

78- The pH of 0.1M HCL is 1.0 , Of 0.1 M Acetic Acid is 2.8. What volume of 0.1N NaOH would be required to titrate 10 mL of each acid solution to their respective end point respectively ?

A- 10 mL , 10 mL.

B- 16 mL , 10 mL

C- 10 mL , 16 mL

D- 100 ml , 16 mL

Answer : A

79- A medical student is attempting to understand the buffering system of the human body and has set up the following experiment in the lab to help with his understanding. Consider a biochemical reaction that is taking place in a Total 0.1 M buffer. The initial pH is 7.4, and the pKa of the buffer is 7.2. If, in a final reaction, a volume of 1.0 mL, 10 µmol of protons are generated, what would be the final pH of the solution?

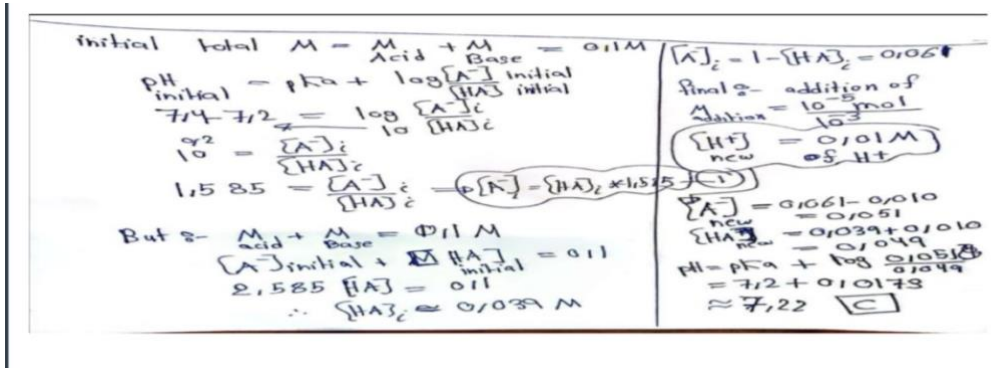
A- 7.59

B- 7.25

C- 7.22

D- 7.00

E- 7.15



Answer : C

80- 4.13g OF $NaC_2H_7O_4$ is added to 250 mL of a 0.150 M $HC_2H_7O_4$ solution. With a Ka= 2.75*10^-5 , M.W of the salt 202.14 g/mol , What is the pH of the buffer system?

A- 6.54

B- 5.43

C- 4.28

D- 7.42

Answer : C

81- Carl, an elementary student, was rushed to the hospital due to decreased level of consciousness. The patient displays slow and deep breathing, and he is tired and irritable in response to stimulation. Measurement of arterial blood gas shows pH 7.0, normal PaO_2, decreased $PaCO_2$, and $[HCO_3]$=12 mmol/L; what is your assessment?

A- Respiratory Acidosis, Uncompensated

B- Respiratory Acidosis, Partially Compensated

C- Metabolic Alkalosis, Uncompensated

D- Metabolic Acidosis, Partially Compensated

E- Metabolic Acidosis, Completely Compensated

Answer : D

Explanation: The results show that he has metabolic acidosis (low HCO_3^-) with respiratory compensation (low CO_2) , Partial since the pH value is still far away from the normal 7.45 blood-pH.

82- A patient with panic attacks and hyperventilation is in a respiratory alkalosis. The excess hydroxide ions were able to overcome by which one of the following buffers, which has the greatest buffering capacity in and near to normal blood pH (pKa of dihydrogen phosphate is 6.80. The pKa of carbonic acid is 3.80. pKa of ammonium ion is 9.25, pKa of acetoacetic acid (a ketone body) is 3.62) ?

A- Carbonic acid

B- Dihydrogen phosphate

C- Ammonium ion

D- Acetoacetic acid

E- Ascetic acid

Answer: B

83- Which one of the following works as a buffer?

A- KOH

B- NaOH

C- HCL

D- H_2SO_4

E- None of the above

Answer : E

84- What initial effects does hyperventilation have on the human's blood pH and H_2CO_3 concentration?

A- pH increases and [H_2CO_3] increases

B- pH increases and [H_2CO_3] decreases

C- pH decreases and [H_2CO_3] increases

D- pH decreases and [H_2CO_3] decreases

Answer : B

85- We have a drug that has [HA] IONIZABLE ACID with pKa of 4.5, that enters the cell via the membrane , what is the best pH that enhances the entry of the drug ?

A- pH=1

B- pH=4.8

C- pH=3.9

Answer : A (where the drug will be mostly non ionised)

86- during a short distance run, the muscles produce a large amount of lactic acid from their glucose stores. hyperventilation can be used for in this situation because:

A. Adds H+ lowering the pH of the blood

B. Increase the composition of bicarbonates

C. remove H+ raising the pH of the blood

D. Reduce the capacity of hemoglobin buffer system

E. decreases the production of carbonic acid

Answer : E

87- which of the following this physiologic/pathologic conditions is most likely to result in an alkalosis provided the body could not fully compensate?

A. repeated vomiting of stomach contents

B. production of ketone bodies by patients with diabetes mellitus

C. starvation

D. production of acids by the highly active liver cells

E. diarrhea with loss of bicarbonate anions secreated by the intestine

Answer : A

88- You have been observing an insect that defends itself from enemies by secreting a liquid . Analysis of lipid shows it to have a concentration of formic acid (Ka= 1.8 * 10^-4) of 1.45M and a concentration of formate ion of 0.015M what is the pH of the secretion ?

A. 5.73

B. 1.76

C. 7

D. 3.37

E. 1.91

Answer : B

89- A patient when an enteropathy (internal disease) produce large amounts of ammonia (NH_3) from bacterial overgrowth in the intestine. the ammonia was absorbed through the intestine into the portal vein , and entered the circulation . Which of the following is a likely consequence of his ammonia absorption :

A. increase expiration of CO_2

B. hyperventilation

C. conversion of ammonia to ammonium ion in his blood

D. decreased concentration of bicarbonate in the blood

E. a decrease of blood pH

Answer : C

89- laboratory tests of the urine of a patient identified the presence of methylmalonate (-OOCCH(CH3)COO-) . Methylmalonate is best described as one which one of the following ?

A. A strong acid

B. it is a triprotic acid

C. The conjugate base of a weak acid

D. It is 100% dissociated at its pKa

E. It's a major intracellular buffer

Answer : C

90- hydrogen bonds can form between electronegative atoms such as oxygen and nitrogen and a hydrogen atom bonded to:

A. oxygen only

B. hydrogen

C. nitrogen only

D. carbon

E. an electronegative atom

Answer : E

91- an individual wears a face mask for a long hours without removing it at all the condition that is expected to happen :

A. nothing would happen

B. metabollic acidosis

C. respiratory alkalosis

D. metabolic alkalosis

E. respiratory acidosis

Answer : E

92- a decrease blood pH from 7.5 to 7 would be accompanied by which of the following changes in ion concentration ?

A. A ten-fold decrease in hydrogen concentration

B. An increase in hydrogen ion concentration by a factor of 7.5 / 7

C. five fold increase in hydroxyl ion concentration

D. shift in concentration of buffer and ions with no change in hydrogen ion concentration

E. A 3 fold increase in hydrogen add concentration

Answer : E

93- You prepare a sodium phosphate buffer by mixing 100ml of 0.1 M Na_2HPO_4 with 100ml of 0.1 M NaH_2PO_4 . The pH of the final solution is 7.8 what is the approximate pKa of the acid component of the buffer ?

A. 7.8

B. 10 to the power of - 5.8

C. 10 to the power of 7.8

D. 6.8

E. 5.8

Answer : A

94- Which of the following statements best describes what is meant by ion product of pH water:

A. Product of concentrations of hydrogen ions and hydroxyl ions in water or an aqueous solution of an electrolytes

B. The sum of concentrations of hydrogen ions and hydroxyl ions in water or solution of electrolytes

C. The product of concentrations of hydrogen ion and hydroxyl ions that are derived only from water molecules in aqueous solution of electrolytes

D. The number of ionized molecules of H2O in one mole of a pure water

E. The total number of negatively and positively charged ions in one liter of an aqueous solution of electrolytes

Answer : C

95- The pKa of base is 2 , what is the pH of a 0.01 M solution of the base?

A- 12

B- 4

C- 14

D-7

E- 8

Answer : D

96- The ability of water to form hydrogen bonds is attributed to:

A. the oxygen atom in a water molecule has a weak positive charge.

B. each of the hydrogen atoms in a water molecule is weakly negative in charge

C. the bonds that hold together the atoms in a water molecule are polar covalent Bonds

Answer : C

97- Water molecules have _____ than molecules of similar size, such as ammonia and Water can form the following noncovalent interactions except:

A. Hydrophobic interactions

B. Van der waals interactions

C. electrostatic interactions

D. hydrogen bonding

Answer : A

98- How many molecules of water dissociate into OH- and H3O+?

A- one in 7

B- One in 10^7

C- One in 10^12

D- One in 10^-7

Answer : B

Carbohydrates

1- **What is the wrong about D and L configuration:**

A- D sugars Exist in abundance in nature

B- all of the amino acid in protein is L configuration

C- they don't deferent in anomeric carbon

D- they are deferent in only last chiral center

E- more than one of the above

Answer : D

2- How many chiral carbons are there in deoxyribose (acyclic) :

A- 1

B- 2

C- 3

D- 4

E- none

Answer : C

3- Which of the following sugars has a beta glycosidic linkage :

A- chitin

B- maltose

C- cellulose

D- none of the above

Answer : A&C

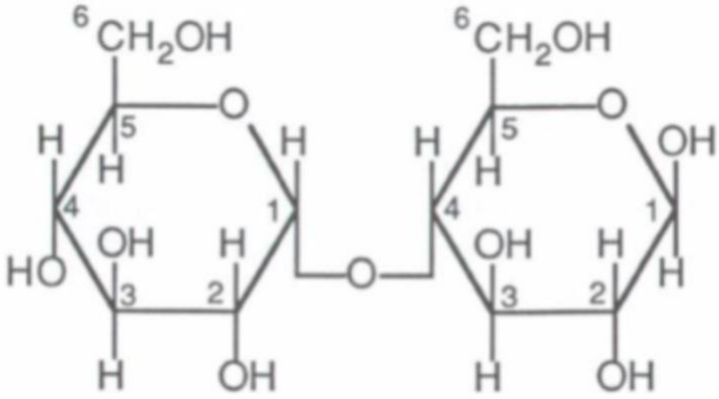
4- Which of the following is correct about this structure?

A) It is lactose

B) It contains alpha-glucose

C) It is a non-reducing sugar

D) This is a beta-(1-4) linkage.



Answer : B

5- Glycosaminoglycans are characterised by all of the following features EXCEPT:

A. The basic unit is a repeated disaccharide

B. At least, one sugar has an amino group

C. At least, one sugar is negatively charged with acidic group

D. The sugars are derived from glucose or fructose

E. It is attached to proteins forming proteoglycans

Answer : D

6- The polysaccharide in a bacterial cell wall has all the following features EXCEPT:

A. is a heteropolysaccharide of NAG and NAM

B. is a homopolysaccharide of sialic acid

C. is a polysaccharide crosslinked by peptides

D. sugars are connected directly to tetrapeptides

E. the strands are connected by Gly pentapeptides

Answer : B nice to practice

7- Which is not correct about glucose?

A. It is an epimer of mannose

B. It is an epimer of galactose

C. Only D-isomer exist in mammalian cells

D. It mainly exists as open chain in solution

Answer : D

8- the polysaccharide which glucose is stored as in animal cells:

A. is stored in the melanocytes and hepatocytes

B. it contains Beta-linkage

C. it extremely branched for more efficient energy supply

D. it is broken down to glucose and maltose

Answer : C

9- D-glucose and D-galactose has all of the following except:

A. Hexoaldoses

B. They are Diastereoisomers

C. They are anomers

D. They are reducing sugars

Answer : C

10- What is the mutual property of amylose and cellulose?

A- alpha 1-4 glycosidic linkage

B- digestible by humans

C- consist of reduced glucose residues

D- They are not branched

E- None of the above

Answer : D

11- How many chiral centers is/are present in the ring structure of 2-deoxyribose?

A- 5

B- 2

C- 3

D- 4

Answer : C

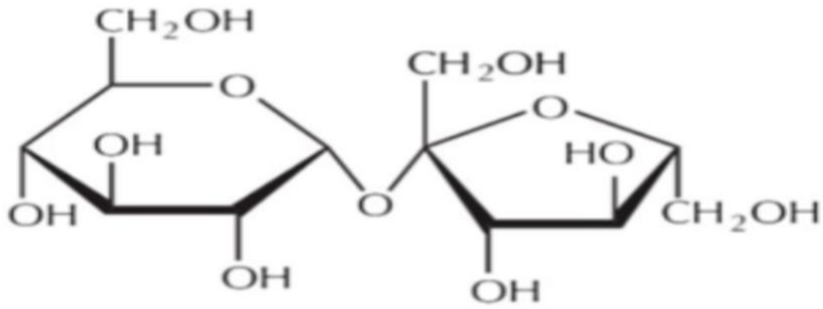
12- The following structure represents:

A- Sucrose

B- Maltose

C- Lactose

D- Ribose



Answer : A

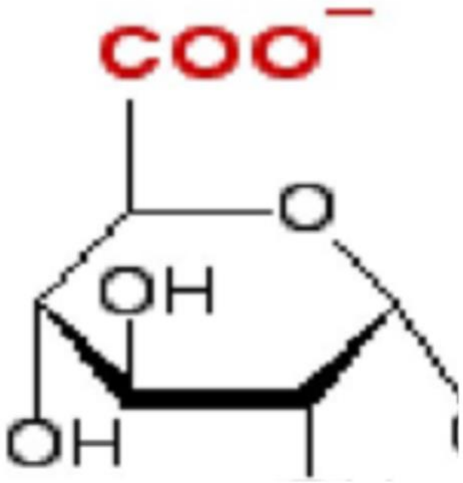
13- The following molecule result by?

A- Strong oxidizing agent

B- Reducing agent

C- Weak oxidizing agent

D- An enzyme



Answer : D

14- Amylopectin is composed of _____ that are corrected by _____ and branched at _____ :

A- Galactose residues, alpha-1,4 linkage, carbon number 1

B- Glucose residues, alpha-1,4 linkage, carbon number 6

C- Galactose residues, alpha-1,4 linkage, carbon number 6

D- Ribose residues, alpha-1,4 linkage, carbon number 6

E- Glucose residues, beta-1,4 linkage, carbon number 1

Answer : B

15- The hetero polysaccharides with sulfated sugars, amino sugars and/or Oxidized sugars that are mainly derived of glucose and galactose and are found in extracellular matrix are:

A- Pectin

B- Dextran

C- Chitin

D- Glycosaminoglycans

E- Cellulose

Answer : D

16- The glycolipid/s which contain/s a sialic acid:

A- Gangliosides

B- Globosides

C- Cerebrosides

Answer : A

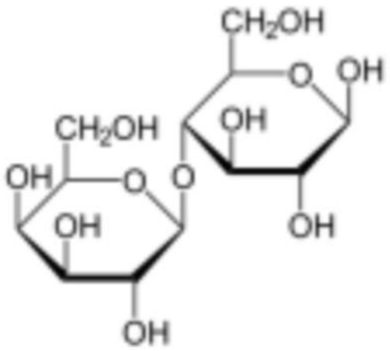
17- What is false about the following disaccharide's structure:

(This question has been omitted) (Omitted because three answers were correct, but nice for practice)

A. It is a non-reducing sugar ***

B. It is a homopolysaccharide ***

C. It has a 1-1 glycosidic linkage ***



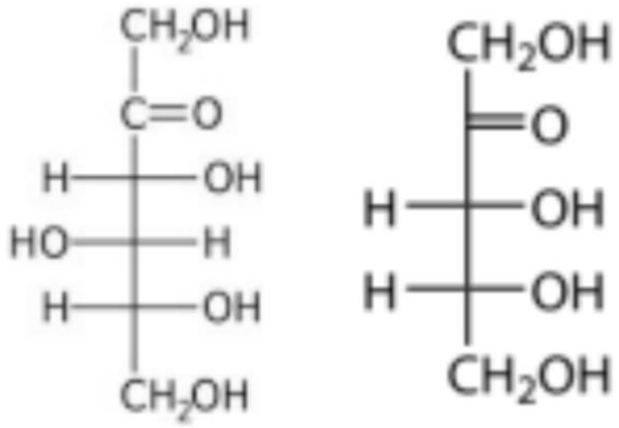
18- Which is false about the two following sugars?

A. They are diastereomers

B. They are both ketoses

C. OH on carbon 4 would be above the ring left

D. Benedict's test is positive for both of them



Answer : A

19- Which best describes glucose?

A. It participates in the formation of sucrose

B. It is mainly in the open chain form

Answer : A

20- What is false regarding GAGs?

A. They are negatively charged

B. They are found extracellularly

C. They can only be made of glucose and fructose derivatives

Answer : C

21- Why is sucrose a non-reducing sugar?

A. It does not contain a free anomeric carbon

B. Contains two non-reducing monosaccharides

Answer : A

22- Why is cellulose indigestible in our bodies?

A. We lack the enzyme necessary for its digestion

B. It is a large molecule

C. It is left undegraded to aid in bowel movement

D. Bacteria digest it faster

Answer : A

23- What is incorrect about bacterial cell walls?

A- The glicosidic bond between protoglycans are beta

B- It has non branched sugar

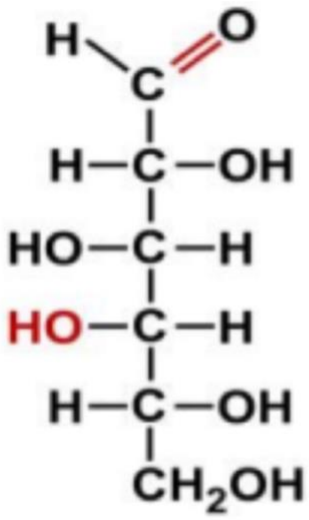
C- It has many chain of sugar connected by peptide

D- It is mainly made of sialic acid

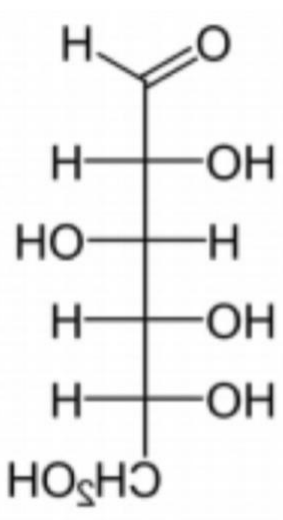
Answer : D

24- Which one of the following is L-glucose :

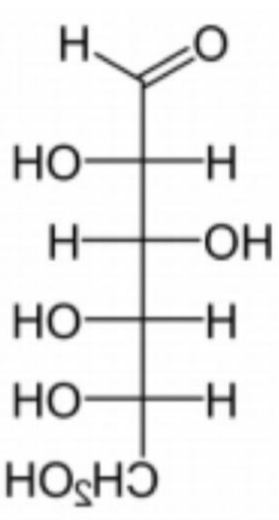
a.



b.



c.



Answer : C

25- The blood types differ in their:

A. sugar content

B. protein content

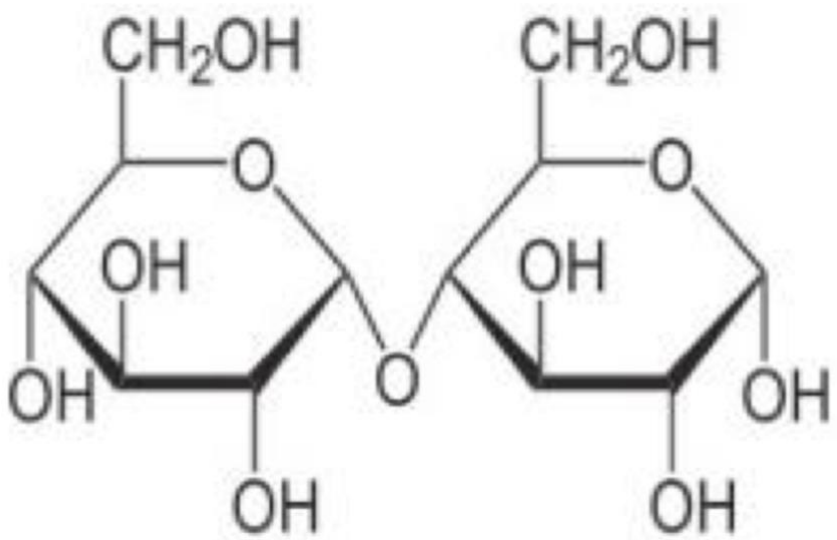
C. lipid content

Answer : A

26- which statement is not true about the following structure?:

A. the glycosidic bond is ß(1-6)

B. it could be a part of dextran



Answer : A as a branch

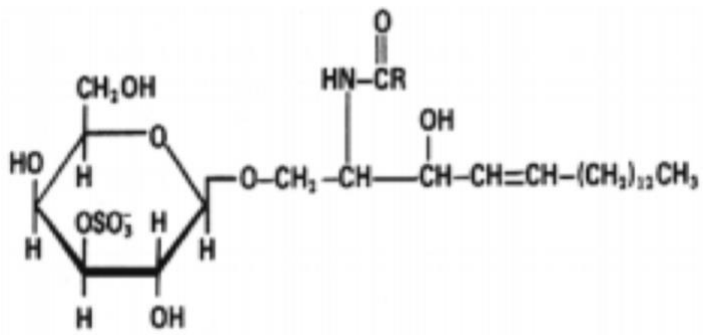
27- One of the following is true about the following structure :

A. Phosphatide

B. Sulfatide

C. you can find it in the muscle cells

D. Glyceride



Answer: B

28- The following figure represents D- sorbose, which of the following statements is wrong ?

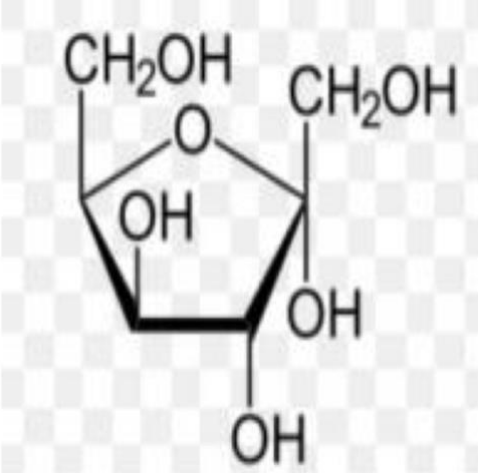
A. It is a furanose.

B. It is an alpha sugar.

C. Carbon no.1 is the anomeric carbon.

D. It is a ketose.

E. It can re-open up into the chain form



Answer: C

30- Glycoside formation results in:

A. reaction of cyclic acetal with alcohol

B. reaction of cyclic acetal with another cyclic acetal

C. reaction of cyclic hemiacetal with alcohol

Answer : C

31- Which of the following is not a reducing sugar?

A. glucose

B. Fructose

C. sucrose

D. galactose

Answer : C

32- which of the following is the most found in nature ?

A. L-sugar

B. D-sugar

C. L-sugar and D-sugar in the same amount

Answer : B

33- D-glucose and D-galactose has all of the following except:

A. Hexoaldoses

B. They are Diastereoisomers

C. They are anomers

D. They are reducing sugars

Answer : C

34- They polysaccharide which glucose is stored as in animal cells:

A. is stored in the melanocytes and hepatocytes

B. it contains Beta-linkage

C. it extremely branched for more efficient energy supply

D. it is broken down to glucose and maltose

Answer : C

35- which of these is aldo-pentose ?

A. glucose

B. fructose

C. maltose

D. ribose

Answer : D

36- Deoxy sugars are produced via :

A. Reduction of a monosaccharide

B. Engaging anomeric carbons in a glycosidic bond

C. Conversion of sugar chain into cyclic form

D. Oxidation of a sugar acid

E. Hydrolysis of a disaccharide

Answer : A

37- The following is a non-reducing sugar :

A. L-glucose

B. Maltose

C. Fructose

D. Cellulose

E. Lactose

Answer : D

38- One of the following is true in regards to L-glucose and D-glucose :

A. D-glucose is natural, but not L-glucose

B. They differ in the orientation of only the chiral carbon farther from the most oxidized group

C. D-glucose is cyclic, but L-glucose is a chain molecule

D. D-glucose has an anomeric carbon, but L-glucose does not

E. They are mirror images of each other

Answer : E

39- Oxidation of carbon #6 of cyclic glucose results in :

A. Conversion to fructose

B. Production of glucuronate

C. Stabilizing the anomeric carbon

D. Production of a deoxy sugar

E. Opening of the ring structure

Answer : B

40- Why are some people lactose- intolerant?

A. They lack the enzyme, lactase

B. They have unusual flora intestinal bacteria) in their digestive system

C. They metabolize lactose faster than normal

D. They cannot digest galactose

E. They did not drink milk when they were young

Answer : A

41- The feature of a polysaccharide with a beta-glycosidic bond is

A. It forms more hydrogen bonds

B. It can be branched

C. It is more water-soluble

D. It is rigid and straight

E. It can be looped taking less space

Answer : D

42- Gluconate is oxidized on carbon number:

A- 2 and 6

B- 1 and 6

C- 1

D- 2

Answer : C

43- Glycosaminoglycans are made of :

A- Repeated hetero-disaccharides derived from amino sugars and fructose.

B- Repeated homo-disaccharides derived from galactose.

C- Repeated hetero-disaccharides derived from glucose and peptides.

D- Repeated hetero-disaccharides derived from glucose and galactose.

E- Repeated hetero-disaccharides derived from glucose and fructose.

Answer : D

44- The polysaccharide type that excess glucose is stored in has the following characteristic:

A- It is a polysaccharide cross linked by peptide.

B- It cannot be digested because of the lack of the digestive enzyme in humans' intestine.

C- It is broken down by enzymes to maltose and glucose.

D- Its monomers are connected by beta linkages.

E- It is unbranched for better mechanical properties.

Answer : C

45- The following sugar has a beta linkage:

A- Galactose

B- Cellulose

C- Glycogen

D- Amylopectin

E- maltose

Answer : B

46- Which of these unique about sucralose?

A) Make from glucose and galactose

B) Naturally present in human body

C) It is used to treat damage DNA

D) All its structure rings contain Cl

Answer : D

47- Which incorrect about GAGs?

A) All have negative charge

B) most abundant GAG is chondroitin sulfate

C) Derived from fructose and glucose

D) The Structure represents 2 repeated units

Answer : C

48- Fructose can not be oxidized, but with benedicts test show positive result, why?

A) By convert it to its isomer, glucose

B) Due to the formation of lactones

C) we use Ca ion in the reaction

Answer : A (not included , good to practice)

48- Which polysaccharide make of galactose and derivative of galactose?

A) Lactulose

B) Dextran

C) Chitin

D) Pectin

Answer : D

49- Mannose and glucose are?

A) Constitutional isomers

B) Epimers

C) Enantiomers

D) Anomers

Answer : B

50- Why raffinose make bloating?

A) Pull H2O toward it

B) Because it a polysaccharide

C) Enzyme that is need to break it absent

D) The bond in it very strong can not be broken

Answer : C

51- What is true about disaccharide connecting by 1-2 linkage?

A) non reducing suger

B) can be lactose

C) The body lacks from its digestive enzyme

Answer : A

52- Which of the following is a reduced sugar:

A. 2-deoxyribose

B. Fructose

C. sucrose

D. galactose

Answer : A

53- Wrong statements about cyclization of sugars :

A. C1 + C5 give cyclic hemiketal

B. C2 + C6 give cyclic hemiacetal

C. C4 + C6 give cyclic hemiacetal

D. C2 + C4 give cyclic hemiketal

E. All of them

Answer : E (d is hypothetically correct because it will produce unstable structure)

54- The non-reducing sugar of the following is :

A) Glucose

B) Fructose

C) Lactose

D) Sucrose

E) Maltose

Answer : D

55- What is the true statement :

A) the type of glycosidic bond in polysaccharides determines their function

B) The length of the polysaccharide chain has no effect on its function.

C) Polysaccharides do not play a role in energy storage.

D) All polysaccharides have the same structure regardless of their function.

E) The presence of branches in polysaccharides does not affect their properties

Answer : A

56- Wrong statement:

a) Carbohydrates are covalently bonded to proteins to form glycoproteins.

b) Glycoproteins play key roles in cell-cell recognition and

signaling.

c) The carbohydrate portion of glycoproteins can affect the protein's stability and function.

d) Glycoproteins are found on the surface of cells and are involved in immune responses.

e) Carbohydrates are connected via non-covalent interaction to protein to form glycoproteins

Answer : E (N-Glycoside or O-Glycoside)

57- The true statement :

a) Polysaccharides are exclusively heteropolysaccharides.

b) Homopolysaccharides do not exist in nature.

c) Structural polysaccharides are always heteropolysaccharides.

d) Polysaccharides are mostly of the homopolysaccharides

e) Polysaccharides have no biological function.

Answer : D

58- The True statement is:

a) Cellulose .. β-glycosidic linkage

b) Cellulose.. extensive intra and intermolecular hydrophobic Interaction between chains

c) Cellulose is digested by some animals by their own

Answer : A

59- True or False" Amylopectin can be completely degraded to glucose and maltose by the Two amylases":

a) True

b) False

Answer : B

60- GAGs are :

a- positively charged

b- connected to protein structures

c- have sulphate group

d- homopolysacharides

e- more hydrophobic than other sugars

Answer : B&C

61- Best definition of carbohydrates is :

a- polyhydroxy aldehydes

b- polyhydroxy ketones

c- polyhydroxy carboxylic acids

d- A or B

e- A or C

Answer : D

62- which of these is aldo-pentose ?

a) glucose

b) fructose

c) maltose

d) ribose

Answer : D

63- Which of the following is the most found in nature ?

a) L-sugar

b) D-sugar

c) L-sugar and D-sugar in the same amount

Answer : B

64- Which of the following is correct about maltose ?

a- It is lactose

b- It contains B-glucose

c- It is a non-reducing sugar

d- This is a alpha-(1-4) linkage

Answer : D

65- Cellulose fibres are healthy because :

A. They are carcinogenic

B. They allow more cholesterol absorption

C. They contain unsaturated fats

D. They bind to toxic substances to decrease their absorption

Answer : D

66- In a vegetarian jelly, the manufacturer used a gelling material which:

A. Is a polymer of glucuronic acid

B. Has animal cell organs

C. Has carboxyl on C6

D. Has a five membrane ring structure

Answer : A (mostly not included)

67- Glycosaminoglycans are characterised by all of the following features EXCEPT:

A. The basic unit is a repeated disaccharide

B. At least, one sugar has an amino group

C. At least, one sugar is negatively charged with acidic group

D. The sugars are derived from glucose or fructose

E. It is attached to proteins forming proteoglycans

Answer : D

Lipids

1- Which lipoprotein has high density of protein relative to lipid?

A) HDL

B) LDL

C) IDL

D) Chylomicrons

Answer : A

2- Choose the correct answer regarding to sulfatides?

A- contain phosphate and sulfate group

B- Are glycolipids

C- We use it to differentiate between blood type

D- have backbone of glycerol

Answer : B

3- How Aspirin inhibit inflammatory :

A) Stimulation of eicosanoids

B) Inhibition of eicosanoids

C) Stimulation enzymatic production of eicosanoids

D) Block enzymatic production of eicosanoids

Answer : D

4- The only hydroxyl group in cholesterol is?

A) Carboxyl

B) Hydroxyl

C) Sulfate

D) Rings

Answer : B

5- Which is not true about 20:4 cis 5,8,11,14?

A) Linoleic acid it's precursor

B) It's common name Arachidonate

C) Control several function in response to injury

D) omega 3

Answer : D

6- Which one of the following common in all sphingolipid?

A) Glycerol

B) Phosphate

C) N-acytIgalactoamine

D) Ceramide

Answer : D

7- Fatty acid 16:1^9 is the structure of :

A) stearic acid

B) oleic acid

C) oleinoic acid

D) mystiric acid

E) palmitoleic acid

Answer : E

8- A patient walks into your clinic, after you test her it turns out that the material surrounding her nerves is destroyed. This material is:

A) Phosphatidylinositol

B) Cerebdrosides

C) sphingomyelins

D) glycoproteins

E) Cephalin

Answer : C

9- A 20 years old lady has attended your clinic complaining of problems in vision and balance. Your investigation showed that she has a severe damage in the material that warps the axons of her neurons. this material is :

A. A ganglioside

B. A lecithin

C. A sphingomyelin

D. A galactocerebroside

E. A glucocerebroside

Answer : C

10- The following membrane lipid is a major component of the inner mitochondrial membrane :

A. Lecithin

B. Cephalin

C. Cardiolipin

D. Glycolipids

E. Phsphatidyl-inositol.

Answer : C

11- Gangliosides contain all the following EXCEPT:

A. Fatty acid

B. Phosphate

C. Ceramide

D. Hexose

E. N-acetylneuraminic acid (sialic acid) .

Answer : B

12- Arrange the following fatty acids according to their melting point starting from the largest to the smallest (oleic acid, linoleic acid, palmitic acid and palmitoleic acid):

A. palmitic acid, oleic acid, palmitoleic acid and linoleic acid

B. palmitic acid, palmitoleic acid, oleic acid and linoleic acid

C. linoleic acid, palmitoleic acid, palmitic acid and oleic acid

D. linoleic acid, palmitoleic acid, oleic acid and palmitic acid

E. oleic acid, linoleic acid, palmitoleic acid, and palmitic acid

Answer : A

13- All of the following are from cholesterol except:

A. Testosterone

B. Vitamin D

C. Thromboxane

D. Estradiol

Answer : C

14- Which of these is in the lipid family :

A. Beta-carotene

B. Retinol

C. Alpha- tocopherol

D. All of the above

Answer : D (not included)

15- Regarding the COX isoenzymes. All are true except:

A. COX-1 is present in all tissues

B. COX-2 is inducible by inflammatory stimuli

C. Aspirin inhibits COX-1 and COX-2

D. Acetaminophen, which inhibits COX-3, has strong anti-inflammatory action.

Answer : D (Option D is not included but good question to practise)

16- Lecithin is a designation of :

A) Phosphatidylethanolamine

B) Phosphatidylserine

C) Phosphatidylcholine

D) Phosphatidylinositol

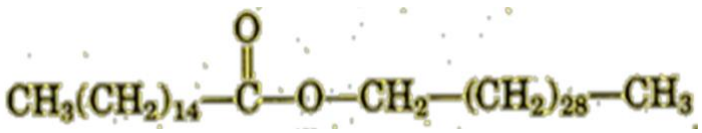
Answer : C

17- Which of the following is false regarding this molecule?

A. Made of two fatty acids

B. Humans are unable to digest it and it is useless

C. Insoluble in water



D. Has no nutritional value

E. The ester group is the only hydrophilic part of it

Answer : A

(You don't have to memorise the structure but form the ester linkage you should know it is a wax)

18- Aspirin works through inhibition of the production of :

A) Leukotrienes

B) Prostaglandins

C) Histamines

D) Cytokines

Answer : B

19- What's true about the structure of the following fatty acid :

A. Palmitate

B. Precursor for eicosanoids

C. Trans fatty acid

D. Cis-delta 9 hexadecenoic acid

Answer : D

20- What's false regarding vLDL :

A. It transports dietary TG to the liver

B. Its diameter is larger than HDL

C. It contains cholesterol

Answer : A (Not included but good question to practise)

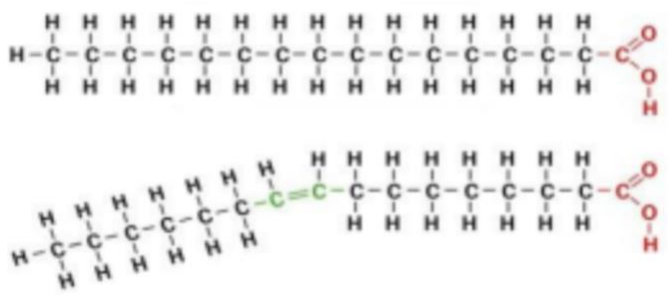
21- Which is false regarding the following graph:

A- The bottom molecule is an eicosanoid

B- The one above is saturated

C- The one below is unsaturated

D- They are fatty acids



Answer : A

22- Which of the following statements is incorrect?

A) Phosphatidylcholine is present in higher amounts in the outer leaflet of the membrane.

B) Phosphatidylethanolamine is present in higher amounts in the inner leaflet of the membrane.

C) Phosphatidylserine is present in higher amounts in the inner leaflet of the membrane.

D) Phosphatidylcholine is present in higher amounts in the inner leaflet of the membrane.

Answer : D

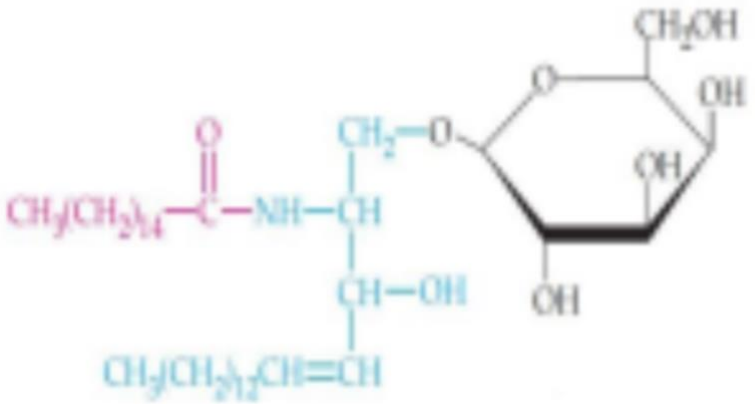
23- What is the following molecule :

A) Glucocerebroside

B) Ganglioside

C) Sphingomyelin

D) Phosphatidylcholine



Answer : A

24- The myelin sheath is primarily composed of :

A. glycolipid

B. phospholipids

C. GAGs

Answer : B (mostly not included)

25- The following statements are true or false "EPA and DHA are omega 6 fatty acids."

A. true

B. false

Answer : B

26- Which of the following has the least solubility in water?

A. palmitate

B. oleate

C. linoleate

D. myristate

E. arachidonate

Answer : E

27- One of the following cannot be hydrogenated?

A. Arachidonic acid.

B. Palmitic acid.

C. Oleic acid.

D- Linoleic acid.

E. Linolenic acid.

Answer : B

28- What is this molecule?

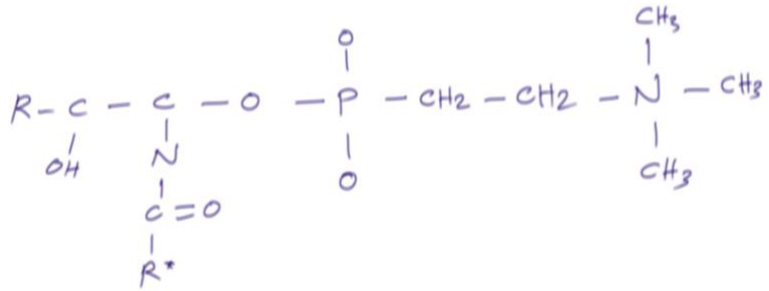
A. Bile acid.

B. Prostaglandin.

C. Monoacylglycerol

D. Glycerophospholipid.

E. Sphingophosphocholine.



Answer: E

29- An omega-3, 24-carbon fatty acid has

A. A double bond between carbon 23 and 22

B. 3 double bonds

C. Multiple double bonds separated by 3 carbons each

D. A double bond between carbon 21 and 22

E. A double bond between carbon 3 and 4

Answer: D

30- An omega-9 fatty can do the following :

A. It can treat asthma

B. It reduces inflammation

C. It relieves gastric pain caused by aspirin

D. It reduces cholesterol

E. It blocks formation of eicosanoid

Answer: D

31- Omega-6 fatty acids are derivatives of :

A. Linolenic acid

B. Stearate

C. Arachidonic acid

D. Linoleic acid

E. Palmitate

Answer : D

32- Creating a cholesterol ester from cholesterol results in :

A. Facilitating of cholesterol transport via lipoproteins

B. Cholesterol being more hydrophobic

C. Increasing the density of lipoproteins

D. Cholesterol being amphipathic

E. Emulsification of cholesterol

Answer: B

33- Liposomes can deliver chemicals into cells because :

A. They can Fuse with the plasma membrane

B. They have small structure that can make them diffuse through the plasma membrane

C. They modify chemicals making them free to pass though the plasma membrane

D. They have a flexible shape that can be squeezed though phospholipids

E. They facilitate chemical transport through the plasma membrane

Answer : A

34- Which one of the followings is a sphingophospholipid :

A. Phosphatidylinositol

B. Plasmalogen

C. Cardiolipin

D. Myelin

E. Lecithin

Answer: D

34- Arrange the following fatty acids depending on the number of double bonds they have (from the highest until zero).

Arachidonic acid, Linoleic acid, Stearic acid, Linolenic acid.

A- Arachidonic acid, linolenic acid, linoleic acid, stearic acid

B- Linoleic acid, linolenic acid, stearic acid, arachidonic acid

C- Stearic acid, linoleic acid, linolenic acid, arachidonic acid

D- Linolenic acid, stearic acid, arachidonic acid, linoleic acid

E- Linoleic acid, stearic acid, arachidonic acid, linolenic acid

Answer : A

35- Fats contain triacylglycerols with more:

A- Saturated fatty acids

B- Phosphate groups

C- Unsaturated fatty acids

D- Cis fatty acids

E- Sphingosine

Answer : A

36- Asthma patients are treated with drugs that reduce the synthesis of compounds that can be described as follows:

A- Linolenic acid derivatives that have cyclic ether structures

B- Arachidic acid derivatives that have 5-membered ring structure.

C- Linoleic acid derivatives that inhibit platelet aggregation

D- Palmitic acid derivatives that constrict airways smooth muscles

E- Arachidonic acid derivatives that have 3 conjugated double bonds

Answer : E (mostly not included)

37- Which of the following conditions can increase membrane fluidity?

A- More phospholipids with saturated fatty acids

B- Decreasing membrane cholesterol concentration

C- Reducing temperature (hypothermia)

D- Increasing membrane cholesterol concentration

E- More sphingolipids with saturated fatty acids

Answer : B

38- The lipid molecule that is destructed in multiple sclerosis is characterized by :

A- Is found exclusively in inner mitochondrial membrane.

B- Is found mainly in the nuclear envelope.

C- Has an inositol.

D- Is the form in which lipids are stored in the adipose tissue.

E- Has a phosphate group.

Answer : E

39- The following fatty acid is an example on omega 3 fatty acids:

A- Linolenic acid

B- Palmitic acid

C- Oleic acid

D- Arachidonic acid

Answer : A

40- Cholesterol can be used to synthesize :

A- Lecithin

B- Cardiolipin

C- Parathyroid hormone

D- Vitamin A

E- Vitamin D

Answer : E

41- An ether bond is found in:

A- Lecithin

B- Phosphatidyl serine

C- Phosphatidic acid

D- Plasmalogen

E- Sphingomyelin

Answer D

42- The lipid which doesn't have a phosphate group in its structure is :

A- Plasmalogens

B- Ceramide

C- Glycerophospholipids

D- Lecithin

E- Phosphatidylserine

Answer : B

43- The lipid which has 3 conjugated double bonds in its structure is :

A- Eicosanoids

B- Thromboxanes

C- Prostacyclins

D- Leukotriene

Answer : D

44- The bond between the glycerol and the fatty acids is :

A- Glycosidic bond

B- Ether bond

C- Ester bond

D- Hydrogen bond

Answer : C

45- The acid with the highest melting point is :

A- palmitic acid

B- Arachidonic acid

C- Stearic acid

D- Oleic acid

E- Linoleic acid

Answer : C

46- Which of the following is a property of Waxes:

A- Saponifiable

B- very resistant to rancidity

C- Butter is an example

D- Digestible

E- Tests positive for Acrolein test

Answer : B

47- The lipoprotein that has the highest lipid content and the lowest protein content is:

A- HDL

B- Chylomicrones

C- LDL

Answer : B

48- Which of the following is an omega 3 fatty acid?

A- 18:3 delta 9,12,15

B- 18:2 delta 9 ,12

C- 18:1 delta 9

D- 20: delta 5,8,11,14

Answer : A

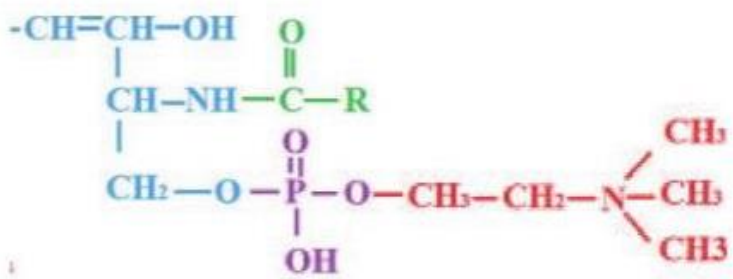
49- The structure represents :

A- Ceramide

B- Plasmalogen

C- Cardiolipin

D- Sphingomyelin



Answer : D

50- True statement :

a) Lipids are connected to proteins by hydrogen bonds to form lipoproteins.

b) Lipids are connected non-covalently to proteins to form lipoproteins.

c) Lipoproteins are formed by ionic interactions between lipids and proteins.

d) Lipoproteins are not important for lipid transport and storage.

Answer : B

51- The valatile fatty acid of the following is :

a) $CH_3(CH_2)_2COOH$

b) $CH_3(CH_2)_{18}COOH$

c) $CH_3(CH_2)_{14}COOH$

Answer : A

52- True about hydrogenated/halogenated fatty acids :

a) Lack fat-soluble vitamins (A,D,E, and K)

b) Less pleasent as cooking fat

c) More liable to rancidity

Answer : A (mostly not included)

53- True :

a) Waxes can be in solid and liquid states

b) Waxes are of no nutritional value

c) Waxes are primarily composed of glycerol and fatty acids

Answer : B

54- One of the following doesn't contain glycerol:

a) Cephalins

b) Cardiolipin

c) Sphingomyeline

Answer : C

55- All of the following are 18-carbon fatty acids except :

a) Palmitic

b) Stearic

c) Linolenic

d) Oleic

Answer : A

56- The true statement about cholesterol is :

a) Cholesterol stabilizes the fluidity of plasma membranes

b) Vitamen D is the sourse of cholesterol

c) Cholesterol is synthesized from acetyl-coA

d) Cholesterol can be obtained from animals and plants

e) All tissues of human have cholesterol with nearly same amounts

Answer : A Not entirely included but good question to practise

57- True or False" Snake venum hydrolyses licithins":

a) True

b) False

Answer : A

58- What is the primary role of thromboplastin in the blood coagulation process?

A. Conversion of fibrinogen to fibrin

B. Formation of blood clots

C. Activation of plasminogen

D. Promotion of platelet aggregation

Answer : B mostly not included

59- Which lipoprotein among the following has the lowest density :

a) Chylomicrons

b) LDL

c) HDL

Answer : A

60- The true about Aspirin is :

a) Blocks the synthesis of leukotriens

b) Activates phospholipase A2

c) Activates cyclooxygenase

d) Blocks the synthesis of prostaglandins/thromboxanes

e) Blocks the synthesis of arachidonic acid

Answer : D good to practice , not included

61- Fats are stored in adipose tissue as

a- phospholipids

b- sphingolipids

c- fatty acids

d- phosphoglycerols

e- TAG

Answer : E

62- Vitamin D3. All of the following is false except:

a- Reduces ca++ absorption

b- has 3 isoprenes

c- has 2 OH groups

d- activated by hydroxylation in liver and kidney

e- Degrades under UV light

Answer : D not included but good to practice

63- What's wrong about LDH:

a- LDH1/LDH2 normally is less than 1

b- there are 5 isozymes

c- all LDH isozymes catalyse the same reactions

d- it's a tetramer

Answer : C not included

64- Eicosanoids are made from

a- arachidic acid

b- palmitic acid

c- linoleic acid

d- Myristic acid

e- Arachidonic acid

Answer : E

65- An essential fatty acid :

a) Linolenic

b) Palmitic acid

c) Stearic acid

d) Oleic acid

Answer : A

60- What bond is found in platelet activating factor?

a) Hydrogen

b) Glycosidic

c) Ester

d) Piptide

Answer : C mostly not included

Amino Acids

1- Serotonin derived from?

A) Tyrosine

B) Tryptophan

C) histamine

D) Phenylalanine

Answer : B

2- What is the net charge of " SER , GLU , ASP , LEU , ARG " in physiological PH?

A) +1

B) 0

C) -1

D) -2

E) +2

Answer : C

4- Which of these is not a functional group in naturally occurring amino acids :

A. Thiol

B. Alkene

C. Hydroxyl

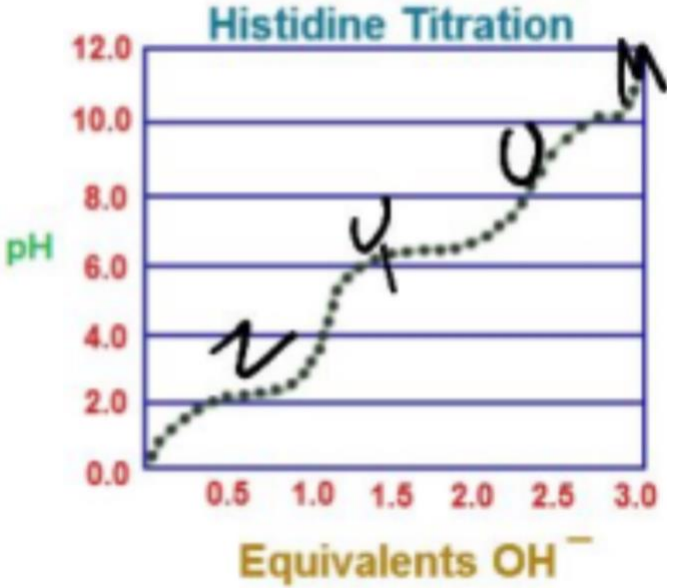
D. Amino

E. Carboxy

Answer : B

5- According to the graph of Histidine's titration curve, in which phase is Histidine in its zwitterionic state ?

(This question has been omitted)



A. Phase (Y)

B. Phase (Z)

C. Phase (U)

D. Phase (M)

Answer : A

6- Aspartic acid in the pH of 5 is mostly :

A. Anionic

B. Cationic

C. Zwitterion

D. Neutral

E. Amphipathic

Answer : A

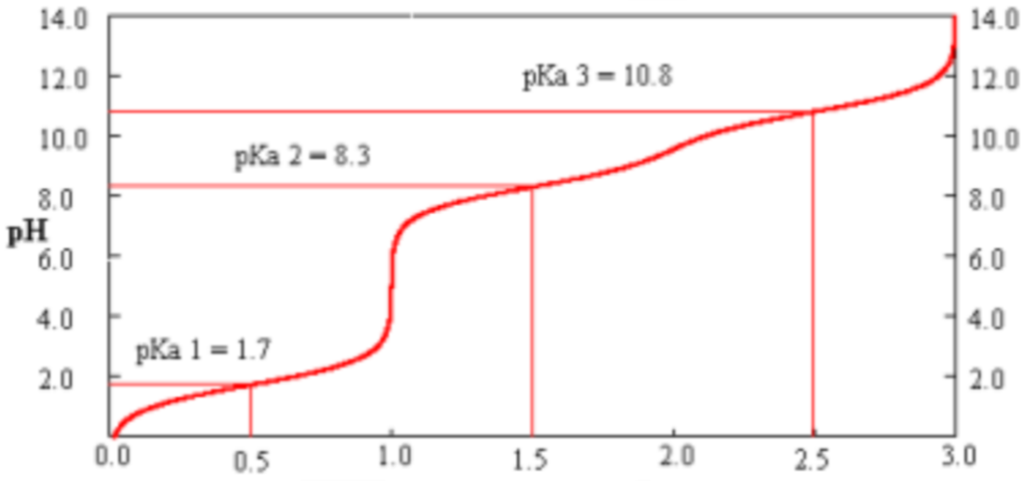
7- The following graph represents the titration curve of :

A- SER

B- GLU

C- CYS

D- ARG



Answer : C

8- Which of the following amino acids can be attached to a chain of oligosaccharides?

A) Lysine

B) Threonine

C) Arginine

D) Histidine

Answer : B

9- Which of the following is a positive amino acid with a guanidine group:

A) Arginine

B) Lysine

C) Glutamic acid

D) Aspartic acid

Answer : A

10- What can you tell about the hydrogen binding of isoleucine?

A- Isoleucine hydrogen bonds with Valine and lysine.

B- Isoleucine hydrogen bonds with lysine.

C- Isoleucine hydrogen bonds with Valine.

D- Isoleucine hydrogen bonds with serine and histidine.

E- Isoleucine hydrogen bonds with serine.

Answer : D not included

11- What's correct about Gramicidin S ?

A- Has only D amino acids.

B- Has a cyclic structure due to hydrogen bonding.

C- Has the amino acid ornithine in its structure.

D- Is a hexapeptide.

Answer: C (not included)

12- Which of the following characteristics do oxytocin and vasopressin have in common?

1- They both act as hormones.

2- They have cysteine residues that are responsible for the formation of their cycles.

3- Have 7 amino acids.

4- Oxytocin induces labor in pregnant women and vasopressin controls blood pressure.

5- They have amide groups at the N-terminus.

6- They are secreted from the anterior pituitary.

Answer: 1+2+4+5 (not included)

13- All of the following statements are true about glutathione EXCEPT:

A- Its oxidized form is GSSG.

B- It makes disulfide bridges within the same molecule.

C- Is a tripeptide.

D- It scavenges oxidizing agents.

E- Reduced glutathione is in the form of GSH.

Answer : B (not included)

14- All of the following statements about phenylketonuria are true ACCEPT :

A- The enzyme phenylalanine hydroxylase is deficient.

B- There's an increase in the amount of tyrosine in the body.

C- Phenylalanine is converted to phenylpyruvate, phenyllactate and phenylacetate.

D- Phenylalanine is not converted into tyrosine.

E- None of the above.

Answer: B (not included)

15- One of these groups (Derivative-Precursor-Function) is correctly matched:

A- Histamine-His-vasoconstriction

B- Gamma-carboxyglutamic acid - Gln - Coagulation

C- GABA - Glu - relaxing inhibitory neurotransmitter

D- Serotonin - Trp - sedative effects

E- Thyroxine - Tyr - metabolism

Answer : C&E (not included)

16- In protein buffers, which factor has the highest buffering contribution?

A) Number of charged amino acids

B) Length of the protein chain

C) Histidine content of the protein

D) Presence of disulfide bonds

Answer : C

17- At neutral pH , what is the charge state of glutamic acid?

A) The amino group is negatively charged, and both carboxyl groups are neutral.

B) The amino group is positively charged, and both carboxyl groups are negatively charged.

C) The amino group is positively charged, and one carboxyl group is negatively charged while the other is neutral.

D) The amino group is neutral, and both carboxyl groups are negatively charged.

Answer : B

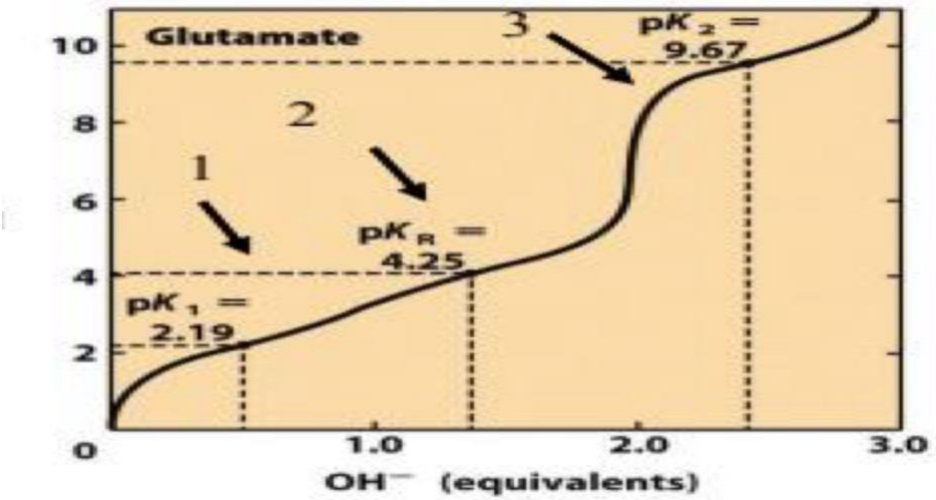
18- the point that represents the Zwitterion (molecule that contains an equal number of positively- and negatively-charged functional groups) is ?

A. 1

B. 2

C. 3

D. 1&2



Answer : A

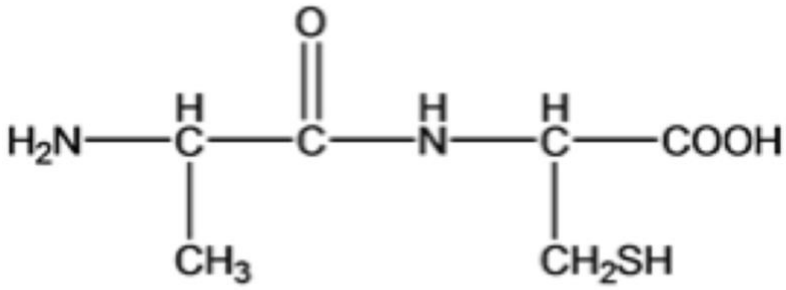
19- This structure is called :

A) Alanylcysteine

B) Cysteinylalanine

C) Alaninylcysteine

D) Cysteinylalanine



Answer : A (good to practice)

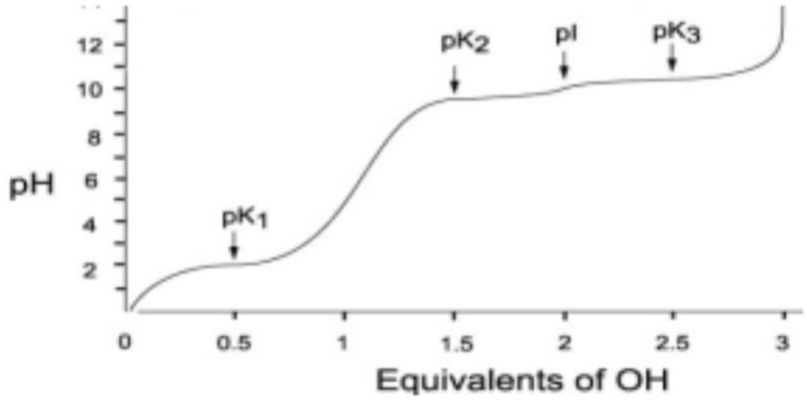
20- The following titration curve is related to which amino acid?

A. Lysine

B. valine

C. arginine

D. alanine



Answer: A

21- Which amino acid cannot be found in human proteins?

A. histidine

B. Ornithine

C. serine

D. glycine

E. glutamic acid

Answer: B

22- Which one is derived from aliphatic amino acid :

A. Dopa

B. epinephrine

C. aspartame

D. norepinephrine

E. histamine

Answer : C

23- What charged groups Glutamine has at physiological pH in the blood?

A. COO^-, NH_3^+

B. COO^-, COO^-, NH_3^+

C. COOH, COOH, NH_3^+

D. COOH, COO^-, NH_3^+

E. COOH, COO^-, NH_2

Answer : A

24- Which of the following amino acid (s) contain(s) sulpfur atom in the side chain?

A. Serine

B. Tryptophan

C. Methionine

D. A & B

E. B & C

Answer : C

25- Phenylalanine can be used to synthesize the following amino acid:

A. Ser

B. Tap

C. Thr

D. Tyr

E. Orn

Answer: D

26- Choose the correct matching between the precursor amino acid and the product synthesized from it.

A. Tyrosine, melatonin

B. Histidine, norepinephrine

C. Tryptophan, serotonin

D. tyrosine, nitric oxide

E. Glycine GABA

Answer: C

27- which of these pairs of amino acid have phenol group , thiol group respectively ?

A. Cys & phe

B. Cys & tyr

C. tyr & cys

Answer: C

28- which is the largest amino acid ?

A. phe

B. trp

C. pro

D. lys

Answer : B

29- The process of this reaction is :

A. Carbxylation

B. Hydrolysis

C. oxidation

D. decarboxylation

Answer : D (not included)

30- These amino acid stretches CANNOT exist on protein surface that is exposed to aqueous environment:

A. Lys Glu Cys

B. Pro, Hs, Tyr

C. The Lesa, Asn

D. Met val Trp

E. Arg Asp Ser

Answer: D

31- Which of the following is a secondary amine?

A- Gly

B- Gln

C- Glu

D- Cys

E- Pro

Answer : E

32- When does the zwitterionic form of Glu form during titration?

A- After the second step of titration

B- In the middle of the first step of titration

C- After the third step of titration

D- After the first step of titration

E- In the middle of the second step of titration

Answer : D

33- Which of the following amino acid is polar uncharged?

A- Arg

B- Leu

C- Phe

D- Tyr

E- Met

Answer : D

34- Which of the following is a correct match between product and precursor amino acid?

A- Epinephrine, Tyr

B- Dopa, Thr

C- Serotonin, Arg

D- GABA, Gln

E- NO, Gly

Answer : A

35- An amide group is present in the side chain of the following amino acid:

A- Thr

B- Cys

C- Lys

D- Glu

E- Ile

Answer : C

36- The total charge on Val at pH 1 is:

A- +1

B- -2

C- -1

D- +2

E- 0

Answer : A

37- The amino acid that makes proteins act as buffers at physiological pH is:

A- Glu

B- Asn

C- Arg

D- His

E- Asp

Answer : D

Feedback here

Wish you all the best