

Introductory Biochemistry
Midterm Exam 2017

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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
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
3. Which of the following amino acids is the precursor of NO?
 - A. Arginine ***
 - B. Asparagine
4. 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
5. KOH is neutralised by 10ml of 0.5M H_2SO_4 . Find the equivalents of KOH in the solution:
 - A. 0.01 eq ***
 - B. 1 eq
 - C. 0.1 eq
 - D. 10^{-3} eq
 - E. 10 eq

6. If pH of patient's urine sample is 5, find the concentration of OH⁻ in the sample:
- A. 10^{-9} ***
 - B. 10^{-5}
 - C. 10^{-7}
7. Which of these solutions is the most acidic?
- A. 0.1M HCl ***
 - B. 0.01M HCl
 - C. 0.1M formic acid (pKa is given)
 - D. 0.1M acetic acid (pKa is given)
 - E. 10-12M NaOH
8. A patient's HCO₃⁻ level is 32mM, while CO₂ levels are normal. Which of the following best describes his condition:
- A. Metabolic alkalosis ***
 - B. Metabolic acidosis
 - C. Respiratory alkalosis
 - D. Not enough information
 - E. Respiratory acidosis
9. Aspartic acid in the pH of 5 is mostly:
- A. Anionic ***
 - B. Cationic
 - C. Zwitterion
 - D. Neutral
 - E. Amphipathic
10. When you increase the concentration of NaOH gradually in a solution:
- A. OH⁻ increases, pOH decreases, H⁺ decreases, pH increases ***
 - B. OH⁻ increases, pOH increases, H⁺ decreases, pH increases
11. Which of the following amino acids can be attached to a chain of oligosaccharides?
- A. Lysine
 - B. Threonine ***
12. Which of the following is true about the bicarbonate buffer in the blood:
- A. It allows for modest changes in the pH ***
 - B. There are high concentrations of H₂CO₃ in blood
 - C. It is the only buffer in the blood

D. It behaves the same way it does in a closed system

13. Which of the following is a positive amino acid with a guanidine group:

A. Arginine ***

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

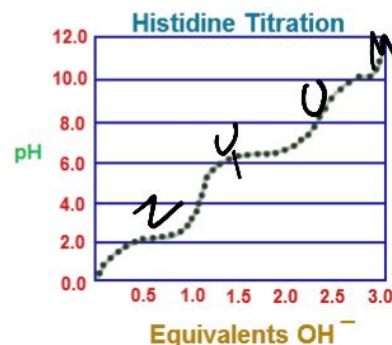
(This question has been omitted)

A. Phase (Y)

B. Phase (Z)

C. Phase (U) ***

D. Phase (M)



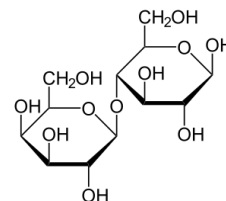
15. What is false about the following disaccharide's structure:

(This question has been omitted)

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

B. It is a homopolysaccharide ***

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



16. Lecithin is a designation of

A. Phosphatidylcholine ***

17. A question on what's false regarding vLDL:

A. It transports dietary TG to the liver ***

B. Its diameter is larger than HDL

C. It contains cholesterol

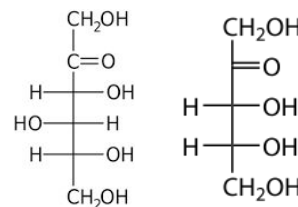
18. Which is false about the two following sugars?

A. They are diastereomers ***

B. They are both ketoses

C. OH on carbon 4 would be above the ring

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



19. To synthesize a nucleic acid in the laboratory, we use:

A. D sugars only ***

B. L sugars only

C. Alpha sugars

D. Aldohexoses

E. Pentoketoses

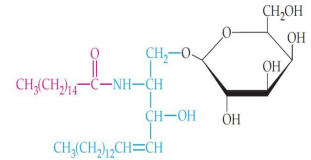
(This question was met with protest since it did not indicate whether the nucleic acid is of a human).

20. Which best describes glucose?

- A. It participates in the formation of sucrose ***
- B. It is mainly in the open chain form

21. What is the following molecule:

- A. Glucocerebroside ***



22. Which of the following is correct regarding integral proteins:

- A. They can be affected by mild detergents
- B. They contain a hydrophobic region embedded in the membrane ***
- C. They are exposed from the extracellular side only

23. Which of the following is false regarding this molecule? (Structure of wax is given)

- 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

24. 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 ***

25. Why is sucrose a non-reducing sugar?

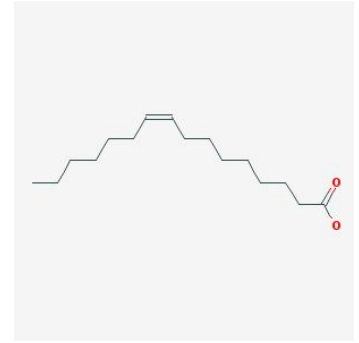
- A. It does not contain a free anomeric carbon ***
- B. Contains two non-reducing monosaccharides

26. Aspirin works through inhibition of the production of:

- A. Prostaglandins ***
- B. All eicosanoids

27. 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 ***



28. Which of these is not a functional group in naturally occurring amino acids:

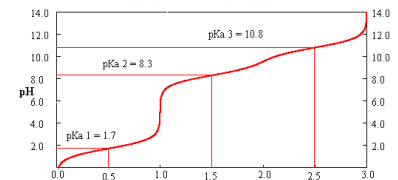
- A. Thiol
- B. Alkene ***
- C. Hydroxyl
- D. Amino
- E. Carboxyl

29. 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

30. The following graph represents the titration curve of:

- A. Cys***



31. 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

32. Which of the following is an example of a buffer and its components:

- A. H₂CO₃ and NaHCO₃ ***
- B. KH₂PO₄ and NaH₂PO₄
- C. NaCl and HCl
- D. HCl and NaOH

33. A question about bacterial cell walls, what is incorrect?

A. It is mainly made of sialic acid***

34. Which of the following is NOT true about alkalosis:

A. Can be caused by an inability to excrete HCO_3^-

B. Caused by panic attacks

C. Characterized by high levels of carbonic acid in the blood***

35. Which is untrue regarding the following graph representing the titration curve of the ammonium ion:

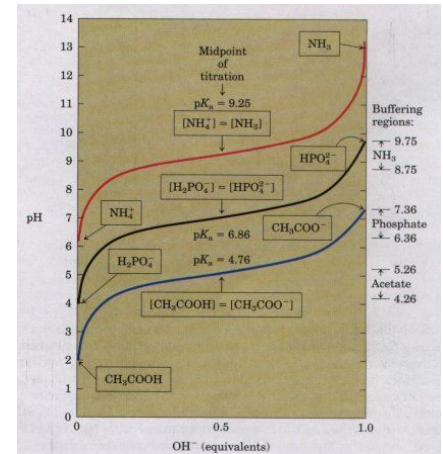
A. Equivalence point is nearly 9 ***

B. The capacity ranges between 8-10

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

D. pK_a is nearly 9

(Refer to the red curve)



36. Concentration of lactic acid = 0.055, lactate = 0.045, calculate the pH (pK_a is given)

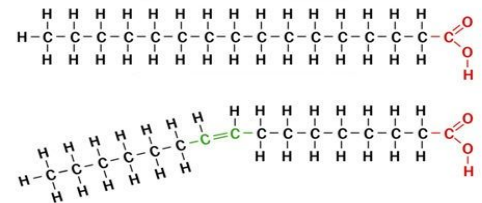
A. 3.76 ***

37. All the of the following are properties of buffers except:

A. Polyprotic buffers have multiple wider buffering capacities ***

38. Which is false regarding the following graph:

A. The bottom molecule is an eicosanoid ***



39. This question asked for the incorrect statement. The answer was:

“Phosphatidylcholine is present in higher amounts in the inner leaflet of the membrane”

40. This question was regarding **N-acetylneuraminate**.