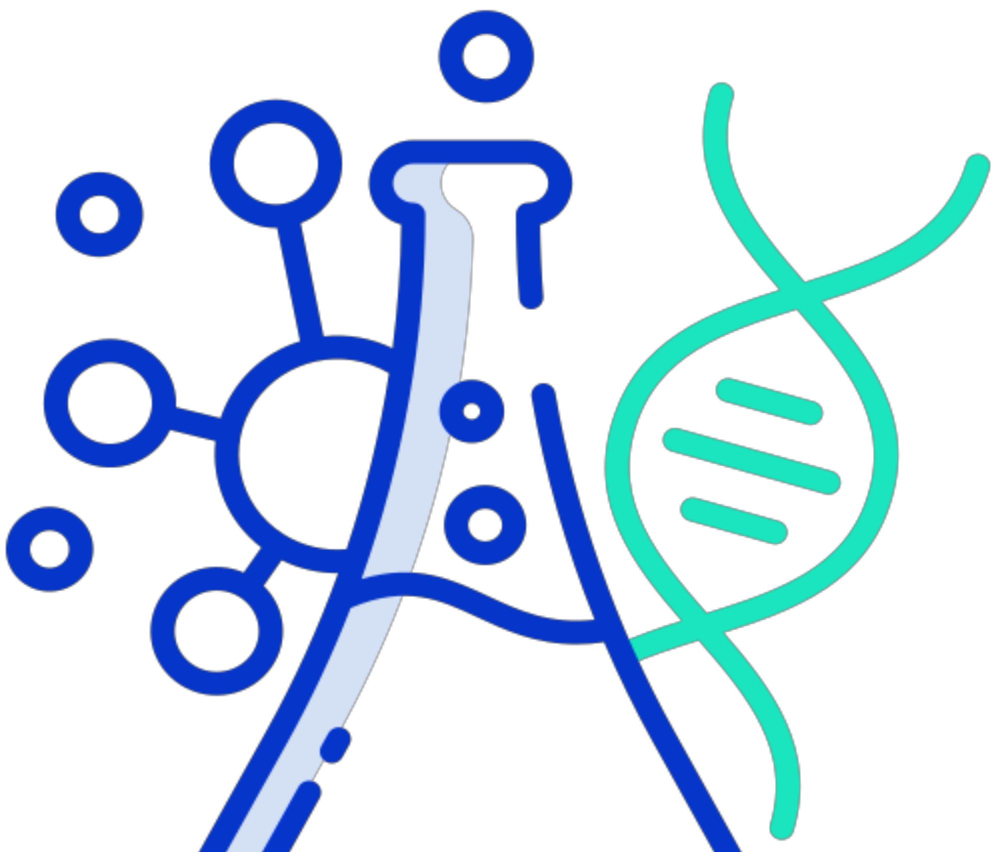
MED-HUB

BIOCHEMISTRY

TEST BANK



Carbohydrates:

1.Gluconate is oxidized on carbon number:

a. 2 and 6.
b. 1 and 6.
c. 1.
d. 2.
e. 6.

2. You bought a packet of vegetarian jelly. In the ingredients list, the manufacturer used a gelling agent that has the following characteristic, it ____________________.

a. Is a heteropolysaccharide of glucose and galactose.

b. Has five membered ring residues.

c. Is a polymer of N-acetyl glucose amine.

d. Is present in exoskeleton.

e. Contains modified galactose residues.

3. 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.

4. 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.

5. The following sugar has a beta linkage:
    a. Galactose.
    b. Cellulose.
    c. Glycogen.
    d. Amylopectin.
    e. Sucrose.

6. Which of the following is a reducing sugar:
    a. Sucrose.
    b. Amylopectin.
    c. Cellulose.
    d. Amylose.

e. Galactose.

7. 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.

8. Which of the following is an oxidized sugar:

    a. Sucrose.
    b. Glucuronate.
    c. Sorbitol.
    d. Fructose.
    e. Ribose.

9. 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. Cellulose.
    b. Chitin.
    c. Glycosaminoglycans.
    d. Dextran.

e. Pectin.

10. The residues of the following disaccharide are connected by a beta linkage:

a. Raffinose.

b. Pectin.

c. Maltose.

d. Sucrose.

e. Lactose.

11. An African native who is going to college in the United States experiences digestive problems (bloating, diarrhea, and flatulence) whenever she eats foods containing milk products. She is most likely deficient in splitting which type of chemical bond:

a. A sugar bond.

b. An ester linkage.

c. A phosphodiester bond.

d. An amide bond.

e. A glycosidic bond.

12. Which of the following statements best describes glucose:

a. It is a C-4 epimer of galactose.

b. It is a ketose and usually exists as a furanose ring in solution.

c. It is produced from dietary starch by the action of α-amylase.

d. It is utilized in biological systems only in the L-isomeric form.

13. Galactose and mannose are:

a. Constitutional isomers.

b. Diastereomers.

c. Epimers and diastereomers.

d. Enantiomers.

e. Epimers.

14. The sugar that does NOT produce a mirror in Tollens' test is:

a. Sucrose.

b. Ribose.

c. Lactose.

d. Maltose.

e. Galactose.

15. The storage form of sugars in animal cells is:

a. Glycogen.

b. Cellulose.

c. Amylose.

d. Chitin.

e. Pectin.

16. The blood types differ in their:

a. sugar content.

b. protein content.

c. lipid content.

d. A+C.

e. B+C.

17. 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.

18. Benedict's test is used to:

a. Confirm the presence of cyclic sugars.

b. Confirm the presence of reducing sugars.

c. Confirm the presence of sucrose.

d. Confirm the presence of disaccharides.

e. Confirm the presence of sugar acids.

19. Oxidation of carbon number 6 of cyclic glucose results in:

   a. Conversion to fructose.

   b. Production of glucoronate.

   c. Stabilizing the anomeric carbon.

   d. Production of a deoxy sugar.

   e. Opening of the ring structure.

20. 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 minor images of each other.

21. The following is a non-reducing sugar:

   a. L-glucose.

   b. Maltose.

   c. Fructose.

   d. Cellulose.

   e. Lactose.

22. 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.

23. 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.

24. 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.

25. How many chiral carbons are there in deoxyribose:

a.1.

b.2.

c.3.

d.4.

e. none.

26. Which of the following sugars has a beta glycosidic linkage:

a. chitin.

b. sucrose.

c. lactose.

d. none of the above.

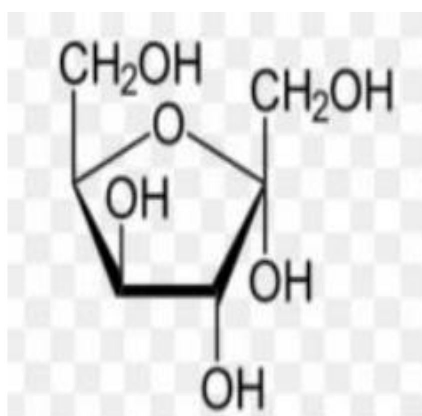
27.Glycoside formation results in:

a. reaction of cyclic acetal with alcohol.

b. reaction of cyclic acetal with another cyclic acetal.

c. reaction of cyclic hemiacetal with alcohol.

28. The following figure represents D-sorbose. which of the following statements are 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.

29. Which of the following doesn't produce (Cu) precipitate in the Benedict's test:

a. lactose.

b. Sucrose.

c. galactose.

30. One of the following polysaccharides is heteropolysaccharide:

a. chitin.

b. pectin.

c. dextran.

d. starch.

1.c	11.e	21.d
2.e	12.a	22.a
3.d	13.b	23.c
4.c	14.a	24.d
5.b	15.a	25.b
6.e	16.a	26.c
7.b	17.a	27.c
8.b	18.b	28.c
9.c	19.b	29.b
10.e	20.b	30.b

Lipids:

1. All of the following eicosanoids contain ring structure EXCEPT:

a. Thromboxane.

b. Prostaglandin E2.

c. Prostaglandin H2.

d. Prostacyclin.

e. Leukotriene.

2. The bond between fatty acids and glycerol in triacylglycerol is a/an:

a. Ester bond.

b. Alpha (1→4) bond.

c. Peptide bond.

d. Glyosidic bond.

e. Amide bond.

3. Ether bond is found in:

a. sphingomyelin.

b.cerbroside.

c. lecithin.

d. phosphatidyl serine.

e. plasmalogen.

4. Which of the following does NOT contain sphingosine:

a. Phosphatidyl choline.

b. Globoside.

c. Sphingomyelin.

d. Ceramide.

e. Galacto-cerebroside.

5. Cholesterol CANNOT be used to synthesize:

a. Bile acids.

b. Progesterone.

c. Cardiolipin.

d. Estrogen.

e. Vitamin D.

6. One of the following is correctly matched with its structure:

a. oleic acid 18:2▲9,12.

b. palmitoleic acid 16:2▲9,12.

c. arachidonic acid 20:2▲9,12.

d. palmitic acid 18:2▲9,12.

e. linolenic acid 18:3▲9,12,15.

7. The following is a sphingophospholipid:

a. Phosphatidylinositol.

b. Plasmalogen .

c. Cardiolipin.

d. Myelin.

e. Lecithin.

8. 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.

9. 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.

10. Omega-6 fatty acids are derivatives of:

a. Linolenic acid.

b. Stearate.

c. Arachidonic acid.

d. Linoleic acid.

e. Palmitate.

11. 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.

12. 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.

13. All of the following are from cholesterol except:

a. Testosterone.

b. Vitamin D.

c. Thromboxane.

d. Estradiol (estrogen).

14. 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, palmitic acid, and palmitoleic acid.

15. All sphingolipids have in common:

a. Ceramide.

b. Phosphorylcholine.

c. N-acetylneuraminie acid.

d. Glycerol.

e. Phosphate.

16. Gangliosides contain all the following EXCEPT:

a. Fatty acid.

b. Phosphate.

c. Ceramide.

d. Hexose.

e. N-acetyl neuraminic acid (sialic acid).

17. The following membrane lipid is a major component of the inner mitochondrial membrane:

a. Lecithin.

b. Cephalin.

c. Cardiolipin.

d. Glycolipids.

e. Phosphatidyl-inositol.

18. 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.

19. One of the following cannot be hydrogenated:

a. Arachidonic acid.

b. Palmitic acid.

c. Oleic acid.

d. Linoleic acid.

e. Linolenic acid.

20. Which of the following has the least solubility in water:

a. palmitate.

b. oleic acid.

c. linoleate.

d. myristate.

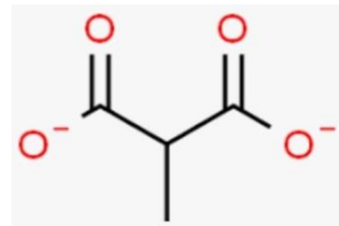
e. arachidonate.

1.e	11.d
2.a	12.d
3.e	13.c
4.a	14.a
5.c	15.a
6.e	16.b
7.d	17.c
8.a	18.c
9.b	19.b
10.d	20.e

Acids & Bases:

1. Water can form the following non-covalent interactions except:
A. Hydrophobic interactions.
B. Van der Waals interactions.
C. Electrostatic interactions.
D. Hydrogen bonds.

2. Laboratory tests of the urine of a patient identified the presence of methylmalonate, methylmalonate is best described as which one of the following:



A. A strong acid.
B. A triprotic acid.
C. The conjugate base of a weak acid.
D. It dissociates 100% when the pH equals its pk_a.
E. It's a major intracellular buffer.

3. What will the pH be if the concentration of the conjugate base A^- is (0.35M), and the concentration of the weak acid HA is (0.25M), after adding (0.05M) of NaOH: (pKa= 7)
A. pH=7.3
B. pH=6.3
C. pH=8.6

4. Membrane formation occurs in part due to which one of the following interactions:
A. Hydrogen bond formation between lipids and water.
B. Hydrophobic interaction between lipid molecules.
C. Hydrophobic interactions between lipids and water.
D. Van der Waals forces between lipids and water.
E. Covalent bond formation between lipids and water.

5. Hydrogen bonds can form between electronegative atoms (such as oxygen and nitrogen) and a hydrogen atom that is bounded to:
A. Oxygen only.
B. Hydrogen.
C. Nitrogen only.
D. Carbon.
E. An electronegative atom.

6. Which of the following statements best describes the ion product of water:
A. The multiplication of the concentrations of hydrogen ion and hydroxyl ion in water or an aqueous solution of an electrolytes.
B. The sum of concentrations of hydrogen ion and hydroxyl ion in water or solution of electrolytes.
C. The multiplication of the concentrations of hydrogen ion and hydroxyl ion that are derived only from water molecules in an aqueous solution of electrolytes.
D. The number of ionized molecules of H_2O in one mole of pure water.
E. The total number of negatively and positively charged ions in one liter of an aqueous solution of electrolytes.

7. A decrease in blood pH from (7.5) to (7) would be accompanied by which one 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 ion concentration.

8. Untreated diabetic patient will have:
A. Metabolic alkalosis.
B. Metabolic acidosis.
C. Respiratory alkalosis.
D. Respiratory acidosis.

9. Which of the following conditions is more likely to result in an alkalosis, provided that 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 secreted by the intestine.

10. A (100) moles of a triprotic acid were titrated with KOH, pK_a values= (3), (6), (9), how many moles of KOH must be added to have pH= (6)?
A. 100
B. 150
C. 200
D. 250
E. 300

11. The two most important buffer systems in the blood are:
A. Albumin and hemoglobin.
B. Bicarbonate and hemoglobin.
C. Inorganic phosphates and hemoglobin.
D. Phosphorylated organic metabolites and hemoglobin.
E. Phosphorylated organic metabolites and pyruvate.

12. In a titration curve of a weak acid, the inflection point has the following characteristics:
A. It has a higher concentration of weak acid than the conjugate base.
B. All the equivalents needed for the titration were used up.
C. Can act as a buffer.
D. The pH of the solution is definitely above (7)

13. Which of the following gives a good protein buffer system:
A. Histidine.
B. Arginine.
C. Asparagine.
D. Aspartic acid.

E. All of the above.

14. One of the following statements is not true about Carbonic acid Bicarbonate buffer system:
A. The most common extracellular buffer.
B. Under physiological conditions the ratio of HCO_3^-/H_2CO_3= (20)
C. Its buffering range is less than the desirable blood pH.
D. When adding a strong acid, it will react with HCO_3^-
E. When adding a strong base, it will react with CO_3^{-2}

15. You prepare a buffer by mixing (0.1M) Na_2HPO_4, with (0.1M) NaH_2PO_4, the pH of the final solution is (7.8) what is the approximate pK_a of the acid component of the buffer?
A. 7.8
B. $10^{-5.8}$
C. $10^{7.8}$
D. 6.8
E. 5.8

16. Analysis of a solution shows it to have a concentration of formic acid (K_a=1.8×10^{-4}) of 1.45M, and a concentration of formate ion of (0.015M), what is the pH of the solution?
A. 5.73
B. 1.76
C. 7
D. 3.37
E. 1.91

17. Given the pK_a of different acids, which one will have the strongest conjugate base when being dissociated in water?
A. 3.5
B. 2.9
C. 4.76
D. 7.2
E. 12.4

18. What initial effects does hyperventilation have on the human's blood pH and H_2CO_3 concentration?
A. pH increases and H_2CO_3 concentration increases.
B. pH increases and H_2CO_3 concentration decreases.
C. pH decreases and H_2CO_3 concentration increases.
D. pH decreases and H_2CO_3 concentration decreases.

19. Can the following pairs make a buffer when mixed together?
$NaOH/NaCH_3COO^-$ mixed together.
$CH_3CH_3/CH_3CH_2^-$ mixed together.
A. Yes.
B. No.

20. Gastric juice (pH= 1.4) compared to human's blood (pH= 7.4):
A. H^+ concentration in gastric juice is 6 times higher than in blood.
B. H^+ concentration in gastric juice is 10^6 times higher than in blood.
C. H^+ concentration in blood is 10^6 times higher than in gastric juice.
D. H^+ concentration in gastric juice is 7 times higher than in blood.

21. Given that K_a for Pyruvate=3.1×10^{-3}, what is the pH of a buffer made by mixing 0.1M Pyruvate with 0.12M Sodium Pyruvate?
A. 4.02

B. 2.45
C. 1.60
D. 2.59

22. Below is the pK_a for weak acids, which weak acid will be approximately (9%) dissociated at pH (3.88)?
A. Acetoacetic acid (pK_a=3.6).
B. Lactic acid (pK_a=3.9).
C. Beta-hydroxyl butyric acid (pK_a=4.6).
D. Propionic acid (pK_a=4.9).
E. Imidazole (pK_a=5.9).

23. 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 more complex 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.

24. What is the concentration of H_2PO_4 if we have 0.5 equivalent in 500ml?
A. 0.5 M
B. 0.25 M
C. 1 M

25. If (4.13g) of $NaC_2H_7O_4$ was added to (250Ml) of a (0.150M) $HC_2H_7O_4$ solution, with a K_a=2.75×10^{-5}, and the M.W. of the salt is (202.14g/mole), what is the pH of the buffer system?
A. 6.54

B. 5.43
C. 4.28
D. 7.42

26. 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 pK_a 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.

27. A buffer is made by adding (0.200M) $HC_2H_3O_2$ and (0.150M) $NaC_2H_3O_2$, if (0.005mol) of NaOH is added to (125mL) 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

28. Which of the following pairs can't make acid/conjugate base pair?
A. CH_3CH_3 / $CH_3CH_2^-$
B. CH_3COOH / $CHCOO^-$
C. HSO_4^- /SO_4^{-2}
D. H_2CO_3 / $NaHCO_3$
E. H_3PO_4 /NaH_2PO_4

29. Calculate the pH of the following solution that contains:
500 ml H_3PO_4 with 0.4M
500 ml H_2PO_4 with 0.6M
A. 2.29
B. 3.54
C. 1.12

D. 4.09
E. 2.90

30. If the pH of a solution of NaOH is (12), what is the ph of another solution containing H_2SO_4 but with the same concentration:
A. 2
B. 12
C. 1.7
D. 10.0387

31. If 1M NaCl and 1M HCL are present in an aqueous solution what is its type:
A. Not a buffer with pH<7
B. Not a buffer with pH>7
C. Buffer with pH<7
D. Buffer with pH>7

32. Hydrophobic interactions are:
A. True interactions.
B. Self-association of polar compounds in an aqueous environment.
C. Interactions that minimize the unfavourable interactions between non-polar groups and water.

33. All of the following are properties of non-covalent interactions except:
A. Reversible.
B. Relatively weak.
C. Can't be attractive and repulsive.

34. Water is all of the following except:
A. Angular.

B. Polar.
C. Not cohesive.
D. Excellent solvent.

35. All of the following about carbon are false except:
A. It can form polar and non-polar bonds.
B. Pure carbon is water soluble.
C. It can't form four bonds.

36. The most 4 abundant elements are:
A. H, O, P, N
B. H, P, N, S
C. H, O, C, N
D. P, S, C, O

DONE BY: MED-HUB TEAM

1. A	7. E	13. A	19. B	25. C	31. A
2. C	8. B	14. E	20. B	26. C	32. C
3. A	9. A	15. A	21. D	27. A	33. C
4. B	10. B	16. B	22. D	28. B	34. C
5. E	11. B	17. E	23. B	29. A	35. A
6. C	12. C	18. B	24. A	30. C	36. C