

## Biomolecules

1. Identify the reaction in which alcohol is formed by breakdown of sucrose in presence of an enzyme zymase.

- (a) Fermentation                      (b) Inversion  
(c) Esterification                      (d) Rearrangement

Answer: (a)

The fermentation reaction is,



2. An average adult human body has approximately 4.7 to 5.5 liter blood of pH \_\_\_\_.

- (a) 8.0                                      (b) 6.0  
(c) 5.4                                      (d) 7.4

Answer: (d)

An average adult human body has approximately 4.7 to 5.5 liter blood of pH 7.4, therefore our blood is slightly alkaline.

3. Human blood is slightly alkaline with pH 7.4 and it does not change by addition of small amount of acid and base because

- (a) serum protein presents in blood acts as buffer  
(b) Na-K channels maintains flow of hydrogen ions

- (c) Hb acts as buffer and also helps in its coagulation
- (d) It is neutral

Answer: (a)

In serum, buffer system  $H_2CO_3 + NaHCO_3$  is present. Buffer system  $H_2CO_3 + NaHCO_3$  resist with the change in pH of blood therefore pH value of blood remains unchanged by a small addition of an acid or a base.

4. CO-Hb bond is
- (a) more stable than O<sub>2</sub>-Hb bond.
  - (b) less stable than O<sub>2</sub>-Hb bond.
  - (c) stability of both bonds are approximately same.
  - (d) CO-Hb does not exist.

Answer: (a)

carboxy haemoglobin is about 300 times more stable than oxy haemoglobin due to back bonding and formation of metal ligand pi bond.

If amount of carboxy haemoglobin is increases in our blood then people can dies, due to suffocation.

5. Match the List I with List II and mark the appropriate combination:

List I

List II

(I) Enzyme	(A) Genetic material
(II)	DNA (B) protein
(III) Ascorbic acid	(C) Sex hormone
(IV) Progesterone	(D) Vitamin

- (a) (I) – (B) ; (II) – (A) ; (III) – (C); (IV) – (D)  
 (b) (I) – (B) ; (II) – (A) ; (III) – (D); (IV) – (C)  
 (c) (I) – (A) ; (II) – (B) ; (III) – (D); (IV) – (C)  
 (d) (I) – (C) ; (II) – (B) ; (III) – (A); (IV) – (D)

Answer: (b)

List I	List II
(I) Enzyme	(A) protein
(II) DNA	(B) Genetic material
(III) Ascorbic acid	(C) Vitamin
(IV) Progesterone	(D) Sex hormone

6. Match the List I with List II and mark the appropriate combination:

List I

List II

- |                                       |                                |
|---------------------------------------|--------------------------------|
| (I)Ascorbic acid                      | (A) loss of appetite           |
| (II) Retinol (III)<br>Tocopherol (IV) | (B) loss of fertility in males |
| Thiamine (a) (I)                      | (C) Scurvy                     |
|                                       | (D) Xerophthalmia              |
- (C) ; (II) (b) (I)– (D) ; (III) – (B); (IV) – (A)  
– (A) ; (II) – (B) ; (III) – (C); (IV) – (D)  
(c) (I) – (D) ; (II)– (C) ; (III) – (B); (IV) – (A)  
(d) (I) – (C) ; (II) – (D) ; (III) – (A); (IV) – (B)

Answer: (a)

- | List I           | List II                        |
|------------------|--------------------------------|
| (I)Ascorbic acid | (A) Scurvy                     |
| (II) Retinol     | (B) Xerophthalmia              |
| (III) Tocopherol | (C) loss of fertility in males |
| (IV) Thiamine    | (D) loss of appetite           |

7. Vitamin that assists in blood clotting is
- |         |       |
|---------|-------|
| (a) A   | (b) D |
| (c) B12 | (d) K |

Answer: (d)

Vitamin K use to coagulate the blood. Vitamin K serves as a coenzyme for the carboxylation of residues of glutamic acid, and a carboxylase catalyzes the reaction.

8. Choose the iodine containing hormone?

- (a) Progesteron
- (b) Testosterone
- (c) Thyroxine
- (d) Estrogen

Answer: (c)

Progesteron, testosterone and estrogen are sex hormones whereas thyroxine is iodine containing hormone released by thyroid gland.

9. Decease caused by plasmodium parasite

- (a) Rickets
- (b) Chicken pox
- (c) Malaria
- (d) Small pox

Answer: (c)

Malaria a life-threatening disease, transmitted by infected Anopheles mosquito carrying Plasmodium parasite.

10. Choose the correct statement.

- (a) The human body does not produce Enzymes.
- (b) The human body does not produce Vitamins.
- (c) Proteins are energy source for our body.

(d) Nucleic acids are building blocks for our body.

Answer: (b)

Mostly enzymes are proteinaceous in nature, proteins are described as building blocks, and nucleic acids are described as hereditary material for our body and all these are produced by our body. Our body does not produce vitamins, which is necessary for our normal growth.

11. Both nitrogen and sulphur containing water soluble vitamin is

(a) Vitamin E

(b) Vitamin B1

(c) Vitamin K

(d) Vitamin B12

Answer: (b)

Vitamin B1 is also known as thiamine. It is nitrogen and sulphur containing water soluble vitamin.

12. A water soluble vitamin is

(a) Vitamin C

(b) Vitamin K

(c) Vitamin A

(d) Vitamin D

Answer: (a)

Vitamin C and group of vitamin B are water soluble vitamins whereas vitamin A, D, E and K are fat soluble vitamins. Vitamin C is also known as L-ascorbic acid.

13. Select the correct general formula of carbohydrates

- (a)  $C_{2n}H_nO_{2n}$                       (b)  $C_nN(H_2O)_{2n}$   
(c)  $C_n(H_2O)_n$                       (d)  $C_nH_{3n}O_{2n}$

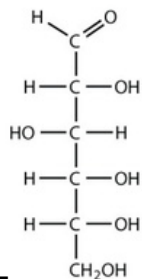
Answer: (c)

General formula for carbohydrates are  $C_n(H_2O)_n$  or  $C_nH_{2n}O_n$ , e.g. glucose  $C_6H_{12}O_6$ .

14. Choose the incorrect statement.

- (a) Glucose has one- CHO group  
(b) Glucose has five -OH groups and one primary alcoholic group.  
(c) Glucose gives fehling's solution test  
(d) Glucose has five secondary alcoholic groups

Answer: (d)



Structure of Glucose is-

It possess one aldehydic group, one primary alcohol and 4 secondary alcoholic group.

CHO group reduce by fehling's solution, hence it is known as reducing sugar.

15. Mostly reactions with sugars are carried out in neutral or acidic medium, If instead of neutral or acidic medium, alkaline medium is used to carry out reaction then sugar will undergoes with \_\_\_\_\_ reaction.

(a) Hydrolysis

(b) Addition

(c) Rearrangement

(d) Inversion

Answer: (c)

If reactions with sugars are carried out in alkaline medium then sugar will undergoes with Rearrangement reaction.

16. \_\_\_\_\_ is a disaccharide.

(a) Glucose

(b) Galactose



(c) Fructose

(d) Sucrose

Answer: (d)

Sucrose on hydrolysis forms glucose and fructose, so it is known as disaccharide.

17. One mole of sucrose on hydrolysis gives

(a) One mole of glucose and 2 moles of fructose

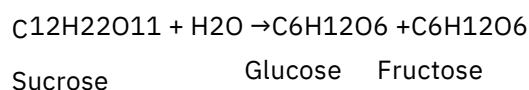
(b) One mole of glucose and 1 mole of fructose

(c) Two moles of glucose

(d) Two moles of fructose

Answer: (b)

Sucrose is also known as cane sugar on hydrolysis form equal moles of glucose and fructose.



18. Hydrolysis of sucrose is called inversion because

(a) Its optical rotation sign changes from dextrorotatory(d) to laevorotatory(l).

(b) Its optical rotation sign changes from laevorotatory(l) to dextrorotatory(d).

(c) Optical rotation sign remains unchanged.

(d) None of above

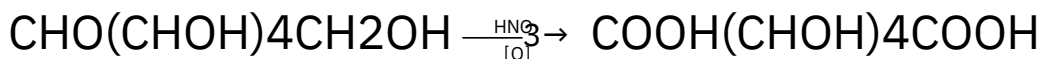




(c) glycolic acid

(d) oxalic acid

Answer: (b)



24. The proteins are hydrolysed by acids, alkalis or enzymes to give

(a) amino acids

(b) ethers

(c) esters

(d) cycloparaffins

Answer: (a)

Amino acids are the basic unit of proteins.

25. Among the following bases, which one is not present in nucleotides?

(a) Guanine

(b) Thymine

(c) Adenine

(d) Tryoxine

Answer: (d)

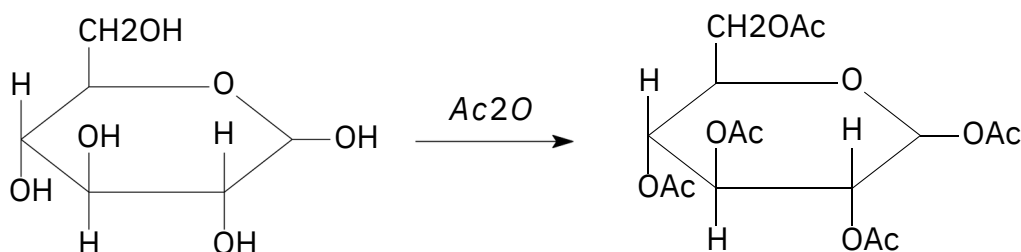
Nucleotides forms building blocks of hereditary materials. It consists by the combination of nitrogenous bases (adenine, thymine, guanine, cytosine and uracil) pentose sugar and phosphate group. Nitrogenous bases are further divide in to three pyrimidine (cytosine, thymine and uracil) and two purine (adenine, guanine).

26. D-(+)-glucose  $\xrightarrow{5(\text{CH}_3\text{CO})_2\text{O}}$  D-(+)-glucose pentaacetate.  
Which statement is true about glucose penta acetate.

- (a) It will react with phenylhydrazine but not with Tollen's reagent.
- (b) It will react with Tollen's reagent but not with phenyl hydrazine.
- (c) It will react with both the reagents.
- (d) It will not react with either of the reagents.

Answer: (d)

Glucose mainly exists as



Thus, cannot react with the above reagent

27. Ring structure of glucose is due to formation of hemiacetal and ring formation between (a) C1 and C5 (b) C1 and C3 (c) C1 and C4 (d) C3 and C4

Answer: (a)

and C4

Glucose has six membered pyranose ring.

28. A chemist isolated a protein from crab and wanted to determine its molecular weight. Which of the following method would have given the best result for him?

- (a) Elevation in boiling point
- (b) Relative lowering of vapour pressure
- (c) Depression in freezing point
- (d) Osmotic pressure method

Answer: (d)

As Osmotic pressure method is more sensitive than other methods it is the most suitable method for the determination of molecular weights of macromolecules like proteins.

29. Extracellular fluid contains \_\_\_\_\_ abundantly.

- (a) Ca metal
- (b) K metal
- (c) Na metal
- (d) Mg metal

Answer: (c)

Extracellular fluid contains Na metal abundantly and it plays an important role by maintaining water balance in blood and tissues. Excess of sodium retain too much water in the body which causes hypernatremia, while due to less amount of sodium retention of water minimizes and it is dangerous for the body.

30. Iron is present \_\_\_\_\_ and \_\_\_\_\_.

- (a) Haemoglobin, Ferritin
- (b) Myoglobin, Ferrous
- (c) Haemoglobin, Ferrous
- (d) Both (a) and (c)

Answer: (a)

Respiratory pigment Haemoglobin has a quaternary structure where each polypeptide has heme group with iron in the center.

Ferritin is an iron storing blood cell globular protein. The ferritin which does not attached with the iron is known as apoferritin.

31.  $\text{H}_3\text{PO}_4$  is dibasic in nature

and forms buffer against

- (a) Strong base      (b) Strong acid  
(c) Weak base      (d) Both strong and weak bases

Answer: (a)

$\text{H}_3\text{PO}_4$  is a strong acid which on ionisation gives  $\text{H}_2\text{PO}_4^-$  and  $\text{HPO}_4^{2-}$  and can form a buffer with strong base.

32. Protistan shells and Sponge spicules have

- (a) Silica and Calcium      (b) Silica and Magnesium  
(c) Magnesium and phosphorous (d) All of these

Answer: (a)

Protistan shells and Sponge spicules are made up of Silica and Calcium.

33. \_\_\_\_\_ is/are a nonreducing sugar.

- (a) Glucose and fructose      (b) Sucrose  
(c) Fructose and maltose      (d) Galactose

Answer: (b)

Sucrose does not give fehling's and silver mirror test, so it is known as nonreducing sugar.

On hydrolysis it gives equimolar mixture of glucose and fructose.

34. Fructose present in honey is

- (a) Laevorotatory                      (b) Dextrorotatory  
(c) Both (a) and (b)                  (d) None of these

Answer: (a)

Monosaccharides with asymmetric carbons, which can rotate polarized light to the left are called Laevorotatory . monosaccharides sugar fructose which are presents in honey, rotate polarised light to left. therefore it is also called Laevulose.

35. During reduction of sugar through fehling's solution, ionic state of metal changes from

- (a)  $Fe^{+2}$  to  $Fe^{+3}$                       (b)  $Fe^{+3}$  to  $Fe^{+5}$   
(c)  $Cu^{+1}$  to  $Cu^{+2}$                       (d)  $Cu^{+2}$  to  $Cu^{+1}$

Answer: (d)

Fehling solution reduce aldehyde group of reducing sugars. During the reaction  $Cu^{+2}$  (blue colour) convert to  $Cu^{+1}$  (red colour).

36. The use of artificial sweetener saccharin has been discontinued, as it is



- (a) Carcinogenic
- (b) Thermally unstable
- (c) 300–400 times sweeter than sugar
- (d) All of these

Answer: (a)

Benzoic sulfimide which is also known as sodium saccharin discovered in 1879 and is used as an artificial sweetener with zero food energy. It is about 300–400 times sweeter than sucrose so used as sugar substitute. It is thermally very stable. It has been discontinued because it is considered a carcinogenic agent by FDA.

37. A fatty acid with no double bond and high melting point are A saturated fatty acid is
- (a) Saturated in nature      (b) Unsaturated in nature
  - (c) Both (a) and (b)      (d) None of these

Answer: (a)

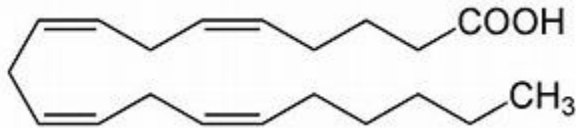
Saturated fatty acids are straight-chain, saturated fatty organic acids and they possess high melting point. Butter fat, meat fat, and tropical oils are some examples of saturated fatty acids.

38. Arachidonic acids are \_\_\_\_\_ essential fatty acids.
- (a) Aromatic      (b) Unsaturated
  - (c) Saturated      (d) Both (b) and (c)

Answer: (b)

Arachidonic acid contains four double bonds hence it is unsaturated in nature.

Its structure is:



39. Which among the following is a pair of essential fatty acids

- (a) Linoleic acid and Arachidonic acid
- (b) Linolenic acid and lauric acids
- (c) Arachidonic acid and carboxylic acids
- (d) All of these

Answer: (a)

Essential fatty acids are required by body for good health, but cannot synthesize by themselves.

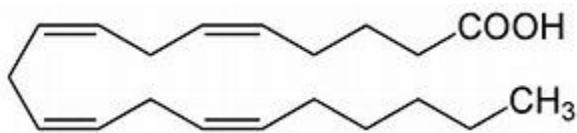
They are mainly two types:

1. Omega-6 fatty acid: it includes linoleic acid and its derivatives, gamma-linolenic acid and arachidonic acid (AA)
2. Omega-3 fatty acid: it includes alpha-linolenic acid and its derivatives, eicosapentaenoic acid and docosahexaenoic acid (DHA).

40. Arachidonic acid, which present in the membranes of the body's cells is abundant in the brain and it contains \_\_\_\_\_ double bonds. (a) 3 (c) 5  
(b) 4  
(d) 8

Answer: (b)

Arachidonic acid is a 20-carbon chain and four cis double bonds, containing carboxylic acid. It is abundantly present in the brain.



41. Choose correct statement about archidonic acid  
(a) is polyunsaturated omega-6 fatty acid  
(b) it helps in the formation of membranes.  
(c) is the most abundant fatty acid in the brain  
(d) All of these

Answer: (d)

Arachidonic acid is a polyunsaturated omega-6 fatty acid. It is found in phospholipids, and helps in membrane formation. It is the most abundant fatty acid in the brain. It helps in the prostaglandins synthesis.

42. PUFA's principal role is  
(a) Supply of essential fatty acids  
(b) Enhance atherosclerosis  
(c) Lowering of cholesterol level

(d) both a and b

Answer: (d)

The fatty acids that contains more than one double bond in their backbone are known as Polyunsaturated fatty acids (PUFAs). It supplies essential fatty acids, enhance atherosclerosis and cholesterol level in our body.

43. Fertility preventing steroid is

(a) Diosgenin

(b) Progesteron

(c) Estrogen

(d) Oogenesis

Answer: (a)

Diosgenin shows a propensity to increase the rate of oocyte recovery and in vitro fertilization. This indicates that by replenishing the reduction in the follicular pool, diosgenin can delay ovarian aging and improve gonadotropin response by aging ovaries in the IVF.

44. Choose the most abundant organic molecule -

(a) Glycogen

(b) Starch

(c) Cellulose

(d) protein

Answer: (c)

Cellulose is produced by almost all plants so it is potentially the most common and abundant organic compound on Earth.

45. Peptide and hydrogen bonds are present in the Primary structure of protein is due to

(a) Primary and alpha helix structure respectively.

- (b) Primary and Beta pleated sheet structures respectively.
- (c) Secondary and alpha helix structure respectively.
- (d) None of these

Answer: (a)

Peptide bonded amino acid sequence are found in the primary structure of a protein whereas in the alpha helix type of secondary structure's proteins are bonded by hydrogen bonds.