

Biochemistry

Long Answer Questions

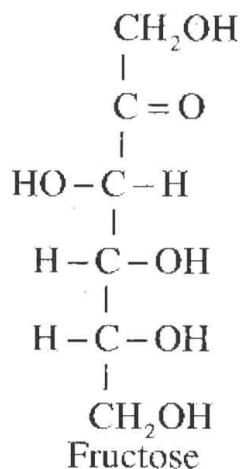
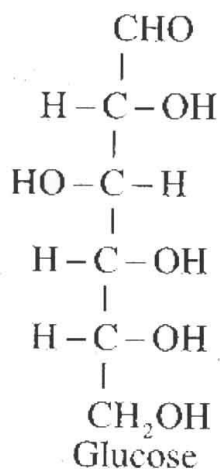
Q.1 What are monosaccharides? Describe with example

Ans. Introduction

Monosaccharides are the simplest sugars which cannot be hydrolyzed. They consist of 3 to 9 carbon atoms. Therefore, they are classified according to the number of carbon atoms in their molecules as trioses, tetroses, pentoses, hexoses, and so on.

Example

The important monosaccharides are hexoses like glucose and fructose, etc. Glucose is a pentahydroxy aldehyde while fructose is pentahydroxy ketone having the open chain structures as follows and general formula $C_6H_{12}O_6$



Properties

Monosaccharides are white crystalline solids. They are soluble in water and have sweet taste. They cannot be hydrolyzed. They are reducing in nature, therefore, these are called reducing sugars.

Q.2 Explain the Sources and uses of proteins.

Ans. Sources and uses of proteins

Proteins make up more than 50% of the dry weight of animals. Each protein has its source and carries out a specific function. Sources and uses of protein are as follows:

- (i) Sources of animal's proteins are meat, mutton, chicken, fish, and eggs. These are used as food by human beings as they are essential for the formation of protoplasm.

- (ii) Enzymes are proteins that are produced by the living cells. They catalyze the chemical reactions taking place in the bodies. They are highly specific and have extraordinary efficiency. Many enzymes are used as drugs. They control the bleeding and treatment of blood cancer.
- (iii) Hides are proteins. These are used to make leather by tanning. Leather is used to make shoes, jackets, sports items, etc.
- (iv) Proteins are found in bones. When bones are heated they give gelatin. Gelatin is used to make bakery items.
- (v) Plants also synthesize proteins, such as pulses, beans, etc. These are used as food.

Q.3 What are the natural sources and uses of lipids?

Ans. Natural sources and uses of lipids

Fats and oils are synthesized naturally by animals, plants and marine organisms.

- (i). Animal fats are found in adipose tissue cells. Animals secrete milk from which butter and ghee obtained. Butter and ghee are used for cooking and frying of food, for preparing bakery products and sweets.
- (ii) Animals fats are used in soap industry.
- (iii) Plants synthesize oils and store them in seeds, such as, sunflower oil, coconut oil, groundnut oil and corn oil. These oils are used as vegetable oils or ghee from cooking and other purposes.
- (iv) Marine animals like salmon and whales are also source of oils. These oils are used as medicines, e.g., cod liver oil.

Q.4 What are the beneficial aspects of carbohydrates to our body?

Ans. Beneficial aspects of carbohydrates

- i. Carbohydrate regulates the amount of sugar level in our body. Low sugar level in body results in hypoglycemia.
- ii. They provide essential nutrients for bacteria in intestinal tract that helps in digestion.
- iii. Dietary fibre helps to keep the bowel functioning properly.
- iv. Fibre helps in lowering of cholesterol level and regulates blood pressure.
- v. Carbohydrates protect our muscles from cramping.

Q.5 What is meant by dextrose? Write its composition and use.

Ans. Introduction to Dextrose

Dextrose is crystallized glucose (natural sugar found in starchy foods). It provides simple carbohydrates to the body that can be easily broken down and processed.

Composition

Dextrose solution is available in several concentrations. For example, five percent dextrose solution (D5W) consists of 5 grams of dextrose in each 100 ml. of solution.

Uses

It is used to provide fluid replacement and energy to the body. It contains approximately 170 calories of energy, but does not contain electrolytes. Therefore, electrolytes are added according to requirements in solution. Dextrose is given to patients directly into vein called intravenous (IV) therapy. It is commonly called drip system. It is the fastest way to deliver fluids, electrolytes and medications throughout the body. It prevents air entering into blood stream.

Q.6 Write a note on DNA.

Ans.

DNA consists of deoxyribose sugar.

Structure of DNA

Its structure was discovered by J. Watson and F. Crick in 1953. It is long double stranded molecule consisting of two chains. Each chain is made up of sugar, phosphate and a base. The sugar and phosphate groups make the backbone of the chains and two chains are linked through bases. The chains are wrapped around each other in a double helix form as shown in figure

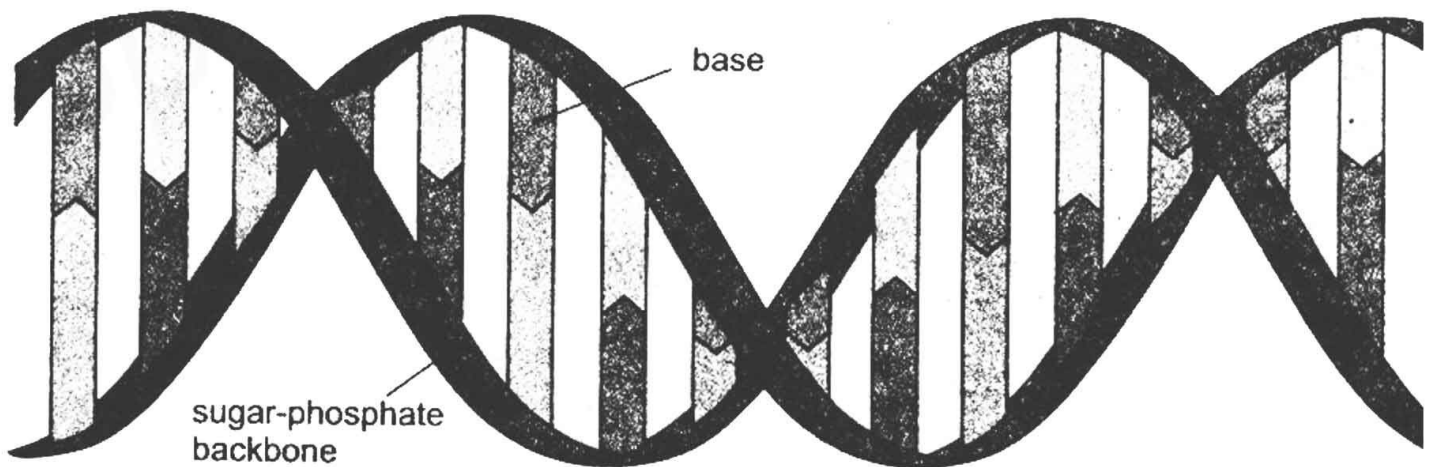


Fig. DNA Structure

Applications of DNA

DNA is the permanent storage place for genetic information in the nucleus of a cell. It carries and stores all genetic informations of the cell. It passes this informations as instruction from generation to generation how to synthesize particular proteins from amino acids. These instructions are a "genetic code of life". They determine whether an organism is a man or a tree or a donkey and whether a cell is a nerve cell or muscle cell.

The sequence of nitrogenous bases in DNA determines the protein development in new cells. The function of the double helix formation of DNA is to ensure that no disorder takes place. DNA carries genes that control the synthesis of RNA. Errors introduced into the genes synthesize faulty RNA. It synthesizes faulty proteins that do not function the way they are supposed to. This disorder causes genetic diseases.

Q.7 What is the importance of vitamins in our daily life?

Ans. Importance of vitamins in our daily life

- (i) Each vitamin plays an important role in the healthy development of our body
- (ii) Natural vitamins are organic food substances found only in plants and animals. Our body is unable to synthesize vitamins. Because of this, they must be supplied either directly in the diet or by way of dietary supplements. They are absolutely necessary for our normal growth.
- (iii) Vitamins cannot be assimilated without ingesting food. This is why, it is suggested that vitamins must be taken with meal. They help to regulate our body's metabolism.

Q.8 Write uses of enzymes on commercial scale

Ans. Following are some of the uses of enzymes on commercial scale:

- i) Enzymes present in the yeast are commercially used for the fermentation of molasses and starch to produce alcohol (Ethanol). These enzymes are diastase, invertase and zymase.
- ii) Microbial enzymes are used in detergents (powder or liquid). Lipases decompose fats into more water soluble compounds. Amylase removes starch based stains. Cellulase degrades cellulose to glucose a water soluble compounds. Bacterial proteases break down protein stains on the clothes. Thus, enzymes containing detergents clean effectively and remove all stains on dirt.
- iii) Enzymes are use for the purification of fruit juices. They are added to fruit that has been crushed like grapes. This increase the yield of the juice extracted by removing suspended particles. It also improves the colour derived from the fruit skins.
- iv) Amylase enzymes are used in bread making because they can yield more starch of the flour. Even they are efficient enough to convert starch to sweet glucose syrup. This can be used as sweetener in the food as well as bread making.
- v) Lactase enzyme is used to increase sweetener in ice cream. As lactose in milk is broken down to galactose and glucose, which are sweeter than lactose.
- vi) In the dairy industry some enzymes are used for the production of cheeses, yogurt and other dairy products while others are used to improve texture or flavours of the products.

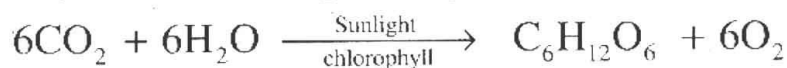
Short Answer Question

Q.1 Define carbohydrates. Give their general formula.

Ans. Carbohydrates are macromolecules defined as polyhydroxy aldehydes or ketones. They have general formula $C_n(H_2O)_n$.

Q.2 How carbohydrates are synthesized by plants?

Ans. Carbohydrates are synthesized by plants through photosynthesis process from carbon dioxide and water in the presence of sunlight and green pigment chlorophyll.



The glucose is further polymerized to form starch and cellulose.

Q.3 Give the classification of carbohydrates.

Ans. Carbohydrates are classified on the basis of units. They are classified as

- i) Monosaccharides
- ii) Oligosaccharides
- iii) Polysaccharides

Q.4 What are monosaccharides? How they are classified?

Ans. Monosaccharides are the simplest sugars which cannot be hydrolyzed. They consist of 3 to 9 carbon atoms in their molecules; they are classified according to the number of carbon atoms in their molecules as trioses, tetroses, pentoses, hexoses, and so on

Q.5 What is meant by glucose and fructose?

Ans. Glucose is a pentahydroxy aldehyde while fructose is pentahydroxy ketone having the open chain structures and general formula is $C_6H_{12}O_6$.

Q.6 Write characteristics of monosaccharides. Why they are called reducing agents?

Ans. Monosaccharides are white crystalline solids. They are soluble in water and have sweet taste. They cannot be hydrolyzed. They are reducing in nature, therefore, these are called reducing sugars.

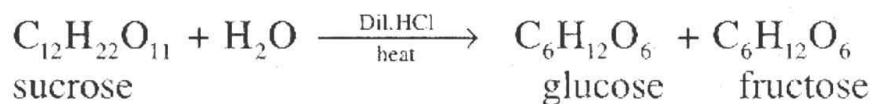
Q.7 What are oligosaccharides? How they are classified?

Ans. Oligosaccharides give 2 to 9 units of monosaccharides on hydrolysis. Therefore, they are classified as disaccharides, trisaccharides, tetrasaccharides, etc depending upon the

number of units they produce on hydrolysis. The most important oligosaccharides are disaccharides like sucrose.

Q.8 Describe hydrolysis of sucrose.

Ans. The most important oligosaccharides are disaccharides like sucrose. On hydrolysis sucrose produces one unit of glucose and one unit of fructose.



Q.9 Name the products formed by the hydrolysis of sucrose.

Ans. On hydrolysis sucrose produces one unit of glucose and one unit of fructose.

Q.10 Write characteristics of oligosaccharides.

Ans. Oligosaccharides are white, crystalline solids easily soluble in water. They are also sweet in taste. They may be reducing or non-reducing.

Q.11 What are polysaccharides? Write its characteristics.

Ans. Polysaccharides are macromolecular carbohydrates consisting of hundreds to thousands of monosaccharides. Examples of polysaccharides are starch and cellulose. They are amorphous solids. They are tasteless and insoluble in water. They are non reducing in nature.

Q.12 Write sources of simple sugars.

Ans. Glucose, fructose and galactose are simple sugars which are found in fruits, vegetables, honey and cereals.

Q.13 Write sources of sucrose.

Ans. Sucrose is found in sugar beet, sugar cane, and fruits.

Q.14 Write sources of Lactose

Ans. Lactose consisting of glucose and galactose is the main sugar in milk and dairy products.

Q.15 Write sources of maltose.

Ans. Maltose is found in cereals.

Q.16 Write sources of starch and cellulose.

Ans. Starch is found in cereal crops: wheat, barley, maize, rice, etc while cellulose is found in cotton.

Q.17 Describe source of energy for brain and muscle?

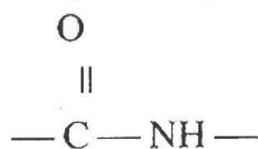
Ans. Our body uses carbohydrates in the form of glucose. Glucose is the only form of carbohydrates that is used directly by muscles for energy. It is important to note that brain needs glucose as an energy source, because it cannot use fat for this purpose.

Q.18 How carbohydrates provide energy to our body system?

Ans. Carbohydrates provides 17 kilojoules of energy per gram. We take carbohydrates as food. Long chains of starch (carbohydrates) are broken down into simple sugars (glucose) by digestive enzymes. The glucose is absorbed directly by small intestine into the blood stream. Blood stream transports the glucose to its place of use, e.g., muscles.

Q.19 What are proteins? Write its composition.

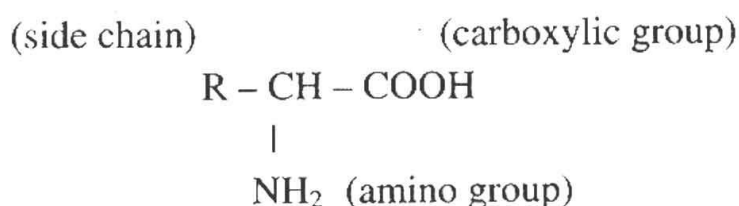
Ans. Proteins are highly complicated nitrogenous compounds made up of amino acids. Proteins consist of carbon, hydrogen, oxygen, nitrogen and sulphur. They are polymers of amino acids. Amino acids are linked with each other through peptide linkage. Protein has more than 10,000 amino acids. All proteins yield amino acids upon hydrolysis.

**Q.20 Write occurrence of protein in living organism.**

Ans. Proteins are present in all living organisms. They make up bulk of the non-bony structure of the animal bodies. They are major component of all cells and tissues of animals. About 50% of the dry weight of cell is made up of proteins. They are found in muscles, skin, hair, nails, wool, feathers etc.

Q.21 What are amino acids? Write its general formula

Ans. Amino acids are organic compounds consisting of both amino and carboxyl groups. They have the general formula

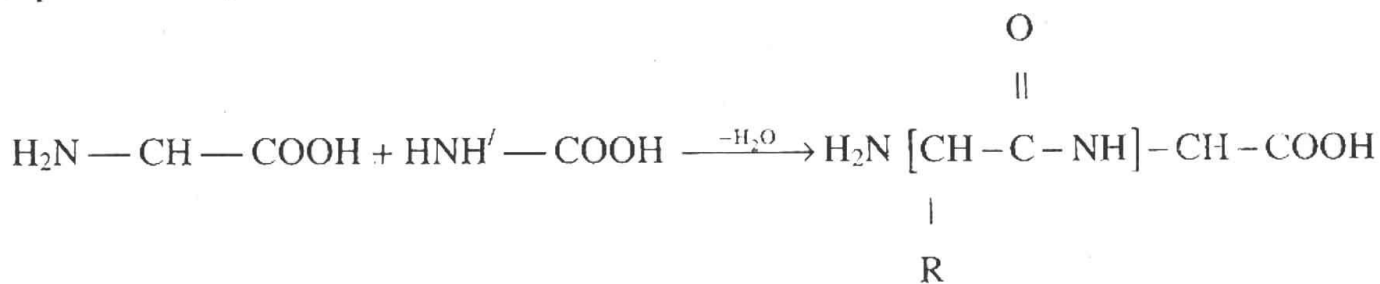


Side chain 'R' is different for different amino acids. There are 20 amino acids.

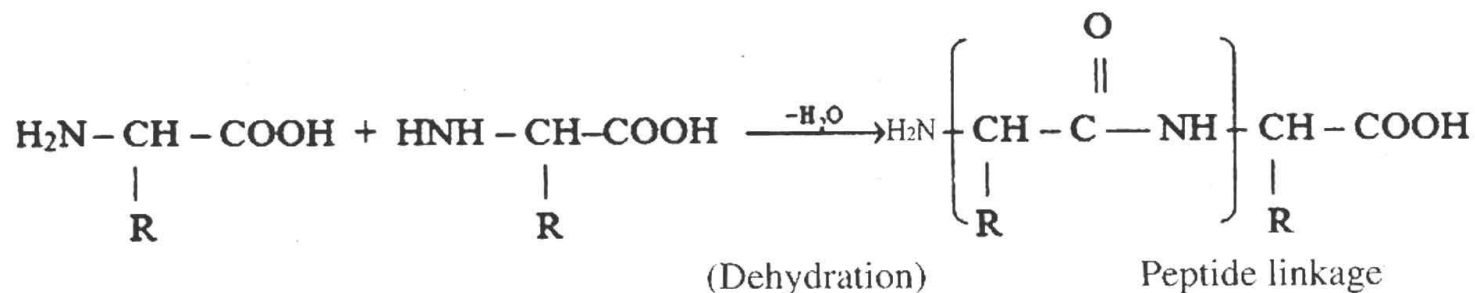
Ans. Ten out of twenty amino acids can be synthesized by human body

Ans. That amino acid which cannot be synthesized in our body is termed as essential amino acids, while those which can be synthesized in our body are termed as non-essential amino acids. Essential amino acids are required by our bodies and must be supplied through diet.

Ans. Two amino acids link through peptide linkage. Peptide linkage (bond) is formed by the elimination of water molecule between the amino group of one amino acid and carboxyl acid group of another, such as

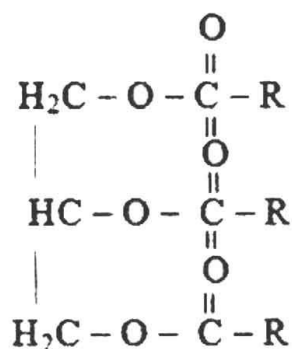


Ans.



Ans. Lipids are macromolecules made up of fatty acids. Lipids are classified into oils and fats. Oil and fats are esters of long chain carboxylic (fatty) acid with glycerol.

Ans. Oils and fats are esters of long chain carboxylic (fatty) acids with glycerol. These esters are made of three fatty acids, therefore, they are called triglyceride. General formula of triglycerides is as under



Q.28 What is the difference between oils and fats?

Ans. Oils exist in liquid form at room temperature. They are triglycerides of unsaturated fatty acids. While fats exist in solid form at room temperature. They are triglycerides of saturated fatty acids

Q.29 What are fatty acids? Give example

Ans. Fatty acids are building blocks of lipids. They are long chain saturated or unsaturated carboxylic acids. Examples are

Palmitic acid $\text{C}_{15}\text{H}_{31}\text{COOH}$

Stearic acid $\text{C}_{17}\text{H}_{35}\text{COOH}$

These acids form esters with glycerol in the presence of mineral acids.

Q.30 How esters are formed?

Ans. Fatty acids form esters (oils or fats) with glycerol in the presence of mineral acids.

Q.31 What are the sources of vitamins A, D and E? Write their uses

Ans. Fats and oils are high energy foods. They are the source of vitamins A, D and E. They are used to build brain cells, nerve cells and cell membranes. They are insoluble in water but soluble in organic solvents. The fats stored in the body insulate it as they are poor conductor of heat and electricity.

Q.32 How vegetable oil is converted into vegetable ghee?

Ans. Vegetable oils are triester of glycerol and fatty acids of unsaturated long chains. These oils are hydrogenated in the presence of nickel catalyst at 250 to 300 $^{\circ}\text{C}$ to form vegetable ghee.



Q.33 How margarine is produced?

Ans. Margarine is produced by adding hydrogen to vegetable oil at 200°C in the presence of catalyst. Greater the amount of hydrogen is added the more solid the margarine becomes.

Q.34 As the presence of butanoic acid causes smell in food fruits? If yes, give suitable example.

Ans. The esters of butanoic acid have fruity smell. For example, methyl butanoate smells like apples and ethyl butanoate smells like pineapple.

Q.35 Why rancid butter has a foul smell?

Ans. Rancid butter has a foul smell because of butanoic acid.

Q.36 What is meant by nucleic acid? How it is classified?

Ans. Nucleic acids are essential components of every living cell. They are generally long chain molecules made up of nucleotides. Each nucleotide consists of three components; nitrogenous base, a pentose sugar and a phosphate group.

Q.37 Nucleic acid is classified into

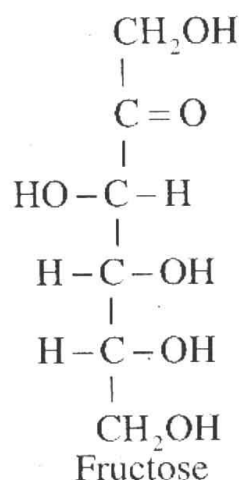
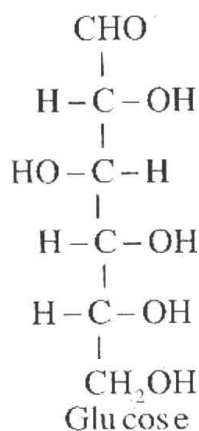
Ans. i) DNA (Deoxyribonucleic acid)
ii) RNA (Ribonucleic acids)

Q.38 Give the balanced chemical equation for the formation of glucose.

Ans. $6\text{CO}_2 + 6\text{H}_2\text{O} \xrightarrow[\text{chlorophyll}]{\text{sunlight}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$

Q.39 Draw the structure of glucose and fructose

Ans.



Q.49 What is meant by RNA? What is its function?

Ans. RNA is synthesized by DNA to transmit the genetic information. RNA receives, reads, decodes and uses the given information to synthesize new proteins. Thus RNA is responsible for directing the synthesis of new proteins.

Q.50 Write brief history of vitamins

Ans. In 1912 Hopkins noticed that in addition to carbohydrates, proteins and fats there are other substances needed for normal growth. Although these substances were needed in small quantity, yet these substances were called Accessory Growth Factors. Later Funk proposed the name Vitamin for these substances. He discovered Vitamin B₁ (Thiamin).

Q.51 Write a short note on fats soluble vitamins?

Ans. the vitamins which dissolve in fats are called fat soluble vitamins. These are vitamin A, D, E and K. If these vitamins are taken in large quantity, they accumulate in the body and cause diseases. For example accumulation of vitamin D in the body causes bone-pain and bone-like deposits in the kidney. However, their deficiency also causes diseases.

Q.52 Write a short note on water soluble vitamins?

Ans. The vitamins that dissolve in water are called water soluble vitamins. These vitamins are B complex (this include 10 vitamins) and vitamin C (ascorbic acid). Water soluble vitamins are rapidly excreted from the body. Hence these vitamins are not toxic even if taken in large quantity. However, their deficiency causes diseases.

Q.53 What are the sources of vitamins A?

Ans. Dairy products eggs, oils, fats and fish. It can also be obtained from the beta-carotene found in green vegetables, carrots and liver.

Q.54 What is the importance of vitamin A?

Ans. Maintains the health of the epithelium and acts on the retina's dark adaptation mechanism.

Q.55 Write any two diseases caused by the deficiency of vitamin A

Ans. Night blindness and eye inflammation

Q.56 What is the source and importance of vitamin D?

Ans. Fish liver, dairy products oils and fats. Vitamin D is formed in the skin when it is exposed to sunlight

Q.57 What is the role of vitamin D in body?

Ans. Vitamin D has a role in the absorption of calcium which is essential for the maintenance of healthy bones.

Q.58 Write uses of amylases enzyme.

Ans. Amylase enzymes are used in bread making because they can yield more starch of the flour. Even they are efficient enough to convert starch to sweet glucose syrup. This can be used as sweetener in the food as well as bread making.

Q.59 Write uses of lactase enzyme

Ans. Lactase enzyme is used to increase sweetness in ice cream. Lactase enzyme metabolizes the lactase sugar in the body. As lactose in milk is broken down to galactose and glucose. Which are sweeter than lactose.

Q.60 What is meant by denaturing of proteins?

Ans. Denaturing of protein means precipitation or coagulation of protein. It can be carried out by heating or changing pH. A simple common method for denaturing of protein is boiling of an egg. White viscous fluid (albumen) present in an egg is protein. When egg is boiled for a few minutes, albumen coagulates i.e., solidifies.

Q.61 What are macromolecules?

Ans. Macromolecules are the bigger molecules which are formed by smaller molecules. Macromolecules are synthesized by living organisms from simple molecules present in the environment. Macromolecules are essential for us as they are reservoirs of energy.

Multiple Choice Questions

1. Carbohydrates are synthesized by plants through photosynthesis process which requires the following except:

- (a) CO₂ and water
- (b) Sunlight
- (c) O₂
- (d) Chlorophyll

2. Which of the followings is a disaccharide?

- (a) Glucose
- (b) Fructose
- (c) Sucrose
- (d) Starch

3. Photosynthesis process produces

- (a) starch
- (b) cellulose
- (c) sucrose
- (d) glucose

4. Which of the following is tasteless?

- (a) starch (b) glucose
- (c) fructose (d) sucrose

5. When glucose and fructose combine they produce

- (a) starch (b) cellulose
- (c) sucrose (d) none of these

6. Glucose is:

- (a) hexahydroxy aldehyde
- (b) hexahydroxy ketone
- (c) pentahydroxy aldehyde
- (d) pentahydroxy ketone

7. Thousands of amino acids polymerize to form

- (a) carbohydrates (b) proteins
- (c) lipids (d) vitamins

8. Which of the followings is a triglyceride?

- (a) carbohydrates (b) proteins
- (c) lipids (d) vitamins

9. Enzymes are proteins which have the following properties except:

- (a) they catalyze reaction
- (b) they are highly non-specific
- (c) they are highly efficient
- (d) they are produced by living cells

10. Which one of the following vitamins is water soluble?

- (a) vitamin A (b) vitamin C
- (c) vitamin D (d) vitamin E

11. Which one of the following is a fat soluble vitamin?

- (a) A (b) E
- (c) K (d) All of these

12. Which one of the following is not the characteristics of monosaccharide?

- (a) White crystalline solids
- (b) Soluble in water

- (c) Hydrolysable
- (d) reducing in nature

13. Which one of the following statements about glucose and sucrose is incorrect?

- (a) Soluble in water
- (b) Naturally occurring
- (c) Carbohydrates
- (d) Disaccharides

14. Which one of the following is a reducing sugar?

- (a) glucose (b) fructose
- (c) sucrose (d) starch

15. The most important oligosaccharide is:

- (a) sucrose (b) glucose
- (c) fructose (d) maltose

16. Night blindness is because of deficiency of:

- (a) vitamin A (b) protein
- (c) vitamin C (d) vitamin D

17. The organic compound used as drugs to control bleeding are

- (a) vitamins (b) proteins
- (c) Lipids (d) glycerides

18. Deficiency of Vitamin E causes

- (a) rickets. (b) scurvy.
- (c) anemia in babies.
- (d) night blindness

19. Lipids are macromolecules. They have characteristics except one of the following:

- (a) they are high energy foods
- (b) they are soluble in water
- (c) they are poor conductor of heat.
- (d) they are esters of fatty acids.

20. vitamins are accessory Growth factors they play important role in our body like;

- (a) provide energy to the body.
- (b) insulate our body from electric shock
- (c) build brain cells
- (d) regulate metabolism

21. General formula of carbohydrate is

- (a) $C_n(H_2O)_n$ (b) CH
- (c) C_nH_{2n} (d) $C_nH_{2n}O$

22. Carbohydrates are synthesized by plants through

- (a) Respiration (b) Photosynthesis
- (c) Dehydration (d) Evaporation

23. Which one of the following cannot be hydrolyzed?

- (a) Polysaccharides
- (b) Monosaccharides
- (c) Oligosaccharides
- (d) All of these

24. Glucose and fructose are

- (a) Pentose (b) Triose
- (c) Hexoses (d) None of these

25. Fructose contain group

- (a) ketone (b) Aldehyde
- (c) Alcoholic (d) Alkyl

26. Monosaccharides are crystalline solids

- (a) Grey (b) Crimson
- (c) Silver (d) White

27. Which is not a reducing sugar?

- (a) Glucose (b) Fructose
- (c) Cellulose (d) All of them

28. Tetrasaccharides are classified under

- (a) Monosaccharides

- (b) Oligosaccharides
- (c) Polysaccharides
- (d) All of them

29. The most important disaccharide is

- (a) Sucrose (b) Glucose
- (c) Cellulose (d) None of them

30. Which one of the following are amorphous solids?

- (a) Monosaccharides
- (b) Oligosaccharides
- (c) Polysaccharides
- (d) All of them

31. On hydrolysis sucrose produces one unit of glucose and one unit of

- (a) Fructose (b) starch
- (c) Cellulose (d) None of them

32. The source of galactose

- (a) Fruits (b) Vegetables
- (c) Cereals (d) All of them

33. Which is the essential sugar found in milk?

- (a) Maltose (b) Lactose
- (c) Galactose (d) Starch

34. Maltose is commonly found in

- (a) Cereals (b) Milk
- (c) Cotton (d) Honey

35. Starch is commonly found in

- (a) Wheat (b) Rice
- (c) Maize (d) All of them

36. Human body uses carbohydrates in the form of

- (a) Glucose (b) Maltose
- (c) Fructose (d) Galactose

37. Which carbohydrate is used directly by muscles for energy?

- (a) Galactose (b) Lactose

- (c) Glucose (d) Fructose
38. Low sugar level in human body results in
 (a) Hyperglycemia (b) Hypoglycemia
 (c) Anemia (d) All of them
39. Which helps to keep the bowel functioning properly?
 (a) Dietary fiber (b) Vitamins
 (c) Lipids (d) Carbohydrates
40. Which helps in lowering of cholesterol level?
 (a) vitamins (b) Fiber
 (c) Carbohydrates (d) All of them
41. The energy provided by carbohydrates in per gram
 (a) 17 KJ (b) 21 KJ
 (c) 35 KJ (d) 10 KJ
42. Which is the natural sugar found in starchy foods?
 (a) Pentose (b) Dextrose
 (c) Hexose (d) All of them
43. 50% dextrose contains approximate amount of energy.
 (a) 250 calories (b) 16 calories
 (c) 170 calories (d) 120 calories
44. Amino acids are the building blocks of
 (a) Proteins (b) Carbohydrates
 (c) vitamins (d) fats
45. The percentage of protein in dry weight of cell
 (a) 20% (b) 40%
 (c) 50% (d) 70%
46. Protein is not found in
 (a) Muscles (b) Skin
 (c) Cotton (d) Hair
47. Chemical formula of amino group is

- (a) NH_3 (b) NH_2
 (c) NH_4^+ (d) COOH
48. Out of twenty how many amino acids can be synthesized by human body?
 (a) Five (b) Ten
 (c) Seven (d) Twelve
49. A bond formed between two amino acids is
 (a) Peptide linkage (b) Covalent bond
 (c) Hydrogen bond
 (d) Glycosidic linkage
50. The nature of enzyme is
 (a) Vitamin (b) Protein
 (c) Carbohydrate (d) fats
51. When bones are heated they give
 (a) Starch (b) Gelatin
 (c) fats (d) Oils
52. Lipids are macromolecules made up of
 (a) Fatty acids (b) amino acids
 (c) nucleotides (d) none of them
53. Oils and fats are esters of large chain fatty acids with
 (a) Glycogen (b) Glucose
 (c) Starch (d) Glycerol
54. Triglycerides are fatty acids
 (a) Unsaturated (b) Saturated
 (c) Both of them (d) None of them
55. Chemical formula of Stearic acid
 (a) $\text{C}_{15}\text{H}_{31}\text{COOH}$
 (b) $\text{C}_{17}\text{H}_{35}\text{COOH}$
 (c) $\text{C}_{17}\text{H}_{37}\text{COOH}$
 (d) None of them
56. In hydrogenation of vegetable oil catalyst employed is
 (a) Ni (b) Pt

- (c) ZnO (d) Cr₂O₃

57. Margarine is produced by adding hydrogen to vegetable oil at

- (a) 2000°C (b) 100°C
(c) 200°C (d) 1000°C

58. Rancid butter has

- (a) Foul smell (b) Rotten egg smell
(c) Pungent smell (d) No smell

59. Smell of rancid butter is due to the presence of

- (a) Propanoic acid (b) butanoic acid
(c) acetic acid (d) citric acid

60. Methyl butanoate smell like

- (a) Apple (b) mango
(c) Lemon (d) Grapes

61. Ethyl butanoate smells like

- (a) Apple (b) Lemon
(c) Pine apple (d) Melon

62. Nucleic acids are made up of long chain of

- (a) Nucleotide (b) fatty acids
(c) Amino acid (d) none of them

63. DNA was discovered by

- (a) J. Watson (b) Funk
(c) Robert Brown (d) Hopkins

64. RNA consists of

- (a) Ribose (b) Pentose
(c) Hexose (d) Trioses

65. Synthesis of protein is directed by

- (a) DNA (b) RNA
(c) Both of them (d) None of them

66. Vitamin B₁ was discovered by

- (a) Funk (b) Hopkins
(c) Crick (d) Watson

67. The accumulation of which vitamin causes bone-like deposits in the kidney

- (a) Vitamin D (b) Vitamin E
(c) Vitamin B (d) Vitamin A

68. Eggs oils and fats contain vitamin

- (a) A (b) B
(c) E (d) D

69. Which is a hereditary material?

- (a) DNA (b) RNA
(c) Protein (d) All of them

70. Denaturing of protein is caused by

- (a) Heating (b) changing pH
(c) Both of them (d) None of them

71. White viscous fluid (albumen) present in an egg is

- (a) Protein (b) Fats
(c) Vitamins (d) Carbohydrates

Answer Key

1	c	2	c	3	d	4	a	5	c
6	a	7	b	8	c	9	b	10	b
11	d	12	c	13	d	14	a	15	a
16	a	17	b	18	c	19	b	20	d
21	a	22	b	23	b	24	c	25	a
26	d	27	c	28	b	29	a	30	c
31	a	32	d	33	b	34	a	35	d
36	a	37	c	38	b	39	a	40	b
41	a	42	b	43	c	44	a	45	c
46	c	47	b	48	b	49	a	50	b
51	b	52	a	53	d	54	a	55	b
56	a	57	c	58	a	59	b	60	a
61	c	62	a	63	a	64	a	65	b
66	a	67	a	68	a	69	a	70	c
71	a								