

25-Sep-2018

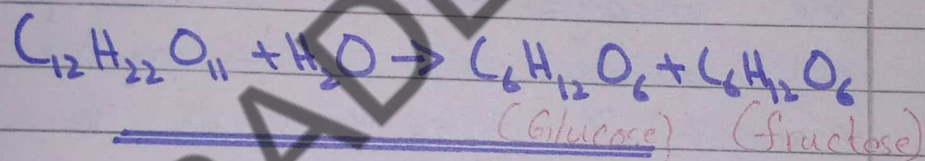
Monday Tuesday

Chapter: 13 "Biochemistry"

• Review Exercise:

Q2(i) Decide, whether sucrose is a disaccharide or monosaccharide. Give reason.

Sucrose is disaccharide as on hydrolysis it produces 2 monosaccharide units that is glucose and fructose.



(ii) What is a dextrose sugar?
Dextrose Sugar:

Monosaccharide molecules which can rotate plane of plane polarized light in clockwise direction are known as dextrose sugar. All monosaccharides are dextro-rotatory except fructose.

Example:

Glucose, manose, galactose.

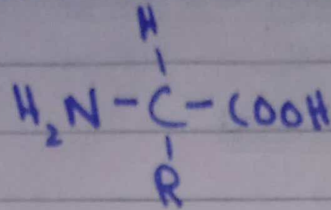
(iii) Write the formula of an amino acid and identify

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Functional groups in it.

The formula of an amino acid is:



Amino acids are bifunctional

i.e; having two functional groups

(i) carboxyl group (COOH)

(ii) Amino group (NH₂)

(iv) What is a peptide bond?

The linkage $-\text{C}-\text{NH}-$ which joins two amino acid units by the removal of water molecule is known as peptide bond.

(v) Which compounds are included in lipids?

The compounds which are included in lipids are:

(a) Fats and oils

(b) cholesterol.

(c) Sex hormones

(d) components of cell membrane, called

(e) phospholipids.

(e) some vitamins (A, D, E and K).

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(vi) What is the function of DNA?

DNA store and transmit all the genetic information needed to build organisms.

Q11: Describe the importance of nucleic acids.

Nucleic acids are vital components of all life. They are found in every living cell. They serve as the information and control centers of the cell. DNA store and transmit all the genetic information needed to build an organism. RNA is responsible for directing synthesis of new proteins.

Q8: Differentiate between fats and oils.

Fats

Oils

Definition
Physical State

1. They are solid at room temperature. They are liquid at room temperature.

Composition

2. Fats are triglycerides of saturated fatty acids. Oils are triglycerides of unsaturated fatty acids.

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Alkyl Group (Bonds)

- 3- There are all single bonds (σ bond) between carbon atoms. There is at least one double bond between carbon atoms.

Melting Point

- 4- Difference They have high melting points compared to oils. They have relatively low melting points.

Example

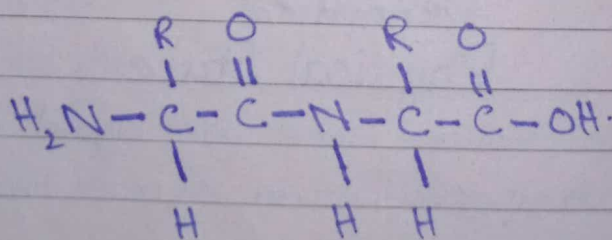
- 5- Butyric acid, Stearic acid. Palmitic acid, Oleic acid.

Q4. Describe bonding in a protein molecule.

Peptide Bond:

The linkage $\text{-}\overset{\text{O}}{\parallel}\text{C}\text{-NH-}$ which joins two amino acid units by the removal of water molecule is known as peptide bond.

The resulting molecule is called dipeptide.



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10. Why are vitamin important for us?

IMPORTANCE OF VITAMINS:

Vitamins are substances that are essential for our bodies.

• Vitamin A:

Importance:

Vitamin A is important in vision. It helps in the chemical transmission of images from the eye to the brain. It also keeps the cornea moist.

Deficiency:

Deficiency of vitamin A causes night blindness and dryness of skin.

• Vitamin B:

Importance:

Vitamin B helps to regulate nerve impulse transmissions, in the formation of haemoglobin and activates more than 100 different enzymes.

Deficiency:

Deficiency of vitamin B causes skin diseases, tongue inflammation,

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anemia and bleeding gums.

- Vitamin C:

- Importance:

- Vitamin C is required for the formation of blood and boosting the immune system that protects against illnesses ranging from common cold to cancer.

- Deficiency:

- Deficiency of vitamin C causes scurvy.

- Vitamin D:

- Importance:

- Vitamin D regulates blood calcium. It is necessary for proper bone and tooth growth.

- Deficiency:

- Deficiency of vitamin D causes rickets and osteomalacia.

- Vitamin E and K:

- Importance:

- Vitamin E is used as an antioxidant.

- Vitamin K is used in blood clotting.

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Deficiency:

The deficiency of vitamin E causes haemolysis of red blood cells and sterility.

The deficiency of vitamin K causes haemorrhage delayed blood clotting.

Q14. List commercial uses of enzymes.

• USES OF ENZYMES:

Enzymes are large protein molecules. They are biological catalysts. They catalyze chemical reactions in living organisms. Enzymes are also commercially important. They are used in the production of sweeteners, chocolate syrup, bakery products, infant foods, detergents to remove food stains, in cheese making, in paper and pulp industries to remove sticky matter, to prepare fabrics for clothes, furniture and other household items.

Example:

For example:

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(a) enzymes like diastase, invertase and zymase are used in the fermentation of molasses and starch to produce ethanol.

(b) Amylase is used in bread making.

(c) Proteases and amylase are used in detergents to remove food stains on the cloths.

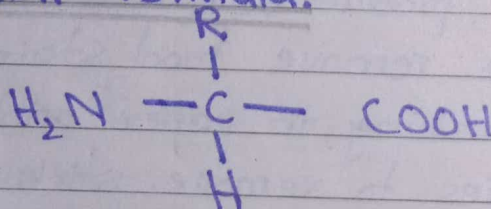
(d) lactase is used in infant foods.

THINK-TANK:

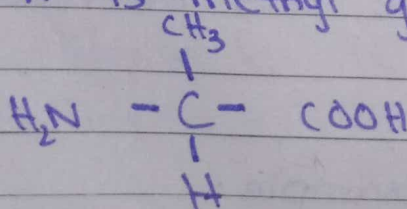
Q20. Draw the structure of each of the following molecules.

(a) An amino acid having $-\text{CH}_3$ as R group.

• General Formula:



when R is methyl group:



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Chapter: 13 "Biochemistry"

Review Exercise:

Q3: Distinguish between mono, di and tri-saccharides. Give examples.

<u>Mono-saccharide</u>	<u>Disaccharides</u>	<u>Trisaccharides</u>
i- Monosaccharides are carbohydrates.	Disaccharides are carbohydrates.	Trisaccharides are also carbohydrates.
ii- Monosaccharide are simple carbohydrates and cannot be hydrolyzed.	Disaccharides on hydrolysis produce two monosaccharides unit.	Trisaccharides on hydrolysis produce three monosaccharides units.
iii- Monosaccharide include simplest carbohydrates.	Disaccharides belong to oligosaccharides.	Trisaccharides belong to oligosaccharides.
iv- Glucose, Manose, galactose etc.	Sucrose, lactose and maltose.	Raffinose ($C_{18}H_{32}O_{16}$)

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Q: Compare between monosaccharides, oligosaccharides and polysaccharides.

Monosaccharides	Oligosaccharides	Polysaccharides
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Definition

Monosaccharides are the simplest carbohydrates that contain 3 to 6 carbon units.	Oligosaccharides are the carbohydrates that contain 6 to 9 monosaccharide units.	Polysaccharides are the carbohydrates that contain 10 to 1000 units of simple sugar.
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Hydrolysis

They cannot be hydrolyzed further.	They can be hydrolyzed into monosaccharides.	They can also be hydrolyzed into monosaccharides.
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Types of Solids

They are white crystalline solids.	They are also white crystalline solids.	They are amorphous solids.
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Solubility

They are soluble in water.	They are also soluble in water.	They are insoluble in water.
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Taste

They have sweet taste.

They have sweet taste.

They are tasteless.

Examples

Glucose, mannose and galactose.

Sucrose, maltose etc.

Cellulose, chitin, starch etc.

Q: Differentiate between DNA and RNA.

DNA

RNA

Abbreviation

It is deoxy-ribonucleic acid.

It is ribonucleic acid.

Sugar Unit

It contains deoxy-ribose sugar (lacks one oxygen).

It contains ribose sugar.

Nitrogenous Bases

It contains Adenine, Guanine, Cytosine and Thymine.

It contains Adenine, Guanine, Cytosine and Uracil instead of Thymine.

Structure

It has double helical structure.

It has single stranded structure.

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Self Replication

DNA has the ability of self replication.

RNA is not self-replicated but formed from DNA.

Functions

It stores genetic information and pass it on from one generation to other.

RNA helps in protein synthesis.

Q: Differentiate between fat soluble and water soluble vitamins.

Fat Soluble
Vitamins

Water soluble
Vitamins

Definition

The type of vitamins which are soluble in fats.

The type of vitamins which are soluble in water.

Quantity/Effect on Body

If present in excess amount they are harmful.

If present in excess amount they are not harmful as they are readily excreted from body.

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Types

It includes vitamin A, D, E and K.

It includes vitamin B and C.

Functions

They are important for eyes, skin, teeth and bones etc.

They are important for energy production in cells.

Sources

They are obtained from milk, butter, and fresh green vegetables, etc.

They are obtained from oranges, lemons, tomatoes and fresh green vegetables etc.

Q: Describe the importance of nucleic acids.

• Nucleic Acids:

More than hundred years ago, a Swiss biochemist discovered a class of nitrogen containing compounds which were first obtained from pus of infected wounds are called nucleic acids.

• Structure:

Nucleic acids are long-chain molecules made up of

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nucleotides. Each nucleotide consist of three components:

- i- Nitrogenous base
- ii- Pentose sugar
- iii- Phosphate group.

• Kinds:

There are two kinds of nucleic acids:

- i- Deoxyribonucleic acid (DNA)
- ii- Ribonucleic acid (RNA).

• Importance of Nucleic acids:

Nucleic acids are vital components of all life.

i- They are found in every living cell.

ii- They serve as information and control & center of the cell.

iii- DNA can store and transmit all the genetic information needed to build organisms for instance in human beings the single fertilized egg cell carry the information for making legs, hands, head, liver, heart, kidneys etc.

iv- RNA is responsible for directing synthesis of new proteins. RNA receives, reads, decodes and uses genetic information from DNA to synthesis new proteins.