

## Bio 202

Galactosylceramide,

A galactocerebroside is a type of cerebroside consisting of a ceramide with a galactose residue at the 1-hydroxyl moiety. The galactose is cleaved by galactosylceramidase.

amide group of asparagine,

n) **Asparagine** is the **amide** of aspartic acid. ... **Asparagine** has a high propensity to hydrogen bond, since the **amide group** can accept two and donate two hydrogen bonds. It is found on the surface as well as buried within proteins.A

bio202....co enzymes

**Coenzymes** are small molecules. They cannot by themselves catalyze a reaction but they can help **enzymes** to do so. In technical terms, **coenzymes** are organic nonprotein molecules that bind with the protein molecule (apoenzyme) to form the active **enzyme** (holoenzyme).

,purine and pyrimidine,cAMP properties,properties of nitrogenous bases,composition of nucleotides and function,how proline destabilize nucleotide,condensation reaction,function of proline etc.

primary structure of DNA

### DNA Primary Structure

- The primary structure of a nucleic acid is its
- covalent structure and
- nucleotide sequence.

The backbone of the primary structure is the linear strand made by sugar phosphate residues, linked together, while the bases project laterally.

- This way a long, un-branched chain is formed.

The resulting long, un-branched chain has polarity.

- Both 5'-end and 3'-end are free.

- at 5'-end there is a free phosphate.

- at 3'-end there is a free OH that are not attached to other nucleotides.

marks Write the types of lipoproteins. 3 .

**Two types of lipoprotein** are involved in this function:

low-density **lipoproteins**(LDLs) and high-density **lipoproteins** (HDLs).

LDLs transport cholesterol from its site of synthesis in the liver to the body's cells, where the cholesterol is separated from the LDL and is then used by the cells for various purposes. The degree of lipid in a **lipoprotein** affects its density—the lower the density of a **lipoprotein**, the more lipid it contains relative to protein. The four major **types of lipoproteins** are chylomicrons, very low-density **lipoprotein** (VLDL), low-density **lipoprotein**(LDL), and high-density **lipoprotein** (HDL). **HDL** cholesterol absorbs cholesterol and carries it back to the liver,

Write the primary structure of DNA. 5 marks. 5.

Nucleotide as a regulatory compound, justify it. 5

4.interactions in DNA. 5 marks

Hydrophobic interaction

Stacking interaction

The strands are held together by hydrogen bonds and hydrophobic **interactions**. ... Those two bases form a base-pair (H-bond **interaction** that keeps strands together and form double helical **structure**). The base-pairs in **DNA** are adenine-thymine (A-T) and

cytosine-guanine (C-G). The stability of the DNA double helix depends on a fine balance of **interactions** including hydrogen bonds between **bases**, hydrogen bonds between **bases** and surrounding water molecules, and **base-stacking interactions** between adjacent **bases**.

No of carbon atoms and nitrogens in nucleotide 2 marks

what is enzyme ? also describe its functional groups

Enzyme are the biological catalyst and they speed up the reaction.

Enzymes are the globular protein

the enzyme will act only on molecules that have specific functional groups, such as **amino**, **phosphate** and **methyl** groups.

5 marks

what is primary DNA

3 marks

Nucleotide regulation ?

**nucleotide** biosynthesis is **regulated** by feedback inhibition in a manner similar to the **regulation** of amino acid biosynthesis (Section 24.3). ... The synthesis of purine **nucleotides** is controlled by feedback inhibition at several sites

1: Give example of condensation??? 2 marks

. Having a cold soda on a hot day, the can "sweats." Water molecules in the air as a vapor hit the colder surface of the can and turn into liquid water.

2: what is the function of bile salt? 2 marks

The **function of bile salts** in the duodenum is to solubilize ingested fat and fat-soluble vitamins, facilitating their digestion and absorption.

3: write the name of functional group of purine and pyrimidines?? 3 marks

the most important **functional groups** of **pyrimidines** and **purines** are ring nitrogens, carbonyl **groups**, and exocyclic amino **groups**. Hydrogen

bonds involving the amino and carbonyl **groups** are the second important mode of interaction between bases.

4: write the three characteristics of glycerol??? 3 marks

Glycerol is a precursor for synthesis of triacylglycerols and of phospholipids in the liver and adipose tissue. When the body uses stored fat as a source of energy, glycerol and fatty acids are released into the bloodstream.

- And enter the glycolysis pathway directly

MCQz

1 torr = . --- mmHg

DNA absorbs light of ----- nm.

Bio202

1. Waxes and its type and its characteristics

True waxes

- Other Waxes or

Non true waxes or

Wax-like compounds **True Waxes**

- Waxes are solid

simple lipids

containing a

monohydric alcohol

(with a higher molecular weight than glycerol)  
• esterified to longchain fatty acids.

### **Lipid Chemistry**

Waxes also form protective coatings of the skins and furs of animals and  
• leaves and fruits of plants.

2.enzymes and its classification

3.name the pentagon sugars in nucleic acid and its characteristic.

4.Role of nucleotide energy currency in cell

5.Simple lipide and types

Esters of fatty acids with various alcohols

These contain:

a. Fats (and Oils) and

b. Waxes.

6. three functions of pyrimidines and purines.

7.differentiate between adenine and guanine

However, guanine has amine or ketone groups attached to C-2 or C-6 positions in its six- membered ring. The structure of adenine, basically, differs from guanine by the presence of an additional point of unsaturation between C-6 and N-1 positions of its six-membered ring.

Iodine number and its importance.

It is the number of the gram of the iodine that is absorbed by 100 of fat in terms as iodine number The more the iodine number, the greater the degree of

unsaturation.

- Fats rich in saturated

fatty acids have low

iodine numbers, The determination of

iodine number is

useful to the chemist

in determining the

quality of an oil or its

freedom from

adulteration

Rancidity and factors affecting it. Waxes. Enzymes. Properties of nucleotides.

How to number carbons in pentose

Each nucleotide has the nitrogenous base attached to the 1' carbon of the pentose sugar. And you number the carbons sequentially from that starting point.

nucleotide and nucleoside

1. 3 functions of cAMP. 3 marks

2. how banaspati ghee is produced from oil. 2 marks

3. hydrogenation of fats. 3 marks

4. interactions in DNA. 5 marks

5. saponification and its end products. 3 marks

6. waxes its types and properties. 10 marks

7. enzymes and its classification. 10 marks

8. 2 examples of unnatural pyrimidine bases. 2 marks.

2. 1. 3 functions of cAMP. 3 marks

cAMP is synthesized

in tissues from ATP

- chemically it is 3'-5'

adenosine

monophosphate. Acts as second

messenger in the cell

- It has role in glycogen metabolism

- $\uparrow$ cAMP,  
 $\uparrow$ glycogenolysis

- $\uparrow$ cAMP  $\uparrow$ TAG metabolism

- $\uparrow$ cAMP  $\uparrow$  lipolysis

## 2. how banaspati ghee is produced from oil. 2 marks

### Hydrogenation

- Oils which are liquid at ordinary room temperature, on hydrogenation become solidified

This is the basis of Banaspti ghee manufacturing.

- Where inedible and cheap oils like cotton seed oil are hydrogenated and converted to edible solid fats.

## 3. hydrogenation of fats. 3 marks

### Hydrogenation

- A hydrogenation reaction involves conversion of a carbon-carbon double bond to a carboncarbon single bond through the addition of hydrogen

Fat becomes  
more solid at  
room temp Oils which are liquid  
at ordinary room  
temperature, on  
**hydrogenation**  
become solidified  
**4.interactions in DNA. 5 marks**

**5.saponification and its end products. 3 marks**

Hydrolysis of a fat by  
an alkali is called  
**saponification**

- The resultant  
products are;
- glycerol and
- the alkali salts of the  
fatty acids, which are  
called "soaps"

**6. waxes its types and properties. 10 marks**

**7.enzymes and its classification. 10 marks**

**8. 2 examples of unnatural pyrimidine bases. 2 marks.**

**Unnatural Pyrimidine**

**Bases:**

- Fluorouracil (5FU) &
- 6-Aza Cytosine (AZC)

3.

4. Bio 202

waxes 10

**Waxes:** Esters of  
fatty acids with higher  
molecular weight

monohydric alcohols.

(having one OH group)

## **Waxes**

- A second group of neutral lipids that are of physiological importance.
- Although they are a minor component of biological systems. Waxes are insoluble in water, but
- soluble in fat solvents and are
- negative for acrolein test.
- very resistant to rancidity. Waxes are not easily hydrolyzed as the fats
- and are indigestible by lipases (enzymes responsible for fat digestion in body)
- Thus they are of no nutritional value Waxes are of two types:
- True waxes
- Other Waxes or Non true waxes or Wax-like compounds **True Waxes**
- Waxes are solid simple lipids containing a monohydric alcohol

(with a higher molecular weight than glycerol)  
• esterified to longchain fatty acids Waxes also form protective coatings of the skins and furs of animals and  
• leaves and fruits of plants.

enzymes 10

pentose sugar 5

**nucleotide as energy currency of cell 5**

Nucleotides play an important role as "energy currency" in the cell. Nucleoside tri- and diphosphates such as **ATP and ADP** are the principal donors and acceptors of phosphoryl group in metabolism.  
• By doing this, they play a key role in the energy transduction.

banaspati ghee 3

types of waxes 3

number of carbon atoms in nucleotide and nucleoside 3

Function of lipoxins(2)

The **lipoxins** are believed to **function** in promoting resolution of inflammation by controlling the entry of neutrophils to sites of inflammation and the affected organs. They are chemo-attractants for monocytes, i.e. cells that are required for wound healin

### **Function of tRNA (2)**

It is adaptor RNA and it contribute to the formation of protein it decode the messenger RNA sequence into protein, Trna function is specific sites in the ribosome during translation.

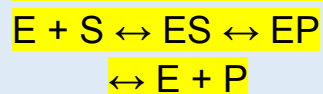
### **Function of Hsp70 (2)**

The hsp70 family of chaperones binds short sequences of hydrophobic amino acids in newly synthesized polypeptides.

They also unfold proteins prior to their insertion through the membrane of mitochondria and other organelles

### **What do u know about enzyme kinetics (2)**

Substrate Concentration Affects the Rate of Enzyme-Catalyzed Reactions



A key factor affecting the rate of a reaction catalyzed by an enzyme is the concentration of substrate, [S].

### **Diff b/w oxidative and hydrolytic rancidity(3)**

It is due to the slow hydrolysis of fats,  
• which in case of fats like butter results in

the

- liberation of short chain fatty acids which are volatile and have rancid taste and odor.

$K_m$  in Michaelis-Menten equation (3)

$$V_0 = V_{max} \frac{[S]}{K_m + [S]}$$

•Where;

• $V_0$  = initial reaction velocity

This is a very useful, practical definition of  $K_m$ :  $K_m$  is equivalent to the substrate concentration at which  $V_0$  is one-half  $V_{max}$

Function of cGMP (3)

It serves as a second messenger in response to nitric oxide during relaxation of smooth muscle (especially blood vessels) so it has role in smooth muscle relaxation and vasodilatation. Protein phosphorylation

- Neurotransmission
- Insulin action
- Regulation of sodium channels

properties of waxes (5)

## Characteristics of pentose sugar

### Pentose Sugar

- D-ribose and 2-deoxy

D-ribose are the only sugars so far found in the nucleic acids.

These also pentoses belong to D-family

### (5) Classification of enzyme (5)

| CLASSIFICATION OF ENZYMES   |                                                                                          |                                     |
|-----------------------------|------------------------------------------------------------------------------------------|-------------------------------------|
| Group of Enzyme             | Reaction Catalysed                                                                       | Examples                            |
| 1. Oxidoreductases          | Transfer of hydrogen and oxygen atoms or electrons from one substrate to another.        | Dehydrogenases<br>Oxidases          |
| 2. Transferases             | Transfer of a specific group (a phosphate or methyl etc.) from one substrate to another. | Transaminase<br>Kinases             |
| 3. Hydrolases               | Hydrolysis of a substrate.                                                               | Esterases<br>Digestive enzymes      |
| 4. Isomerases               | Change of the molecular form of the substrate.                                           | Phospho hexo<br>Isomerase, Fumarase |
| 5. Lyases                   | Nonhydrolytic removal of a group or addition of a group to a substrate.                  | Decarboxylases<br>Aldolases         |
| 6. Ligases<br>(Synthetases) | Joining of two molecules by the formation of new bonds.                                  | Citric acid<br>synthetase           |