Assignment

DATE : / /
PAGE NO. :

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Sub - Biological chemistry

Q.1 One Marks

1) Define Monosaccharide
Carbohydrate that cannot be hydrolysed to simple compounds is called Monosaccharide

2) Define PH
PH is defined as the negative logarithm of hydrogen ion concentration

3) Define acid
Acid are the substance which on ionisation donates a proton

4) What are zwitter ions ?
A molecule or ion having seprate +ve charge and -ve charge group
e.g. Amino acid

5) Explain Buffer

Buffer is gaseous system that tends to resist change in PH when small amount of acid (H+) and base (OH-) is added

6) What are conjugate acids ~~and~~

When acid dissociates the proton and conjugate base is From

7) Define km

?

8) Explain steriosomerism

These different froms of the same monosaccharides are known as stereoisomers and the phenomenon as steriosomerism

Q.2 Short Notes

1) Biological significance of carbohydrated

- Carbohydrates constitute one of the most important groups of natural products.
- Carbohydrates can be also classified into two broad groups, sugar and non-sugars
- some carbohydrates contain nitrogen and sulphur in addition to carbon, hydrogen and oxygen
- e.g - glucose $C_6H_{12}O_6$ - $C_x(H_2O)_y$

- carbohydrates can be define as opHically achive polyhydroxy aldehyde or polyhydroxy ketones or compound that can be hydrolysed.

2) PH scale

- PH is define as the negative logarithm of hydrogen ion concentration.
- PH range is 0-14 and 7 indicates a acidic solution
- Basic PH range 7.1 - 14
- Acid range 0 - 6.9
- Formula $PH = -\log [H^+]$
- Example PH of 1M CH_3COOH
- H+ ion concentration is 0.1 M

3) Hyperglycemia

- Hyperglycemia is characterised by fasting and 2-hour postprandial blood glucose levels of more than 125 mg/dl and 180 mg/dl
- A patient with fasting glucose level of 100 - 125 mg/dl is considered pre-diabe
- If patient sugar is rise above the normal level is called hyperglycemia

4) Hypoglycemia

- Hypoglycemia is condition which your blood sugar (Glucose) level is lower than the standard range
- Hypoglycemia is an low blood sugar people who has diabetes, but sometime

affect people without diabetes
- To treat the hypoglycemia we should consumed carbohydrates
- Hypoglycemia is when blood sugar level is below 55 mg/dL or 3.1 mmol/L

Q.3 long answer

1) derive H-H equations and write its applications

→ Consider the weak acid dissociate

$$HA \rightleftharpoons H^+ + A^-$$

let Ka the equillibrium constant for the reaction

$$Ka = \frac{[H^+] - [A^-]}{[HA]}$$

or

$$[H^+] = Ka \frac{[HA]}{[A^-]}$$

Taking negative logarithum on both side

$$-\log [H^+] = -\log Ka \frac{[HA]}{[A^-]}$$

In logarithum multiplication is add changing sign the exchanging terms in numerator and denominator, we get

$$-\log [H^+] = -\log Ka + \log \frac{[A^-]}{[HA]}$$

But $-\log [H^+] = pH$

$$pH = -\log K_a + \log \frac{[A^-]}{[HA]}$$

If the we now denote

$-\log K_a = pK_a$

equn - $$\boxed{pH = pK_a + \log \frac{[A^-]}{[HA]}}$$

The above equn is called Handerson Haselbatch equn. This equn is useful for preparation of buffers of pH near to pKa value of acids

Application of Henderson - Hasenlbatch equn

1) Henderson equn is useful for preparing buffer solun of desired pH
2) The Handerson - HasselBalch equn unable to calculate pH value of Buffer mixture of weak acid and its salt

e) Types of Buffer

1) The phosphate Buffer system
2) The Bicarbonate Buffer System
3) The protein Buffer system
4) The Amino acids Buffer System
5) The Hemoglobin Buffer system

3) ~~Diags~~

3) Diasaccharides

A carbohydrates that can be hydrolysed two monosaccharides is called a diasscharide.

Diasaccharides are most frequently encountered in nature. Among the maltose, cellobiose, isomaltose, lactose and sucrose are most common

① Maltose

It is a disaccharide made up to two glucose molecules joined together by α-1-4 glycosidic linkage (bond)

② ~~Maltose~~ cellobiose

It is composed of two glucose units joined together through β-1-4 glycosidic linkage. It is diasaccharides fromed hydrolysis cellulose

③ Isomaltose

It is made up of two glucose molecule joined by α-1-6-glycosidic linkage this linkage is responsible for branching in glycogen and amylopechin

④ Lactose-

It is milk is also referred as milk sugar. Lactose is diassaccharide made up of glucose and galactose linked together β-1-4 glycosidic bond.

⑤ Sucrose

It is a diasaccharides. occur in high concentration in cane and beet. It is formed of D (+) glucose and D (-) fructose

4) significance of glycogenesis, gluconeogenesis and glycogenolysis

1) glucogenesis

- The formation of glycogen take place in liver and muscle
- About 200 gm of glycogen in equal amount is present in these two organs of human body
- In presence of all these glucose is converted to glucose - 6 - phosphate

2) Gluconeogenesis

- The formation of glucose from substance other than carbohydrates in known as gluconeogenesis
- In the muscles the lactic acid formed is transported to the liver by the blood stream
- radioactive isotopes show that glycogen in the liver is not only formed from lactic acid but from carbon dioxide

3) Glycolysis - oxidation of Glucose

- Apart from its conversion to glycogen in the muscle & liver
- glucose is utilized to from chemical energy as ATP.
- carbon dioxide and water are the by-products
- This is the principle fate of glucose under normal conditions.

5) Isomerism in carbohydrates

- It is know of configuration of various monosaccharides which are the simplest carbohydrates from which all the complex carbohydrates are derived
- Study of chemical formulae of various monosaccharides indicate their molecular structure contains one or more asymmetric carbon atom

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