

**UNIVERSITY OF KELANIYA- SRI LANKA**

Faculty of Science

**Bachelor of Science General degree examination, June 2023**

**Academic year 2020/2021 - Semester II**

**Applied Chemistry -APCH 12632**

**Number of Questions: Four (04)**

**Time: Two (02) hrs.**

**Number of pages: Five (05)**

**Answer all questions.**

1. A).

- i). Define the following terms    a).    aldo sugar and  
b).    keto sugar    (2x 03 marks)
- ii). Name three (03) aldo sugars and draw their fisher structures.    (12 marks)
- iii). Name one (01) keto sugar and draw its fisher structure.    (04 marks)
- iv). Draw one enantiomer, one epimer, and one diastereomer for the structures given in above part ii) and iii)    (03 x 3x4 marks)
- v). Glucose answer for benedict reaction. Indicate why?    (04 marks)
- vi). Indicate the observation that you will get for glucose in the above reaction.    (04 marks)
- vii). Write the equation pertaining to this colored reaction.    (10 marks)

B). i). Name the monosaccharides present in following disaccharides

- a). Sucrose (02x 3 marks)
- b). Maltose (03 marks)
- c). Lactose (02x 3 marks)

ii). Name the monosaccharide present in starch. (03 marks)

iii). Amylose and amylopectin are the two major components in starch. Name the glycosidic bond present in amylose and amylopectin.

(02x 3 marks)

2.

A). Provide the example / examples (provide the names only ) for the following amino acids.

- i. Two acidic amino acid
  - ii. two Basic amino acids
  - iii. Two Hydrophobic amino acid
  - iv. Two neutral amino acids
  - v. One polar uncharged amino acid
  - vi. Two Sulphur containing amino acids
- (02 marks for each)

B). Answer the following

- i. amino acid/s which can make disulphide bonds (02 marks)
- ii. pair of amino acids which can make H bond (02x2 marks)
- iii. pair of amino acids which can make ionic bonds (02x2 marks)
- iv. pair of amino acids which can make hydrophobic interaction (02x2marks)

c). i. What is meant by primary structure of protein? (08 marks)

ii. what are the forms that you will observe in 2ry structure of protein? Name the bond which stabilize these secondary structures. (12 marks)

↓  
Hydrogen

D). i. Name 5 industrial uses of enzymes. (10 marks)

ii. Enzymes are known as biocatalyst. enzymatic reactions are very fast. Explain why.

(10 marks)

activation energy.

iii. Define the following terms.

- a). Holoenzyme b). Apoenzyme c). Co enzyme d). Prosthetic group

(06 marks for each)

3.A)

i) What is the Chargaff's rule?

(05 marks)

ii) A piece of DNA consisted of 74 base pairs. The two strands of the DNA, strand A and B, were analyzed to find the number of bases of each type that are present. Some results are shown in the table.

	A	T	C	G
Strand A	20	9	26	19
Strand B	9	20	19	26

Complete the table by writing the missing values.

(10 marks)

iii) What are the two major characteristics of a DNA double strand?

(04 marks)

iv) Define the following terms.

Denaturation of DNA

Melting temperature of DNA ( $T_m$ )

(06 marks)

v) DNA sequences of two short DNA double strands are shown below.

Strand A

5' - G A G C T C C T C G G C - 3'

| | | | | | | | | |

3' - C T C G A G G A G C C G - 5'

Strand B

5' - A A T C T T A T C G T A - 3'

| | | | | | | | | |

3' - T T A G A A T A G C A T - 5'

Briefly explain why Strand A has a higher  $T_m$  compared to strand B.

(10 marks)

- vi) What are the three major forms of DNA? Using three of the following parameters compare and contrast these forms of DNA.

parameters: Helix (right-handed or left-handed), Base pairs per turn, Helical diameter (nm), Helical length (nm), Shape, Major groove, Minor groove.

(15 marks)

B)

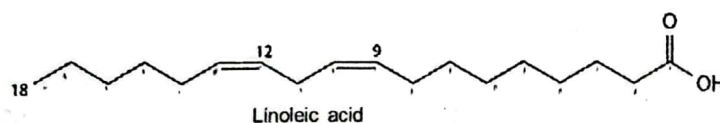
- i) Briefly explain the term lipids and their biological importance.

(15 marks)

- ii) What are the differences between fats and oils?

(16 marks)

- iii) Write the IUPAC name and omega ( $\omega$ ) system name of Linoleic acid. What is the importance of Linoleic acid for humans?



(09 marks)

- iv) Briefly explain importance of triacylglycerol as the major storage form of energy in cells.

(10 marks)

4. A) i) What is the purpose of Molisch's test?

(04 marks)

- ii) What are the possible colors for a positive Molisch's test result?

(04 marks)

- iii) What chemical compound or its derivative is responsible for the positive Molisch's test color?

(Structure not required.)

(02 marks)

B)

Five carbohydrates labelled as A, B, C, D and E were tested as given in the following chart to reveal their identity. A, B, C, D and E can be Glucose, starch, fructose, lactose or sucrose. Using the observation given in the following chart identify A, B, C, D and E.

