DEPARTMENT OF BIOCHEMISTRY
CENTER FOR SANDWITCH PROGRAMME
OLABISI ONABANJO UNIVERSITY, REMO CAMPUS
2009/2010 HARMATTAN SEMESTER EXAMINATION
BCH 201: INTRODUCTION TO BIOCHEMISTRY I

Answer any five (5) questions

Date: Saturday 20th of March, 2010 Time Allowed: 2hours

1 Describe the Bio-polymer nature showing existing bonds in the following:
(i) Carbohydrates – O-glycocidic bond – form to 2 none sugar
(ii) Proteins – Amino Acid – peptide bond Amide bond
(iii) Nucleic acid – N-glycosyl bond

2a. Describe in full the mechanism of action of buffer in:
(i) A strong acid e.g HCl – equilibrium shift to left, more OH^- is produced
(ii) A strong base e.g NaOH – shift right decrease in OH^- to produce
b. Define the term BUFFER CAPACITY – no of moles of strong acid or base to change the pH of 1 liter of buffer to undergo a unit change
c. Name and list constituent of any 3 examples of buffer.
Acetate buffer – Acetic acid and sodium acetate
Carbonic buffer – Carbonic acid and bi carbonate

3. Prof. Tayo, in one of his Xerodermal pigmentisum research works, need to maintain his cultures preparation at pH of 5.8, requiring 500ml of sodium acetate buffer whose molar conc. is 0.02. Given that: Molar mass of CH3COOH (60.04g), CH3COONa (80.05g), Pka of the buffer is 4.74, density (1.11). Showing all calculations involved and citing all precautions, describe briefly, how he will go about it.

4a. Define the term LIPIDS.
b. Classify LIPIDS, citing two biochemical examples each.
c. Using 2 classified examples, describe nomenclature process of LIPIDS

5a. (i) What is pH?
(ii) Which is the best method to determine Ph of a given substance, and why? pH meter ∵ Accurate and read in decimal place
(iii) What is the importance of buffer solution.
(iv) What is the importance of indicator in any laboratory experiment.

P.T.O

5b. How can you differentiate the following:
(i) Ketose sugar from aldose sugar.
(ii) Protein from non protein substance
(iii) - amino acid from non -amino acid
(iv) Monosaccharide from disaccharides.

5c. Prove that at ½ titration between weak acid and strong base

pKa=pH

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

6a. Briefly classify amino acids based on the nature of their alkyl group citing an example each.

b. Highlight the general properties of amino acids.

7. Write short notes on any two of the following:
(i) Plasma protein
(ii) Protein conformation
(iii) Secondary bonds of proteins.

Disulphide bond
Electrostatic bond
Hydrogen bond

13902

All

87574

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

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

Take the -ve log of both sides

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

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

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

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

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

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

$Ka[HA] = [H^+][A^-]$

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