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DEPARTMENT OF BIOCHEMISTRY
CENTER FOR SANDWICH PROGRAMME
OLABISI ONABANJO UNIVERSITY, REMO CAMPUS
2009/2010 AARMAATTAN SEMESTER EXAMINATION
BCII 201: INTRODUCTION TO BIOCHEMISTRY I

Answer any five (5) questions

Date: Saturday 20th of March, 2010

Time allowed: 2 hours

1. Describe the Bio-polymer nature showing existing bonds in the following:

- (i) Carbohydrates — *O-glycosidic bond - form to 2 more sugar*
 (ii) Proteins — *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 shifts to keep more H^+ is produced*
 (ii) A strong base e.g. NaOH — *shifts not decrease in H^+ produced*

b. Define the term BUFFER CAPACITY:

c. Name and list constituent of any 3 examples of buffer.

*Acetate buffer — Acetic acid and sodium acetate
 Carbonic buffer — Carbonic acid and bicarbonate*

3. Prof. Tayo, in one of his Xeroderma pigmentosum 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 CH_3COOH (60.04g), CH_3COONa (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.

H →

P. T. O

5b. How can you differentiate the following:

- Ketose sugar from aldose sugar. ✓
- Protein from non protein substance
- amino acid from non - amino acid
- Monosaccharide from disaccharides. ✓

5c. Prove that at $\frac{1}{2}$ titration between weak acid and strong base
 $pK_a = pH$



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.

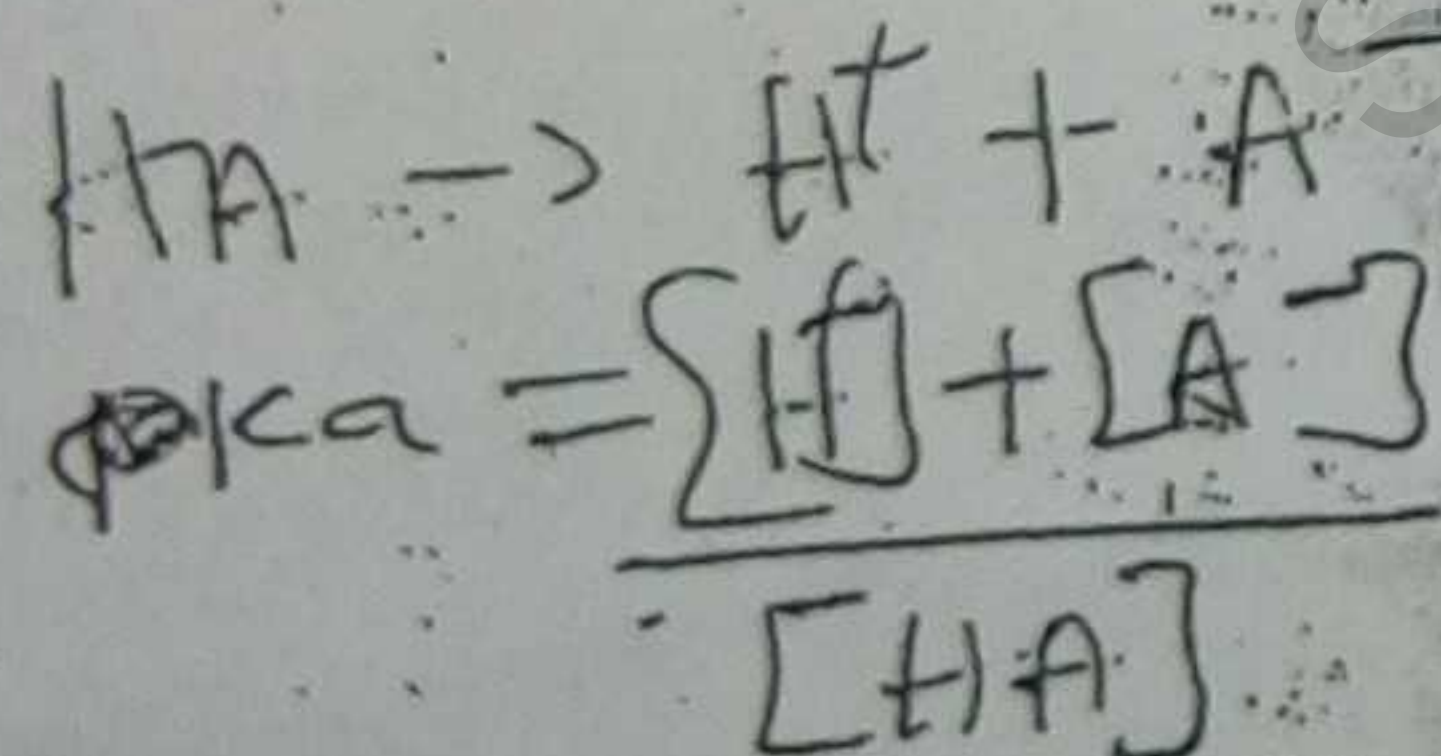
7. Write short notes on any two of the following:

- Plasma protein
- Protein conformation
- Secondary bonds of proteins

Disulphide bond
 Electrostatic bond
 Hydrogen bond

139021 Hydrophobic interaction

All



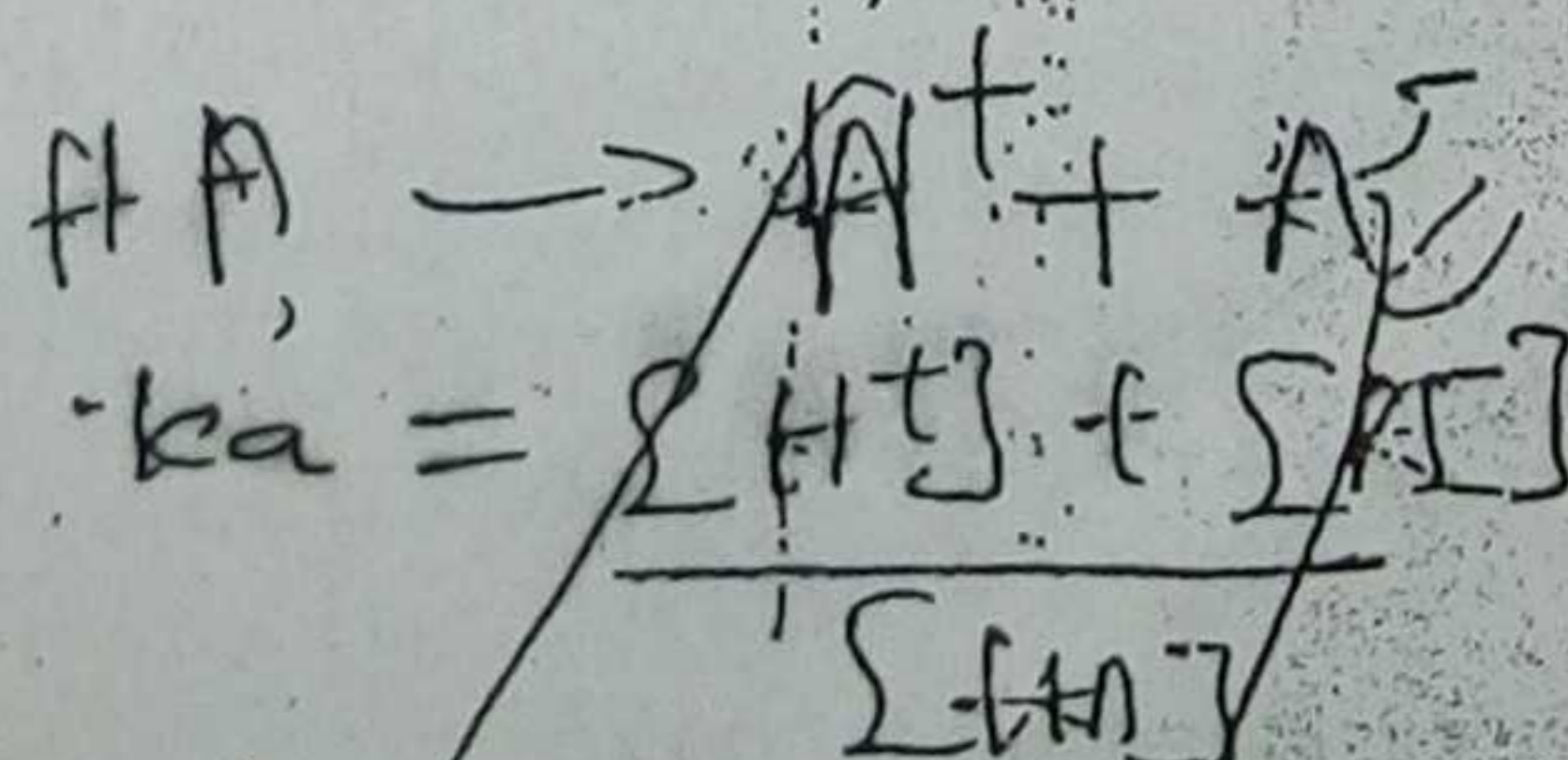
Take \log of both side

$$\log K_a = \log [H^+] + \log [A^-] - \log [HA]$$

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$$\log pK_a = \log K_a = \log [H^+] + \log [A^-] - \log [HA]$$

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



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

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