



**ELIZADE UNIVERSITY**  
**FACULTY OF BASIC AND APPLIED SCIENCES**

**DEPARTMENT: PHYSICAL AND CHEMICAL SCIENCES**

**PROGRAMME: BIOCHEMISTRY EXAM TITLE: DEGREE EXAMINATION**

**COURSE CODE & TITLE: BCH 201 – GENERAL BIOCHEMISTRY I**

**TIME ALLOWED: 2 hrs SEMESTER/SESSION: FIRST / 2020/2021**

**INSTRUCTIONS: Write your matriculation number on the cover page of the exam booklet.**

**ANSWER FOUR (4) QUESTIONS ONLY**

**HOD's SIGNATURE**

1. (a) (i) Define pH  
(ii) Why is pH important in Biology?  
(iii) How can you determine the pH of a given solution?  
(iv) Calculate the pH of the resulting solution if 200ml of 0.64M of NaOH are added to 400ml of 0.400M HCl,  
(v) What is the hydrogen ion concentration of a solution whose pH is 2?  
(b) (i) What are buffers? Give two (2) examples of a buffer  
(ii) Name the two components of each buffer given in b (i) above.  
(iii) Define Buffer Capacity  
(iv) At what point does a buffer works best?  
(v) From the reaction,  $HA \leftrightarrow H^+ + A^-$ , derive  $pH = pK_a + \text{Log } [A^-]/[HA]$ . A buffer solution contains 0.25M acetic acid and 0.25M sodium acetate. Calculate the pH of the buffer ( $pK_a$  of acetic acid is 4.75).

*25 marks for Question 1*

2. (a) Briefly describe Aspartame and state what it's used for.....5 marks  
(b) List five (5) basic functions of proteins.....5 marks  
(c) State the name and structure of any six (6) amino acids you know... 6 marks  
(d) List the four levels of structural organization of proteins.....4 marks  
(e) Differentiate between essential and non-essential amino acids.....5 marks
3. (a) With specific examples, differentiate between  
(i) Purines and Pyrimidines..... 4 marks  
(ii) DNA and RNA.....4 marks  
(iii) Monocistronic and Polycistronic gene..... 4 marks  
(iv) Nucleosides and Nucleotides.....4 marks  
(b) Showing the right sequence, describe  
(i) Palindrome..... 3 marks  
(ii) Hairpin.....3 marks

- (iii) Cruciform.....3 marks
4. (a) (i) Give the name and structure of a 3, 4, 5, 6, and 7 carbon atoms sugar 10 marks  
(ii) Give two examples each of a disaccharide and polysaccharide.....4 marks
- (b) Clearly state the similarities and differences between Amylose and Amylopectin.....6 marks
- (c) Briefly explain why cellulose is not soluble in water despite having same composition as amylose which is water soluble.....5 marks
5. (a) (i) Is this statement True or False? "The greater the percentage of saturated fatty acids in food fats the higher the melting temperature". Give reasons for your answer.....5 marks.
- (b) (ii) "Glycosphingolipids are determinants of blood group". Succinctly describe this statement in relation to Blood Group Antigens A, B and O.....5 marks
- (c) Differentiate between saturated and unsaturated fatty acids and state three (3) examples of each.....10 marks
- (d) Margarine is said to be made with healthy unsaturated vegetable oil, if the vegetable oil is liquid at room temperature, then why is margarine solid at room temperature?.....5 marks