ILARA-MOKIN, ONDO STATE

DEPARTMENT OF PHYSICAL AND CHEMICAL SCIENCES

2019/2020 FIRST SEMESTER B.Sc. DEGREE EXAMINATIONS

BCH 203: PROTEIN STRUCTURE AND FUNCTION B

TIME: 2 HOURS

SECTION A: ANSWER ANY 2 QUESTIONS

1. a. List and briefly explain at least six biological functions of proteins **(5marks)**

   b. Protease from the leaves of *Calotropis procera* was purified indicated in the table below.

   Complete this table

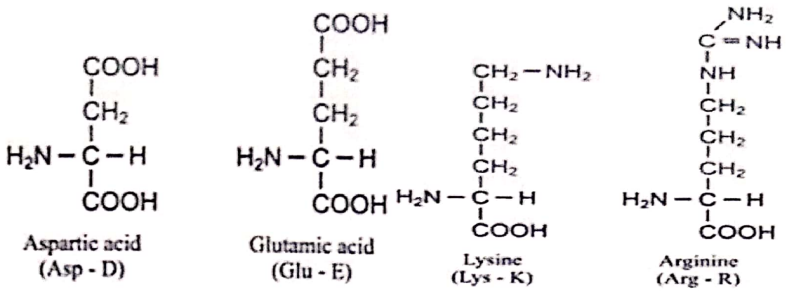
   (10 marks)

Table A

	Total Activity (U)	Total Protein (mg)	Specific Activity (U/mg)	Yield (%)	Fold
Crude	24.8	40.5			
Gel-Filtration Chromatography	11.3	28.4			
Affinity Chromatography	9.8	12.4			
Two-phase partitioning	12.2	10.2			
Ion exchange chromatography	16.1	4.4			

2a. Using the table indicated below, determine the net charge on aspartic acid, glutamic acid, lysine and arginine at pH 1, 4 and 11 **(12 marks)**

Amino acid	**pKa_1**	**pKa_2**	**pKa_3**	**pI**
Aspartic acid	1.88	9.60	3.65	2.77
Glutamic acid	2.19	9.67	4.25	3.22
Lysine	2.18	8.95	10.53	9.74
Arginine	2.17	9.04	12.48	10.76



2 b. Briefly explain the structure and function relationship of proteins in the context of specific binding

(3 marks)

3. a. Illustrate the steps involved in protein isolation and purification using a flowchart **(7 marks)**

b. What are the criteria for purity? **(3 marks)**

c. Give two examples each of the following

i. Basic amino acid

ii. Polar, aliphatic amino acid

iii. Aromatic amino acid

iv. Sulphur containing amino acid

v. Non-polar aliphatic amino acid **(5 marks)**

SECTION B: ANSWER ALL QUESTIONS

Instructions: Answer any Two (2) Questions

1. Describe the process of biosynthesis of any amino acid of your choice. **(15 marks)**
2. Briefly describe the following:

i. Ketogenic amino acid
ii. Glucogenic amino acid
iii. Essential and non-essential amino acid
iv. Biomolecules derived from amino acids
v. Nitrobacters and Nitrosomonas **(15 marks)**

3. Describe the classification of proteins based on the biological functions they perform in a living system. **(15 marks)**