



ILARA-MOKIN, ONDO STATE

DEPARTMENT OF PHYSICAL AND CHEMICAL SCIENCES

2018/2019 FIRST SEMESTER B.Sc. DEGREE EXAMINATIONS

BCH 203: PROTEIN STRUCTURE AND FUNCTION

INSTRUCTIONS: ANSWER ALL QUESTIONS

TIME: 2 HOURS

1. a. List 6 biological functions of proteins (3 marks)
 - b. Briefly explain classification of proteins based on (i) solubility and composition (ii) function (iii) shape and size (iv) structure (3 marks)
 - c. Give one example each of following types of proteins (i) simple (ii) conjugated (iii) aggregated and (v) exotic (2 marks)
 - d. Explain the following with appropriate illustration (i) gel filtration chromatography and (ii) ion-exchange chromatography (3 marks)
 - e. Mention two techniques used in (i) homogenization of cells (ii.) protein fractionation (iii) determination of protein concentration (3 marks)
 - f. An enzyme of molecular weight 24 kD and $pH_1 = 5.5$ is contaminated with a protein of similar molecular weight but with pH_1 of 7.0 and another protein of molecular weight of 100 kDa and pH_1 of 5.4. Suggest a purification strategy. (6 marks)
2. a. Illustrate using a flow chart, steps involved in protein isolation and purification (3 marks)
 - b. In a typical tetrapeptide that contains the amino acids coded **DIET**. Determine the net charge at pH 1, 3.5 and 12.0 (8 marks)
 - c. Complete the purification table below

	Total Activity (U)	Total Protein (mg)	Specific Activity (U/mg)	Yield (%)	Fold
Crude	250	25			
Gel-Filtration Chromatography	180	10			
Affinity Chromatography	100	3			

(2 marks)

d. What are the criteria for purity? **(2 marks)**

e. In what direction will the following proteins move in an electric field (toward the anode, toward the cathode or remain stationary). Ovalbumin (pHi = 4.6) at pH 5.0. (b) Pepsin (pHi = 5.3) at pH 5.0 (c) Albumin (pHi = 5.3) at pH 7.0. **(3 marks)**

f. Explain the term Zwitterions using appropriate illustration **(2 marks)**

3. a. Describe the metabolic fates of amino groups during amino acid biodegradation **(3 marks)**

b. List the factors that determine the roles of protein in a biological system **(2 marks)**

c. Describe the process of biosynthesis of one none-essential amino acid **(7 marks)**

d. Differentiate between essential and non-essential amino acid **(2 marks)**

e. Describe the process of biodegradation of one AROMATIC amino acid **(6 marks)**