

School: School of Science

Program/s: BMS

Year: 1st Semester: 1

Examination: End-Semester Examination

Examination year: December 2022

Course Code: BM122 Course Name: Chemistry for Biologists

Date: 13/12/2022

Time: 08:30 am to 10:30 am

Total Marks: 40 Total Pages: 2

Instructions: IQAC Copy

- Write each answer on a new page.
- Use of a calculator is permitted.
- Please write to the point. For Q1A, Q1B and Q1C please justify the choice you make in one or two sentences.

Q. No.	Details	Marks	COs*	BTL*
	(A) Amino acids are joined during a(n) reaction and a(n) bond/linkage is formed. [Marks 2]  (i) hydrolysis; peptide (ii) condensation; amide (iii) neutralization; ether (iv) oxidation; ester	7	CO1 CO2	BT1. BT2 BT3 BTL4 BTL5
	(B) Calculate the [H <sub>3</sub> O] <sup>+</sup> and OH <sup>-</sup> concentrations in the following solutions. Each is either a strong acid or a strong base. [Marks 2] a) 0.013 M Li (OH) <sub>3</sub> b) 0.15 M HNO <sub>3</sub>			
Q.1	(C) The components of poison ivy and poison oak that produce the characteristic itchy rash are catechol's substituted with long-chain alkyl groups. If you were exposed to poison ivy, which of the treatments below would you apply to the affected area? Justify your choice. [Marks 1+2]			
	OH $(CH_2)_n - CH_3$ $pK_a \sim 8$			
	<ul> <li>(a) Wash the area with cold water.</li> <li>(b) Wash the area with dilute vinegar or lemon juice.</li> <li>(c) Wash the area with soap and water.</li> <li>(d) Wash the area with soap, water, and baking soda (sodium bicarbonate).</li> </ul>			

Q.2	What is the H <sup>+</sup> concentration of a solution with pH of (a) 5 (b) 6	5	CO1 CO2	BT1. BT2. BT3 BTL4
Q.3	Convert the Fischer Projection to Sawhorse and Newman. Also, find out the number of stereoisomers and their relationships.  CO <sub>2</sub> H  H  OH  HO  H  CO <sub>2</sub> H  Fischer  Sawhorse  Newman Projection	6	CO1 CO2	BT1, BT2, BT3 BTL4 BTL5 BTL6
Q.4	The $\Delta G'$ of the hydrolysis of ATP at pH and 25C is -7700 kcal/mol. The $\Delta G'$ of the hydrolysis of glucose-6-phosphate at pH =7 and 25 °C is -3138 cal/mol. From this information, calculate the $\Delta G'$ and $K'_{eq}$ for the reaction between glucose and ATP catalyzed hexokinase	5	CO1 CO2	BT1, BT3, BT3
Q.5	Calculate the NET charge of the dipeptide Gly-Lysisne. Ionizable group pKa are, Carboxy terminus - $CO_2H = 2.7$ , Amino terminus ( $NH_3^+ = 9.7$ ), Lysine $\epsilon$ - $NH_3^+ = 10$	5	C01 C02	BT1. BT2
Q.6	You have a buffer solution containing an acid HA whose pKa is 6.5 and its conjugate base A- a) What is the pH of a solution in which [HA] = [A-]? b) What is the pH of a solution in which [HA] = 10[A-]? c) Calculate the ratio [A-]/[HA] for pH = 4.5	5	CO1 CO2	BT1. BT2. BT3 BTL4 BTL5
Q.7	The antibiotic linezolid is the pure S enantiomer. Draw the structural formula of the molecule with this configuration.	2	CO1 CO2	BT1, BT2, BT3 BTL4 BTL5
Q.8	What relationship do the following pairs of compounds have to each other?  OH + H <sub>2</sub> O	4	CO1 CO2	RT3

\*\*\*\*\*\*End of Question Paper\*\*\*\*\*\*\*\*