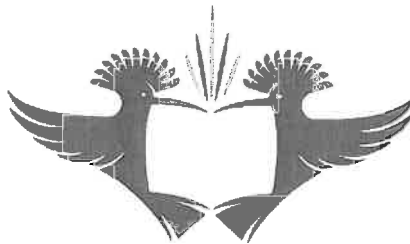


Faculty of Science



**UNIVERSITY
OF
JOHANNESBURG**

**Principles of Biochemistry BIC1B01/BIC01B1
Examination**

DATE 12 NOVEMBER 2018

SESSION 08h30 – 11h30

EKSAMINAR

Dr. G. Koorsen

MODERATOR

Dr I. Mwaba

TIME 3 HOURS

MARKS 80

Please read the following instructions carefully:

- Answer all the questions in the examination book provided.
- The use of a calculator is allowed.

Question 3 (11)

3.1. Give the dissociation reaction for the amino acid aspartic acid. (6)

$pK_a(\alpha\text{-COOH}) = 2.09$; $pK_a(\alpha\text{-NH}_3^+) = 9.82$; $pK_a(R) = 3.86$

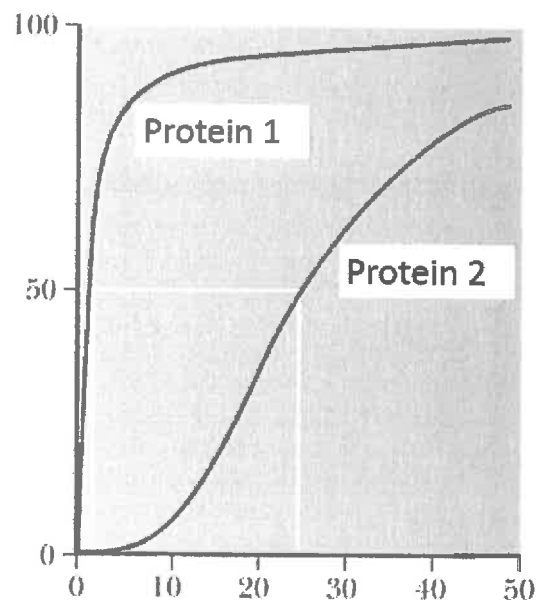
3.2. What is the net charge of aspartic acid at pH 10? (1)

3.3. Give an example of two cyclic peptide hormones, that are very similar in primary structure, but with different functions. Give the names and the functions of the two hormones. (4)

Question 4 (16)

4.1. Describe how pH-mediated change in the quaternary structure of hemoglobin explain the Bohr effect. (12)

4.2. The following diagram shows the binding curves of two oxygen binding proteins. Consider the curves carefully and answer the question that follow:



Compare protein 1 and protein 2 in terms of the cooperativity of binding and motivate your answer. (4)

Question 5 (15)

Compare the composition of ribosomes in prokaryotes and eukaryotes. (15)

Question 6 (5)

6.1. Draw the structure of the fatty acid that can be denoted by the following notation: 16:1-- Δ^9 . (3)

6.2. What is the definition of a wax? Give an example. (2)

Question 7 (6)

7.1. Draw the structures of the following monosaccharides:

7.1.1. α -D-glucopyranose (3)

7.1.2. α -D-fructofuranose (3)

Question 8 (7)

8.1. What disaccharides are made of the following monosaccharides?

8.1.1. galactose- β -1,4-glucose (1)

8.1.2. glucose- α -1,4-glucose (1)

8.1.3. glucose- β -1,4-glucose (1)

8.1.4. glucose- α -1,2-fructose (1)

8.2. What are the cellular functions of:

8.2.1. heparin (1)

8.2.2. chondroitin sulphates (1)

8.2.3. hyaluronate (1)

TOTAL [80]