

UNIVERSITY OF SWAZILAND

RESIT- EXAMINATION PAPER: DECEMBER 2017/2018

TITLE OF PAPER: INTRODUCTORY BOTANY

COURSE CODE: BIO101

TIME ALLOWED: THREE HOURS

- INSTRUCTIONS:
1. THIS PAPER IS DIVIDED INTO TWO SECTIONS
 2. ANSWER 2 QUESTIONS FROM EACH SECTION IN TWO SEPARATE BOOKLETS.
 3. ANSWER QUESTION 1 (COMPULSORY) AND ONE OTHER QUESTION FROM SECTION A.
 4. ANSWER ANY TWO QUESTIONS FROM SECTION B.
 5. EACH QUESTION COUNTS TWENTY FIVE (25) MARKS.
 6. USE CLEARLY LABELLED DIGRANS WHERE NECESSARY.

SPECIAL REQUIREMENTS: GRAPH PAPER

THIS PAPER IS NOT TO BE OPENED UNTIL PERMISSION HAS BEEN GRANTED BY THE INVIGILATORS

SECTION A

Question 1 (COMPULSORY)

- (a) Define the K_m and V_{max} of an enzyme-catalysed reaction and explain how the enzyme-substrate affinity can be inferred from K_m . (5 marks)
- (b) The following results were obtained for the reaction of ATPase on ATP at 20°C, where the concentration of the ATPase was 20 nmol dm⁻³.

[ATP] ₀ (μM)	Initial velocity (μmol dm ⁻³ s ⁻¹)
0.6	0.81
0.8	0.97
1.4	1.3
2.0	1.47
3.0	1.69

Draw the hyperbolic and double-reciprocal plots to estimate the constant K_m for the ATPase and V_{max} of this reaction. Comment on any discrepancies in your values obtained using the two plots. (20 marks)

[Total marks = 25]

Question 2

Explain the differences between the following:

- (a) A saturated and an unsaturated fatty acid, (2 marks)
- (b) RNA and DNA, (4 marks)
- (c) A nucleoside and a nucleotide, (2 marks)
- (d) Mitosis and meiosis, (3 marks)
- (e) An L-sugar and a D-sugar, (2 marks)
- (f) An aldose and a ketose, (2 marks)
- (g) A primary metabolite and a secondary metabolite, (2 marks)
- (h) A prokaryotic and a eukaryotic cell, (2 marks)
- (i) A plant cell and an animal cell, (2 marks)
- (j) A furanose and a pyranose ring, (2 marks)
- (k) A β-anomer and an α-anomer. (2 marks)

[Total marks = 25]

Question 3

Discuss the primary, secondary, tertiary and quaternary structure of proteins.

(25 marks)

[Total marks = 25]

SECTION B

ANSWER ANY TWO (2) QUESTIONS FROM THIS SECTION.

Answer ANY TWO (2) questions from this Section

Question 4

(a) Draw and give an example (eg. *Vibrio* = , *Vibrio spp*) of the following:

- (i). A spiral
- (ii). A bacillus
- (iii). A coccus
- (iv). A spirochaete
- (v). A streptobacillus
- (vi). A staphylococcus

(6 marks)

(b) Explain the cell structure of a typical bacterium.

(8 marks)

(c) How can a gram-positive and a gram-negative bacterium be distinguished based on a diagrammatic representation of each?

(3 marks)

(d) Discuss the temperature requirements of bacteria.

(8 marks)

[TOTAL MARKS = 25]

Question 5

(a) Why are viruses called obligatory intracellular parasites?

(1 mark)

(b) Explain the morphological classes of viruses.

(8 marks)

(c) Explain how viruses multiply within their host cells.

(5 marks)

(d) Discuss the relevance of viruses in humans.

(11 marks)

[TOTAL MARKS = 25]

Question 6

- (a) Name the asexual and sexual spores produced by different divisions of fungi. (3 marks)
- (b) Draw the following: (6 marks)
- (i). A perithecium
 - (ii). An apothecium
 - (iii). A cleistothecium
 - (iv). A pycnidium
 - (v). An acervulus
 - (vi). A basidiocarp
- (c) Name and draw a representative of each of the following: (4 marks)
- i) A green algae
 - ii) A brown algae
 - iii) A liverwort
 - iv) A fern
- (d) How does the death angel mushroom (*Amanita* spp) result in human death after consumption? How does this species' mode of action compare with that of toxins produced by *Aspergillus* spp? (3 marks)
- (e) Discuss the socio-economic relevance of fungi to humans. (9 marks)

[TOTAL MARKS = 25]

END OF EXAM PAPER