UNIVERSITY OF ESWATINI

FINAL EXAMINATION PAPER: FEBRUARY 2021

| | |
|---|---|
| TITLE OF PAPER: | INTRODUCTORY BOTANY |
| COURSE CODE: | BIO 101 |
| TIME ALLOWED: | THREE HOURS |
| INSTRUCTIONS: | 1. THIS PAPER IS DIVIDED INTO TWO SECTIONS.<br>2. ANSWER 2 QUESTIONS FROM EACH SECTION IN 2 SEPARATE BOOKLETS<br>3. ANSWER ANY TWO QUESTION FROM SECTION A<br>4. ANSWER ANY TWO QUESTIONS FROM SECTION B<br>5. EACH QUESTION CARRIES TWENTY FIVE (25) MARKS<br>6. USE CLEARLY LABELLED DIAGRAMS WHERE APPROPRIATE. |

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

[PLEASE TURN OVER]

## SECTION A: Answer Any Two Questions

### Question 1

With the aid of a well-labelled diagram, describe the structure of a plasma membrane, highlighting how this structure is related to the membrane's different named functions.

**[TOTAL MARKS= 25]**

### Question 2

(a) State the main differences between mitosis and meiosis. (10 marks)

(b) Differentiate between a nucleoside and a nucleotide (2 marks)

(c) Explain how in nature triacylglycerols are formed. Hence explain why oils are liquid and fats are solid at room temperature. (6 marks)

(d) Explain the process of photosynthesis, highlighting what happens during light-dependent and light-independent reactions. (7 marks)

**[TOTAL MARKS= 25]**

### Question 3

a) Fill in the gaps to complete the paragraph that follows;

Polysaccharides are polymers of monosaccharide units that are joined to each other via (i) .....Some monosaccharides such as (ii)..... or (iii)..... are found in repeating monomer units of RNA or DNA. RNA and DNA are also known as (iv)..... These repeating units are called (v).....and are formed when a (v)..... is phosphorylated. Monomer units in RNA and DNA are joined via (vii)..... (viii)..... are also polymeric biomacromolecules that are formed when (ix)..... are joined via peptide bonds. In such molecules two cysteine residues may be far away from each other in a chain but may be locally adjacent to each other and their (x)..... functional group can be covalently bonded via (xi)..... (11 marks)

b) Compare and contrast between a prokaryotic and an eukaryotic cell (10 marks)

c) Illustrate how a polypetide can be formed (4 marks)

**[TOTAL MARKS= 25]**

**SECTION B: Answer Any Two (2) Questions from This Section**

**QUESTION 4**

(a) Define the following terms as used in bacteriology:

i. An autotroph
ii. A heterotroph
iii. A mesophile
iv. A thermophile
v. A psychrophile
vi. A generation time

(6marks)

(b) Match the structures in column A to their function in column B (8 marks)

| COLUMN A | COLUMN B |
|---|---|
| a. Cell wall | 1. Attachement to surfaces |
| b. Endospore | 2. Motility |
| c. Fimbriae | 3. Protection from osmotialysis |
| d. Flagella | 4. Protection from phagocytes |
| e. Glycocalyx | 5. Resting |
| f. Pili | 6. Protein synthesis |
| g. Plasma membrane | 7. Selective permeability |
| h. Ribosomes | 8. Transfer of genetic material. |

(c) State the role of a bacterial spore in the survival of bacteria. (3 marks)

(d) Diagrammatically show how a gram-positive and a gram-negative cell wall of a bacterium differ. (3 marks)

(e) Draw and explain the phases of the growth or logistic curve of a bacterium such as *Escherichia coli.*

(5 marks)

**[TOTAL MARKS = 25]**

## Question 5

(a) Tabulate the different divisions of fungi with their asexual and sexual spores they produce. (4 marks)

(b) Draw the following:

i. A perithecium
ii. An apothecium
iii. A cleistothecium
iv. A pycinidium
v. An acervulus
vi. A basidiocarp (6 marks)

(c) Name and draw a representative of a:

i. A green algae
ii. A brown algae
iii. A liverwort
iv. A fern (5 marks)

(d) List the most notorious disease of humans caused by microorganisms and then explain the socio-economic importance of fungi to the welfare of humans. (10 marks)

**[TOTAL MARKS=25]**

## Question 6

a) What is a virus? (5 marks)

b) Illustrate the morphological classes of viruses. (8 marks)

c) Explain how viruses multiply within their host cells (6 marks)

d) Write an essay on the relevance of viruses to humans? (6 marks)

**[TOTAL MARKS = 25]**

**END OF QUESTION PAPER**