

UNIVERSITY OF ESWATINI

FINAL EXAMINATION PAPER: NOVEMBER 2019

PROGRAMMES: B.Sc. I

B. Ed Secondary I

B. Ed Primary I

TITLE OF PAPER: INTRODUCTORY BOTANY

COURSE CODE: BIO101

TIME ALLOWED: THREE HOURS

- INSTRUCTIONS:
1. THIS PAPER IS DIVIDED INTO TWO SECTIONS
  2. ANSWER TWO 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 CARRIES TWENTY FIVE (25) MARKS
  6. ILLUSTRATE YOUR ANSWERS WITH LARGE AND CLEARLY LABELLED DIAGRAMS WHERE APPROPRIATE.

SPECIAL REQUIREMENTS: NONE

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

**Section A: (Answer Question 1 and One (1) Other Question in this Section)**

**Question 1; (COMPULSORY)**

- a) State the cell theory and three characteristics of cells (3 marks)
- b) State two differences between prokaryotic and eukaryotic cells (4 marks)
- c) Explain the role of **any four** of the following during plant growth (4 marks)
  - (i) Abscisic acid
  - (ii) Auxins
  - (iii) Nitrogen
  - (iv) Phosphorus
  - (v) Cytokinins
  - (vi) Ethylene
- d) What is the function of rRNA in a cell? (2 marks)
- e) What are the biological functions of carbohydrates apart from being a major source of metabolic energy (4 marks)
- f) List and state roles of the three main groups of secondary metabolites (6 marks)

**[TOTAL MARKS= 25]**

**Question 2**

- a) State the two types of nucleic acids and its functions (5 marks)
- b) Describe the structure of the plasma membrane, using clearly labelled diagram and highlighting how this structure is related to the membranes different named functions. (20 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) Briefly describe the two types of passive transport across membranes. (10 marks)
- c) Illustrate how a polypeptide 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. autotroph
- ii. heterotroph
- iii. mesophile
- iv. thermophile
- v. psychrophile
- vi. Generation time

(6marks)

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

(8 marks)

COLUMN A

- a. Cell wall
- b. Endospore
- c. Fimbriae
- d. Flagella
- e. Glycocalyx
- f. Pili
- g. Plasma membrane
- h. Ribosomes

COLUMN B

1. Attachment to surfaces
2. Motility
3. Protection from osmotic lysis
4. Protection from phagocytes
5. Resting
6. Protein synthesis
7. Selective permeability
8. Transfer of genetic material.

c) State the role of an endospore in the survival of bacteria

(3 marks)

d) Diagrammatically or otherwise show how a gram-positive and a gram-negative cell wall of a bacterium differ.

(3 marks)

e) Draw and explain the typical 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. (3 marks)
- b) Draw the following:  
i. A perithecium  
ii. An apothecium  
iii. A cleistothecium  
iv. A pycnidium  
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 (4 marks)
- d) Explain the socio-economic importance of fungi to the welfare of humans. (6 marks)
- e) Write an essay on the importance of algae to the environment. (6 marks)
- [TOTAL MARKS=25]**

**Question 6**

- a) What is a virus? (5 marks)
- b) Draw the well labelled diagrams of 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**