

UNIVERSITY OF SWAZILAND

MAIN (FINAL) EXAMINATION PAPER : 2018/2019

- COURSE CODE : B402/BIO442
- TITLE OF PAPER : PLANT PHYSIOLOGY
- TIME ALLOWED : THREE (3) HOURS
- INSTRUCTIONS :
1. ANSWER ANY THREE (3) QUESTIONS
 2. EACH QUESTION COUNTS 25 MARKS.
 3. ILLUSTRATE YOUR ANSWERS WITH LARGE AND CLEARLY LABELLED DIAGRAMS WHERE APPROPRIATE

SPECIAL REQUIREMENTS:

CANDIDATES MAY BRING THEIR CALCULATORS. GRAPH PAPER WILL BE PROVIDED ON REQUEST.

THIS PAPER IS NOT TO BE OPENED UNTIL PERMISSION HAS BEEN GRANTED BY THE INVIGILATOR(S).

QUESTION 1.

[a]. Explain how stomatal activity responds to conditions of water stress in plants.

[5 Marks]

[b]. Describe the mechanism of stomatal activity.

[20 Marks]

[Total Marks 25]

QUESTION 2.

Explain the role played by auxins as phytohormones in plant growth and development.

[25 Marks]

QUESTION 3.

Discuss the significance of the free space in a root cross-section in terms of mineral nutrition in plants and other ecological links within the rhizosphere.

[25 Marks]

QUESTION 4.

Explain the physico-chemical parameters that regulate solute mobility across the plant cell membrane and calculate the Nernst Potential in the scenarios presented below:-

SOLUTE	C_o (mM)	C_i (mM)	E_M (mV)
1. Cl^-	2.0	100	140
2. K^+	0.11	150	140
3. Na^+	1.3	20	140

NB. $R = 1.58/\text{mol-deg}$; $T = 298\text{K}$; $F = 23060 \text{ cal/volt}$.

[Total 25 Marks]

QUESTION 5.

[a]. Explain the importance of essential elements in higher plants.

[10 Marks]

[b]. Discuss the functional role of Magnesium in higher plants.

[15 Marks]

[Total Marks 25]

[TOTAL MARKS: 75]