

UNIVERSITY OF SWAZILAND  
FINAL EXAMINATION PAPER 2005

**TITLE OF PAPER:** PLANT PHYSIOLOGY  
**COURSE CODE:** B 402  
**TIME ALLOWED:** THREE HOURS  
**INSTRUCTIONS:**

- 1 ANSWER ANY FOUR (4) QUESTIONS.
- 2 EACH QUESTION CARRIES TWENTY FIVE (25) MARKS.
- 3 ILLUSTRATE YOUR ANSWERS WITH LARGE AND CLEARLY LABELLED DIGRAMS WHERE APPROPRIATE.

**SPECIAL REQUIREMENTS:**

**CANDIDATES MAY BRING THEIR CALCULATORS  
GRAPH PAPER TO BE PROVIDED ON REQUEST**

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

**QUESTION ONE**

Give a detailed account of the importance of light in plant growth and development.

[25 Marks]

**QUESTION TWO**

Describe the process of biological nitrogen fixation in soils.

[25 Marks]

**QUESTION THREE**

Write an essay on 'The Role And Mechanism Of Phloem Transport In Vascular Plants'.

[25 Marks]

**QUESTION FOUR**

Describe water stress and its physiological effects in flowering plants.

[25 Marks]

**QUESTION FIVE**

Describe the deficiency symptoms and the patterns of their development for five selected mineral nutrients in crop plants.

[25 Marks]

**QUESTION SIX**

- a). Briefly describe symplastic movement of charged solutes in plant cells. [ 10 Marks ]
- b) Using the data in the table below, calculate the Nernst potentials and determine the direction of the passive driving force for the ions noted for mineral element uptake in typical plant cells.

ION	$C_o$ (mM)	$C_i$ (mM)	$E_m$ (mV)
K	0.1	131	-140
Na	1.0	15	-140
Cl	1.50	70	-140

- N.B:**  $C_o$  = Concentration outside the cells;  
 $C_i$  = Concentration inside the cells  
 $E_m$  = Membrane potential  
 $R$  = 1.98/mol-deg  
 $T$  = 298 K  
 $F$  = 23060 cal/volt

TOTAL MARKS: 100

[ 15 Marks ]

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