GWANDA STATE UNIVERSITY

FACULTY OF LIFE SCIENCES

DEPARTMENT OF CROP SCIENCE

BACHELOR OF SCIENCE (HONOURS) DEGREE IN CROP SCIENCE

CROP PHYSIOLOGY 1

LCS 2101

First Semester Examination Paper

January 2022

This examination paper consists of 3 pages

Time Allowed: **3 hours**

Total Marks: **100**

Special Requirements: **None**

Examiner's Name: **R. Mapuranga**

INSTRUCTIONS

1. This paper contains two (2) Sections (A and B) and seven (7) Questions

2. Answer **any two (2)** questions from **Section A** and **three (3)** questions from **Section B**.

3. Start each question on a new page

MARK ALLOCATION

QUESTION	**MARKS**
SECTION A	**40**
SECTION B	**60**
TOTAL ATTAINABLE MARKS	**100**

SECTION A: ANSWER ANY TWO (2) QUESTIONS [40 MARKS]

1. (a) Define the following terms
    i. Double fertilization [1]
    ii. Generative cell [1]
    iii. Endosperm [1]
    iv. Apomixis [1]
    (b) Differentiate between the following terms
    i. Complete flowers vs. incomplete flowers [2]
    ii. Microsporocyte vs. megasporocyte [2]
    (c) Discuss the different mechanisms which prevent self fertilization in plants. [12]
2. (a) Define the term desiccation tolerance [1]
    (b) List the importance of seed [4]
    (c) Giving examples, write short notes on endospermic, non-endospermic and perispermic seed structures [9]
    (d) Discuss the roles of different environmental factors during seed germination [6]
3. (a) Describe the dormancy Model for the regulation of dormancy and germination by ABA and GA in response to the environment. [8]
    (b) Write short notes on the following classes of seed dormancy
    i. Physical dormancy [4]
    ii. Morphological dormancy [4]
    iii. Physiological dormancy [4]

SECTION B: ANSWER ANY THREE (3) QUESTIONS [60 MARKS]

4. (a) List the four (4) biosynthetic pathways for plant hormones, using named examples of hormones [4]
    (b) Describe the structure, function and agricultural uses of each of the following hormones
    i. Ethylene [6]
    ii. Auxin [6]
    (c) Evaluate how the ratio of auxin to cytokinin influence growth and development

with reference to cell division and growth, and root and shoot growth. [6]

5. (a) A tropism is the directional growth of a plant, or part of a plant, in response to an external stimulus. A stimulus is an action or condition that causes a response while a response is an action or condition that is a reaction to a stimulus.
   Define the two types of responses exhibited by plants when exposed to stimuli [4]
   (b) List the environmental stimuli which elicit each of six (6) tropisms. [6]
   (c) Describe two types of nastic movements, and explain how they help in adapting plants to changes in their environment [10]

6. (a) Define the following terms
      i. Photoperiodism [1]
      ii. Photomorphogenesis [1]
      iii. Vernalization [1]
   (b) Describe the role of critical night length in flowering [6]
   (c) List the three (3) categories of plant responses to phytochrome [3]
   (d) Discuss the regulation of gene expression by phytochrome in flowering plants. [8]

7. (a) State and define the three pathways used by water molecules as they move from root hairs to the root xylem vessels [6]
   (b) Differentiate between vesicular arbuscular mycorrhizal fungal – plant associations from ectotrophic mycorrhizal fungal – plant associations. [4]
   (c) Outline how the structure of the xylem vessels is adapted for water transportation, minimizing resistance to water flow, and overcoming cavitation. [10]

End of the Examination Paper