UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER

PROGRAMMES:

B.SC. IN AGRICULTURAL AND BIOSYSTEMS ENGINEERING YEAR 1
B.SC. IN AGRICULTURAL ECONOMICS AND AGRIBUSINESS MANAGEMENT YEAR 1
B.SC. IN AGRICULTURAL EDUCATION YEAR 1
B.SC. IN AGRONOMY YEAR 1
B.SC. IN ANIMAL SCIENCE YEAR 1
B.SC. IN ANIMAL SCIENCE (DAIRY) YEAR 1
B.SC. IN CONSUMER SCIENCE YEAR 1
B.SC. IN CONSUMER SCIENCE EDUCATION YEAR 1
B.SC. IN FOOD SCIENCE, NUTRITION AND TECHNOLOGY YEAR 1
B.SC. IN HORTICULTURE YEAR 1
B.SC. IN TEXTILES, APPAREL DESIGN AND MANAGEMENT YEAR 1

COURSE CODE: **CPR 104**

TITLE OF PAPER: **BOTANY**

TIME ALLOWED: **TWO (2) HOURS**

INSTRUCTIONS: **ANSWER QUESTION ONE (1) AND ANY OTHER THREE (3) QUESTIONS OF YOUR CHOICE**

DO NOT OPEN THIS PAPER UNTIL PERMISSION HAS BEEN GRANTED BY THE CHIEF INVIGILATOR

QUESTION 1 (THIS IS A COMPULSORY QUESTION)

For each question, choose the correct option which best answers that question. Read all choices before you choose.

1. The function of the cell wall is to
   - **A.** Enclose different organelles of the cell and the fluid that harbours these organelles.
   - **B.** Allow for intercellular movement of water, various nutrients, and other molecules.
   - **C.** Support and strengthen non extending regions of a plant.
   - **D.** Limit protoplast size thus preventing cell rapture.

2. The characteristic of the primary cell wall is
   - **A.** It glues cells together.
   - **B.** Have altered polysaccharide composition and is lignified.
   - **C.** It stretches as the cell grows and is the only cell wall in growing and dividing cells.
   - **D.** Is abundant in walls of conducting and secretory cells.

3. The characteristic of the secondary cell wall is
   - **A.** It has altered polysaccharide and is lignified
   - **B.** It glues cells together
   - **C.** It matures after the primary cell wall and has pits
   - **D.** Is composed of pectic compounds and proteins

4. The characteristic of the middle lamella is
   - **A.** It provides medium for transport of water and nutrients
   - **B.** Is deposited by the protoplast after cell stops growing
   - **C.** Is a layer between two adjoining cell walls
   - **D.** Is a layer between the secondary cell wall and the cell membrane.

5. The cell membrane is also called the phospholipid bilayer because
   - **A.** It has hydrophilic and hydrophobic bilayers
   - **B.** It has hydrophilic tails and hydrophobic heads
   - **C.** It has hydrophilic head and hydrophobic tails
   - **D.** It has two cell wall layers made of phospholipids.

6. The main function of the plasmodesmata is
   - **A.** To enclose the different organelles of the cell and the fluid that harbours these organelles.
   - **B.** To facilitate communication and transport of materials between cells.
   - **C.** To digest lipids from other parts of the cell.
   - **D.** To play a role in defence against microbes invading the cell.

7. The carbohydrate produced during the Calvin cycle is
   A. Starch
   B. Glucose
   C. Phosphoglyceric acid (PGA)
   D. Adenoside TriPhosphate (ATP)

8. During photosynthesis, oxygen (O_2) is released from
   A. Carbon dioxide (CO_2) during the light reactions
   B. Carbon dioxide (CO_2) during the Calvin cycle
   C. Water (H_2O) during the light reactions
   D. Water (H_2O) during the Calvin cycle

9. Crassulacean acid metabolism (CAM) plants
   A. Open their stomata during the day
   B. Open stomata during the night
   C. The stomata are always open
   D. The stomata opens only when CO_2 is limited in the atmosphere

10. In C_4 plants, photosynthesis happens during
    A. The light reaction in the mesophyll cells and the Calvin cycle in the bundle sheath.
    B. The Calvin cycle in the mesophyll cells and the light reaction in the bundle sheath
    C. Both the Calvin cycle and the light reaction happens in the mesophyll cells
    D. Both the Calvin cycle and the light reaction happens in the bundle sheath

11. Photosynthetic plants that undergo C_3 photosynthesis begin the process of energy conversion by producing
    A. Glucose
    B. 3-Adenoside Triphosphate (3-ATP)
    C. ribulose-1,5-bisphosphate carboxylase/oxygenase (RuBisco)
    D. 3-Phosphoglyceric acid (3-PGA)

12. In flowers, the gynoecium consists of
    A. The stigma, style and anthers
    B. Ovary, ovules and petals
    C. Filament, anthers and pedicel
    D. Stigma, style and ovary.

13. In flowers, the androecium consists of
    A. Corolla, calxy and anthers
    B. Anther and filament
    C. Ovule, stigma and style
    D. Receptacle, pedicel and perianth.

14. Microgametophytes are produced from
- **A.** Microspores by meiosis
- **B.** microsporophytes by mitosis
- **C.** Microspores by mitosis
- **D.** Megaspores by mitosis

15. Megaspores are produced from
- **A.** Megasporocytes by meiosis
- **B.** Megasporophytes by mitosis
- **C.** Megasporocytes by mitosis
- **D.** Microporocytes by meiosis

16. How many cells are there in the microgametophyte?
- **A.** 6
- **B.** 4
- **C.** 2
- **D.** 3

17. How many cells are in the megagametophyte?
- **A.** 16
- **B.** 12
- **C.** 10
- **D.** 8.

18. Pollination is
- **A.** The transfer of pollen grains from the stigma to the anther
- **B.** The transfer of pollen grains from the anther to the stigma
- **C.** The movement of pollen in the style to facilitate fertilization in the ovary.
- **D.** The release of pollen grains from flowers by pollination vectors.

19. The phenomenon of double fertilization involves the fusion between;
- **A.** The egg cell and two sperm cells
- **B.** The egg cell and one sperm cell, and the two polar nuclei cells and the other sperm cell
- **C.** The egg cell and one sperm, and the synergids and the other sperm cell
- **D.** The egg cell and the pollen grains

20. The products of double fertilization are
- **A.** Diploid fruits
- **B.** Triploid seeds
- **C.** Triploid embryo and haploid seeds
- **D.** Diploid zygote and triploid endosperm

21. Botanically speaking, what is a fruit?

A. Matured ovary of a flower
B. Matured seeds and its embryo
C. Ripened embryo after fertilization
D. Matured gynoecium after fertilization

22. Aggregate fruits are

A. Fruits which split open along definite edges at maturity to shed their seeds
B. Composed of ovaries from separate pistils of one flower
C. Composed of ovaries from separate pistils of several flowers
D. Fruits which do no split open along definite edges at maturity to shed their seeds

23. Which of the following fruits are false berries?

A. Peach and plum
B. Tomato and banana
C. Raspberry and strawberry
D. Pumpkin and watermelon.

24. Which of the following fruits are hesperidiums?

A. Peach and plum
B. Orange and lemon
C. Raspberry and strawberry
D. Pumpkin and watermelon.

25. Which of the following fruits are caryopses?

A. Maize and rice
B. Beans and groundnuts
C. Sweet potato and cassava
D. Apple and pear

[25 MARKS, 1 MARK EACH]

QUESTION 2

Discuss the morphology of the root and shoot systems in angiosperms and explain why the two systems depend on each other for survival. **[25 MARKS]**

QUESTION 3

a) Draw a well labelled diagram showing the **cross section** of a dicot primary root. (11 marks)

b) Give functions of all the labelled anatomical features of your diagram. (14 marks)

[25 MARKS]

QUESTION 4

In detail, describe the following terms related to growth and development of angiosperms;

a) Shoot apical meristem (10 marks)
b) Lateral meristems (10 marks)
c) Intercalary meristems (5 marks)

[25 MARKS]

QUESTION 5

Give a complete scientific classification of any cultivated plant (one plant) belonging to the following Families;

a) Poaceae (5 Marks)
b) Rutaceae (5 Marks)
c) Fabaceae (5 Marks)
d) Convolvulaceae (5 Marks)
e) Solanaceae (5 Marks)

[25 MARKS]