



**FIJI NATIONAL UNIVERSITY**  
**College of Agriculture, Fisheries & Forestry**  
**School of Agricultural Sciences & Forestry**  
**Department of Crop Production &**  
**Department of Entomology and Plant Pathology**  
**Bachelor of Science in Agriculture– Year 1**

**Final Examination**

**Semester 1 - 2019**

**GPB 511- Agricultural Biology**

**Writing Time: 3:00 hours**

**Reading Time: extra 10 minutes allowed at the beginning of the exam**

**Total Marks: 100**

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**INSTRUCTIONS:**

1. This paper consists of **three** pages.
2. Please check to see that all your paper is complete.
3. Answer all questions in the Answer Booklet only.
4. No written or printed material and mobile phones are allowed in the examination hall.
5. Marks allocated for each section appears at the side of each question so allocate your time accordingly.
6. This paper is divided into **TWO PARTS**. First attempt, write and complete the Part I questions and then move to Part II or *vice versa*. **Don't MIX the questions of Part I and Part II**. Follow and write the exact question number while writing each answer.

**PART I**

<b>Section A: (A1 &amp; A2) Multiple choice and Fill up the blanks</b>	<b>(15 Marks)</b>
<b>Section B: Short answer</b>	<b>(15 Marks)</b>
<b>Section C: Essay</b>	<b>(20 Marks)</b>

**PART II**

<b>Section A: (A1 &amp; A2) Multiple choice and Match the following</b>	<b>(15 Marks)</b>
<b>Section B: Short answer</b>	<b>(15 Marks)</b>
<b>Section C: Essay</b>	<b>(20 Marks)</b>

**PART I:****SECTION A****Section A1: Multiple Choice****(8 Marks)**

1. \_\_\_\_\_ transport carbohydrate from the leaves to the storage organs.
  - a. Phloem
  - b. Parenchyma
  - c. Apical Meristem
  - d. Xylem
2. \_\_\_\_\_ is a fertilized mature ovule containing an embryo.
  - a. Fruit
  - b. Seed
  - c. Flower
  - d. Cotyledon
3. \_\_\_\_\_ is also called as suicidal bags.
  - a. Mitochondria
  - b. Vacuoles
  - c. Lysosomes
  - d. Ribosomes
4. \_\_\_\_\_ is a cellular reproduction and called as reduction division.
  - a. Mitosis
  - b. Meiosis
  - c. Mitosis & Meiosis
  - d. None of the above
5. The \_\_\_\_\_ contains light-trapping pigment chlorophyll.
  - a. Flowers
  - b. Thalamus
  - c. Ribosomes
  - d. Thylakoids
6. Glycolysis occur in the \_\_\_\_\_ and TCA cycle occur in \_\_\_\_\_.
  - a. Cytoplasm, Golgi body
  - b. Cytoplasm, Mitochondria
  - c. Mitochondria, Golgi body
  - d. Mitochondria, Cytoplasm
7. \_\_\_\_\_ plants open their stomata at night and close them during the day.
  - a. C3
  - b. C4
  - c. CAM
  - d. Perennial
8. \_\_\_\_\_ serves as food storage tissue.
  - a. Parenchyma
  - b. Sclerenchyma
  - c. Collenchyma
  - d. Cambium

**Section A2: Fill in the blanks****(7 Marks)**

9. A \_\_\_\_\_ is the smallest unit of life that can replicate independently.
10. \_\_\_\_\_ is the part of seed where the root develops.
11. \_\_\_\_\_ is made up of 80% water and 20% salts & protein.
12. Chromosomes line up along center of cell called the \_\_\_\_\_.
13. \_\_\_\_\_ is the processing, packaging and secreting organelle of the cell.
14. The addition of phosphate in presence of light is called \_\_\_\_\_.
15. \_\_\_\_\_ meristems are found beneath the bark.

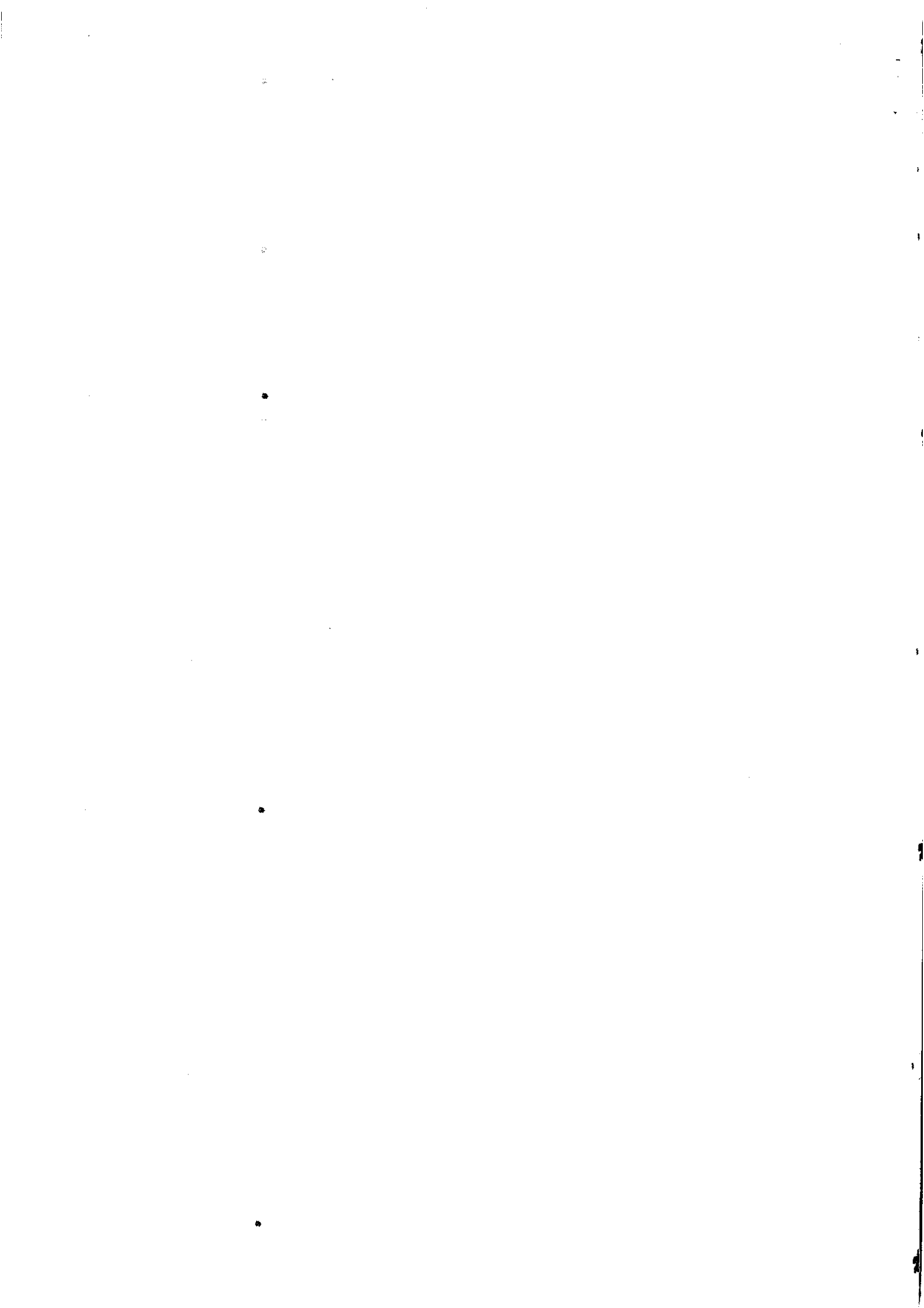
**Section B: Short answer****(15 Marks)****Attempt any THREE questions (3 x 5 = 15 Marks).****Apply the knowledge and provide suitable answers for the following with DIAGRAMS.**

16. Stages of Mitosis
17. Structure of seeds.
18. Power house of cell, suicidal bags and semi permeable membrane.
19. Ten differences in photosynthesis and respiration.
20. CAM Pathway with diagram.

**Section C: Essay****(20 Marks)****Attempt any TWO question (2 x 10 = 20 Marks).****Demonstrate with diagram and provide relevant explanations with DIAGRAMS.**

21. Prophase I of Meiosis
22. Light dependent reaction of photosynthesis
23. Mechanism of Respiration. TCA cycle and net gain of energy from it.
24. Classification of plant tissues and write in detail about each tissues

***END OF PART I*****Don't MIX the questions of Part I and Part II.**



**PART II:****SECTION A****Section A1: Multiple Choice****(8 Marks)**

1. Blue-green algae plays a major role in the ecosystem as it supplies \_\_\_\_\_.
  - a. Iron
  - b. Food
  - c. Oxygen
  - d. Calcium
2. Bacteria belongs to the Kingdom \_\_\_\_\_.
  - a. Animalia
  - b. Fungi
  - c. Protista
  - d. Monera
3. A common microbe found in the root nodules to assist in conversion of complex ammonia into simpler forms is known as \_\_\_\_\_.
  - a. Rhizobium
  - b. Nitrobacter
  - c. Acetobacter
  - d. Denitrifying bacteria
4. A microbe which can be classified as a prokaryote is \_\_\_\_\_.
  - a. Bacteria
  - b. Fungi
  - c. Nematode
  - d. Algae
5. Which of the following is an example of a macro element?
  - a. Calcium
  - b. Molybdenum
  - c. Zinc
  - d. Nickel
6. Which of the following bases of nucleic acids are classified as pyrimidines?
  - a. Cytosine and Guanine
  - b. Adenine and Guanine
  - c. Cytosine and Thymine
  - d. Thymine and guanine
7. The work of the restriction enzyme is \_\_\_\_\_.
  - a. Cut through the DNA
  - b. Restrict cutting of DNA
  - c. Prevent vector from attaching to DNA
  - d. Produce more enzymes
8. Gene cloning is responsible for \_\_\_\_\_.
  - a. Making copies of specific regions of DNA
  - b. Produce large numbers of identical recombinant DNA molecules
  - c. Separates DNA fragments by size
  - d. Cut DNA strands into fragments

**Section A2: Match the following (7 Marks)****Match the correct description from Column A to Column B.**

	Column A		Column B
9.	Vector	A	Fix Nitrogen
10.	Basidiomycota	B	Plasmid
11.	Bacteria	C	Trace element
12.	Rhizobium	D	Alexander Fleming
13.	Iron	E	<i>Agaricus bisporus</i>
14.	Discover Penicillin in 1928	F	Koch Postulate
15.	Aseptic technique	G	Binary Fission

**Section B Short Answer Questions. (15 Marks)**

16. Define the following terms: (4 marks)

- Fastidious
- Mesophile
- Genetic Engineering
- Ammonification

17. Differentiate between the following terms: (6 Marks)

- Acidophiles and Zerophiles
- Lithotrophs and Organotrophs
- Barophiles and Halophiles

18. Briefly explain the role of the following bacteria in nutrient cycling. (2 marks)

- Nitrifying
- De-nitrifying bacteria

19. State 3 importance of micro-organisms to the agriculture sector. (3 marks)

**Section C: Essay writing: Attempt any TWO question (2 x 10 = 20 Marks).**

Choose any **two** topics of your choice from the four essays given and write 750-850 words based on the topic you have chosen. Your essay should be formatted to an academic writing essay with supporting arguments and examples. The essay is worth 10 marks.

20. Explain the procedures of Koch postulates for the culturing of micro-organisms in the laboratory and how they were carried out to obtain a pure culture.

21. With your own knowledge on any particular microbe you have studied, explain the importance or harmful effects of the microbe to mankind, livestock and agriculture with much focus on the Taxonomy and morphology, Habitat, significance or harmful impacts and how to manage them if they are classified as pathogens.
22. Briefly explain genetic engineering and its application in biotechnology with reference to its contribution to the development of agriculture today.
23. Briefly explain how pathogenic organisms causes diseases and how they are transmitted or spread from host to other crops or animals.

**THE END**  
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