



**FIJI NATIONAL UNIVERSITY**

**COLLEGE OF AGRICULTURE, FISHERIES AND FORESTRY**

**SCHOOL OF AGRICULTURE SCIENCES & FORESTRY**

**DEPARTMENT OF SOIL SCIENCE & AGRICULTURAL ENGINEERING**

**Unclassified, TDA.**

**Final Examination**

**Semester 1 - 2019**

**SAC 311-Soils, Fertilizer and Organic Farming.**

**Writing Time allowed: 3:00 hours**

**Reading time: 10 minutes**

**Total marks: 100.**

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**This paper consists of eight (8) pages, please check to see that your paper is complete.**

**INSTRUCTIONS:**

**Answer all questions in the answer booklet**

- Number your answers correctly in the provided answer booklet.
- Write your student ID number on all pages including additional sheets.
- Write your student ID number on question paper.
- Don't write answers on question paper; write answers only in answer booklet.

**“MOBILE PHONES ARE STRICTLY PROHIBITED IN THE EXAMINATION HALL”**

Sections	Guidelines	Total Marks
A	Part I: Multiple Choice Questions (20marks) Part II: True or False Question (10marks) Part III: Fill in the blanks (10 marks)	40
B	Short Answer Questions	40
C	Long Answers	20
<b>Total marks</b>		<b>100</b>

**Section: A**

**Part I - Multiple Choices [20 marks]**

IN THE ANSWER SHEET PROVIDED, CIRCLE THE LETTER, WHICH REPRESENTS THE BEST ANSWER TO THE QUESTIONS BELOW.

1. One of the basic component of soil is:
  - a) pore space.
  - b) organic matter.
  - c) Soil structure.
  - d) aggregate
2. One function of soil in the ecosystem is:
  - a) habitat for soil organism.
  - b) mineral matter.
  - c) water.
  - d) air.
3. The properties of soil that affect plant growth is:
  - a) texture.
  - b) porosity.
  - c) aeration.
  - d) all of the above.
4. Soil is important to plants because:
  - a) it stores nutrients and serves as a medium for growth.
  - b) it is used for cultivating the soil.
  - c) it is used for building houses.
  - d) it is used for soil surveying.
5. One method of textural determination is:
  - a) test tube shaking method.
  - b) decantation method.
  - c) pipette method.
  - d) all of the above.
6. Soil that contains all three particle sizes in significant amounts is called:
  - a) loam soil.
  - b) sandy soil.
  - c) clay soil.
  - d) silt.
7. One factor influencing pore space is:
  - a) biological activity.
  - b) vegetation.
  - c) soil texture.

- d) all of the above.
8. One of the major horizon in the soil profile is:  
a) A horizon.  
b) D horizon.  
c) E horizon.  
d) F horizon.
9. A nutrient element that can be obtain from the atmosphere is called:  
a) carbon.  
b) nitrogen.  
c) phosphorus.  
d) sulfur.
10. One of the factor that affect soil water availability is;  
a) soil depth.  
b) organic matter.  
c) soil compaction.  
d) all of the above.
11. Formation of a soil can be influenced by:  
a) organisms.  
b) caterpillar.  
c) bad drainage.  
d) good drainage.
12. One of the soil forming factor is:  
a) time  
b) losses  
c) addition  
d) none of the above
13. One of the main type of weathering is:  
a) biological  
b) chemical  
c) physical  
d) all of the above
14. One type of chemical weathering is:  
a) hydrolysis  
b) oxidation  
c) carbonic acid  
d) all of the above
15. One of the basic type of soil is:  
a) loam  
b) silt  
c) clay  
d) all of the above
16. One of the factor that the plant growth depend on is:  
a) light  
b) heat  
c) oxygen supply  
d) all of the above

17. One function of soil in our ecosystem is:
- a) physical support
  - b) water retention
  - c) protect from toxin
  - d) all of the above
18. One of the nutrient element obtained from the soil is called:
- a) hydrogen
  - b) carbon
  - c) oxygen
  - d) sulfur
19. One source of organic matter is:
- a) crop residue
  - b) green manure
  - c) livestock manure
  - d) all of the above
20. How many percentages of nitrogen contain in the vermicompost?
- a) 1.6%
  - b) 1.7%
  - c) 1.8%
  - d) 0.80%

**Part II**

**True or False**

**[10Marks]**

**Instructions:**

**In the “ANSWER BOOKLET” provided, write “TRUE” if the statement is correct and “FALSE” if the statement is incorrect.**

1. Most plants will take up the majority of their nitrogen from soils in the form of nitrate.
2. A fertile soil is the basis for healthy plants.
3. The primary source of organic matter contained in soil is vegetal.
4. Adding less fresh organic matter, can overstimulated soil microorganisms.
5. N, P, and K are often referred to as primary nutrients and are the most common elements found in commercial fertilizers.
6. You can have better drainage by not loosening soil structure.
7. Understanding the importance of organic matter is crucial to success with organic farming.
8. There are 17 essential elements that plants must have in order to grow properly.
9. One of the nitrogen deficiency symptom is poor growth and yellow color.
10. Organic farming enhances the long term soil fertility.

**Instructions:**

**In the “ANSWER BOOKLET” provided, fill in the blanks.**

1. \_\_\_\_\_ refers to the breakdown and decomposition of rocks and minerals by factors including air, water, sun and frost.
2. \_\_\_\_\_ is the breakdown of plant remains- leading to the formation of different types of humus.
3. Wherever rainfall exceeds evaporation and there is free downward movement of water through the soil pore system is called \_\_\_\_\_
4. Generally, the soil \_\_\_\_\_ is determined by the amount of organic matter and the state of the iron.
5. \_\_\_\_\_ is the process of addition and combination of oxygen to minerals.
6. \_\_\_\_\_ is the process of removal of oxygen from the soil.
7. \_\_\_\_\_ influences water holding capacity.
8. There are \_\_\_\_\_ numbers of textural classes.
9. \_\_\_\_\_ is caused by inherent soil properties.
10. The components of organic matter in the soil is \_\_\_\_\_%

This section consists of FORTY MARKS short answer questions.

**Instructions:**

**Attempt ALL questions in this section.**

**Write your answers in the Answer Booklets provided**

1. Name the three (3) groups of mineral nutrients? (3marks)
2. How many essential nutrient elements a plant require for a healthy growth? (1mark)
3. Compare between the following: (3 marks)
  - a) Soil structure
  - b) Soil texture
4. Briefly differentiate between the following: (3 marks)
  - a) Microspores
  - b) Macrospores
5. Give your reason why does water move through sandy soil very rapidly and move slowly in clay soil? (4 marks)
6. Define the following? (5 marks)
  - a) Soil permeability
  - b) Soil consistence
  - c) Soil tilth
  - d) Soil compaction
  - e) Soil porosity
7. Explain what is CEC? (2marks)
8. Briefly explain what is soil organic matter? (2marks)
9. Give only four benefits of organic matter? (2marks)
10. Briefly explain what is vermicomposting? (1mark)
11. Give four benefits of vermicomposting? (2marks)
12. What are the two methods of vermicompost production? (1mark)
13. Briefly explain what is bio fertilizer? (2marks)
14. Give only four advantages of bio fertilizer? (4marks)
15. Briefly explain why soil is important to plant growth? (2marks)
16. Briefly explain why soil is important for plant? (1mark)
17. Lists three important factors a plant needed in order to grow? (2marks)

**Section C**

**Long Answers**

**(20 marks)**

**Long answers type of questions.**

**Instruction:**

- 1. ALL QUESTIONS ARE COMPULSORY**
- 2. Write your answers in the “Answer Booklet” provided**
- 3. Start each question on a NEW page of your Answer Booklet.**

**QUESTION 1 – (10 marks)**

- a) Briefly explain what is soil profile? (3 marks)
- b) Lists the five (5) soil forming factors. (2 marks)
- c) Give only three (3) importance of soil profile? (2 marks)
- d) Explain how do soils within the soil profile change over time? (3 marks)

**QUESTION 2 - (10 marks).**

- a) What is farming system? (2.5 marks)
- b) Explain the role of farming system? (2.5 marks)
- c) Briefly explain what is food security? (2.5 marks)
- d) Explain what is crop rotation? (2.5 marks)

**END OF EXAMINATION PAPER**