

**COLLEGE OF AGRICULTURE, FISHERIES AND FORESTRY****School of Agricultural Sciences and Forestry****Bachelors of Science in Agriculture Year 2****Semester 1, 2019 Final Examination****SAC 621 - INTRODUCTION TO SOIL SCIENCE****TOTAL MARKS: 100****TIME DURATION: 3:10 HOURS****INSTRUCTIONS TO STUDENTS**

1. This paper consists of six (6) pages. Please check to see that your paper is complete.
2. You are allowed 10 minutes extra reading time in which you are NOT permitted to write.
2. Attach all the sheets used as your answer paper in their correct sequence and secure with a string.
3. Use both sides of the answer sheet and write your candidate number on each sheet.
4. Write clearly the number(s) of the question(s) attempted on the top of each sheet.
5. Candidates are not allowed to carry any textual material, printed or written material, bits of papers, inside the Examination Room/Hall

**“MOBILE PHONES ARE STRICTLY NOT ALLOWED”**

SECTION	PARTICULARS	TOTAL MARKS
A	Multiple choice questions	20
B	Short answers questions	30
C	Long answers questions	50
	Total	100

## SECTION A

### MULTIPLE CHOICE QUESTIONS

(16X1.25=20 MARKS)

1. Organic matter breaks down in the soil to form \_\_\_\_\_.
  - a. Humus
  - b. Green manure
  - c. Microorganisms
  - d. None of the above
  
2. Mulching helps in \_\_\_\_\_.
  - a. soil fertility
  - b. moisture conservation
  - c. improvements soil structure
  - d. soil sterility
  
3. Cation exchange capacity is \_\_\_\_\_.
  - a. The capacity of the soil to hold its structure
  - b. The total amount of exchangeable ions held by the clay
  - c. The ability of the soil to move ions from one particle to another
  - d. The capacity to exchange between the organic fraction and inorganic fraction
  
4. A soil horizon is \_\_\_\_\_.
  - a. A factor influencing how soil is formed
  - b. A layer of soil
  - c. An organism found within the soil
  - d. A technique used to map soils
  
5. Organic matter (humus) an important part of soil as \_\_\_\_\_.
  - a. It helps to improve water infiltration
  - b. It can break down organic pollutants
  - c. It converts nitrogen in the air into nitrates used by plants
  - d. It is rich in nutrients, which is important for fertility

6. Hue is the term in soil colour, which is used for the determination of \_\_\_\_\_.
- Relative thickness or whiteness
  - Purity of the colour
  - Dominant spectral or rainbow
  - All of the above
7. Lacustrine deposit are formed by the transportation of materials through \_\_\_\_\_.
- Running water
  - Sea
  - Lakes
  - Ice
8. Diameter of clay particle is \_\_\_\_\_.
- Less than 0.002 mm
  - 0.05 - 0.5 mm
  - 0.5 - 1.0 mm
  - 0.7 - 0.9 mm
9. Eluviation refers to \_\_\_\_\_.
- Removal of clay from above horizons to lower horizons
  - Removal of clay and sesquioxide from above horizons to lower horizons
  - Removal of sesquioxide from above horizons to lower horizons
  - None of the above
10. There are total \_\_\_\_\_ orders included in the 7th Approximation system of soil classification.
- 8
  - 15
  - 10
  - 12

**11. Passive soil forming factors are \_\_\_\_\_.**

- a. Organisms
- b. Time
- c. Climate
- d. None

**12. Active soil forming factors are \_\_\_\_\_.**

- a. Relief
- b. Time
- c. Climate
- d. None of these

**13. Soil horizon which is above the bedrock in the soil profile is \_\_\_\_\_.**

- a. Horizon C
- b. Horizon A
- c. Horizon B
- d. Horizon D

**14. When rocks break down because of chemical reactions, it is called \_\_\_\_\_.**

- a. climate
- b. precipitation
- c. chemical weathering
- d. abrasion

**15. Best method to keep the soil fertile and to protect it from erosion is called \_\_\_\_\_.**

- a. soil fertility
- b. soil texture
- c. soil conservation
- d. soil structure

**16. The breakdown of rock into smaller pieces by physical means called \_\_\_\_\_.**

- a. chemical weathering
- b. acid precipitation
- c. oxidation
- d. mechanical weathering

**SECTION B**

**SHORT ANSWERS QUESTIONS (30 MARKS)**

**A) DEFINE THE FOLLOWING TERMS: (5x2=10 marks)**

1. Soil porosity
2. Soil classification
3. Soil structure
4. Pedology
5. Pedon

**B) DIFFERENTIATE THE FOLLOWING: (5X4=20 MARKS)**

1. Primary and secondary minerals
2. Soil profile and soil horizon
3. Bulk density and particle density
4. Cation exchange capacity and anion exchange capacity
5. Physical and chemical weathering

## SECTION C

### LONG ANSWERS QUESTIONS

**Answer any (5) five questions (5X10=50 MARKS)**

1. “Conserving soils, increasing soil organic matter, contributes to climate change mitigation” explaining this statement describe the need for soil conservation and soil resource management in Fiji.
2. Describe the principal roles and visual plant deficiency symptoms of the following plant nutrients: a. nitrogen b. potassium c. calcium d. iron e. sulfur
3. Discuss in details the effect of organic matter on different soil properties.
4. Explain the rock cycle with the help of a diagram and explain how different types of rocks are formed with examples.
5. Describe in what way water flow, infiltration and percolation are affected by: a. bulk density b. porosity c. structure d. texture.
6. The intensity of rainfall causes extensive soil erosion in Fiji” elaborating this discuss the different processes involved in soil erosion. Explain the effects of soil erosion on soil productivity.
7. Describe the formation soil, factors of soil forming and explain soil profile with the help of a diagram.

**END OF EXAMINATION PAPER**